TasNetworks
Delivering your power

Strategic Asset Management Plan

2017

Tasmanian Networks Pty Ltd
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Cover photo: Brent Mckillop took this photo of a Super-Moon (Perigee-syzygy) behind an 11 kV distribution line near Pawleena.

Message from the General Manager Strategic Asset Management

Tasmanian Networks Pty Ltd (TasNetworks) owns, operates and maintains the transmission and distribution electricity networks on mainland Tasmania and Bruny Island.

We supply the power from generation sources to over 280,000 customers in homes and businesses across Tasmania through a network of transmission towers, substations and power lines worth approximately $3 billion. TasNetworks also owns and operates a high-reliability telecommunications network that supports the operation of the electricity network, and we also provide communications services to other customers. TasNetworks is owned by the Tasmanian Government.

It is our vision that we will be: “Trusted by our customers to deliver today and create a better tomorrow”. Our purpose is: “We safely deliver electricity and telecommunications network services and complementary services, creating value for our customers, our owners and our community”.

I am pleased to present our 2017 Strategic Asset Management Plan, which outlines our systems and strategies targeted to effectively and efficiently manage the delivery of electricity and telecommunication network services to customers and to provide information to stakeholders regarding the environment in which we operate. Key themes supporting our asset management approach and associated levels of investment are:

- managing our assets to ensure safety and the environment is not compromised;
- maintaining reliability of the network;
- where we can safely do so, running our network harder rather than building more;
- responding to the changing nature of consumer behaviours and requirements through participating in an industry-leading residential battery trial on bruny island through a joint-funded partnership.
- undertaking financial analysis of a second interconnector with Victoria, and working with Hydro Tasmania in its battery of the nation project proposal;
- taking a whole of life (life-cycle) approach to optimise cost and service outcomes for our customers; and
- working hard to ensure we deliver the lowest sustainable prices.

Mr Wayne Tucker
General Manager Strategic Asset Management
TasNetworks Pty Ltd

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1. Introduction and Context

1.1 Purpose

The purpose of this document is to outline our systems and strategies targeted to effectively and efficiently manage the delivery of electricity and telecommunications network services to customers and to provide information to stakeholders regarding the environment in which Tasmanian Networks Pty Ltd (TasNetworks) operates. TasNetworks stakeholders include: shareholders, customers, regulators, policy makers, industry groups, land owners, employees and the general public.

This document aims to provide alignment between our stakeholder's requirements, the organisational objectives and the resulting asset management objectives, to ensure that the assets are being managed to provide the value required of them by the organisation and the stakeholders. This document also is structured to meet the requirements of the ISO 55000 series of asset management standards (see section 2.2).

This Strategic Asset Management Plan is part of a suite of documents that are required to satisfy TasNetworks' electricity transmission and distribution licence obligations and support the safe and efficient delivery of electricity and telecommunications network services.

1.2 Scope

This document includes the physical assets, systems and processes that are required for the provision of electricity and telecommunications network services.

1.3 Planning Period and Review

This document covers a nominal planning period of thirty years and is typically reviewed every two and a half years.

1.4 Who is TasNetworks

TasNetworks delivers electricity and telecommunication network services, creating value for our customers, our owners and the community. We commenced operations on 1 July 2014, and are owned by the Tasmanian Government.

TasNetworks is the sole licensee for regulated transmission and distribution network services on mainland Tasmania and Bruny Island. We are registered with the Australian Energy Market Operator (AEMO) as both a Transmission and Distribution Network Service Provider (NSP) and operate in the National Electricity Market (NEM). TasNetworks is unique in the NEM in that it is the only combined Transmission and Distribution NSP providing services to all customers in its jurisdiction.

As a monopoly provider of transmission and distribution network services, our revenue for these services is regulated. We prepare submissions to the Australian Energy Regulator (AER) who determines our revenue and the maximum amount we can recover from customers, generally for periods of five years. We are presently transitioning the timing of the Distribution revenue period to align with the Transmission revenue period. This results in the present Distribution revenue period being for a period of 2 years.

1.5 What We Do

TasNetworks owns, operates and maintains the transmission and distribution electricity networks on mainland Tasmania and Bruny Island. We deliver electricity generated from our generation customers at hydro-electric, wind and gas-fired power stations to our more than 280,000 demand customers throughout the state. Our demand customers range from domestic and commercial customers to major energy users connected directly to the transmission network. Our network also allows electricity generated from private embedded generating units to be transported to other customers.

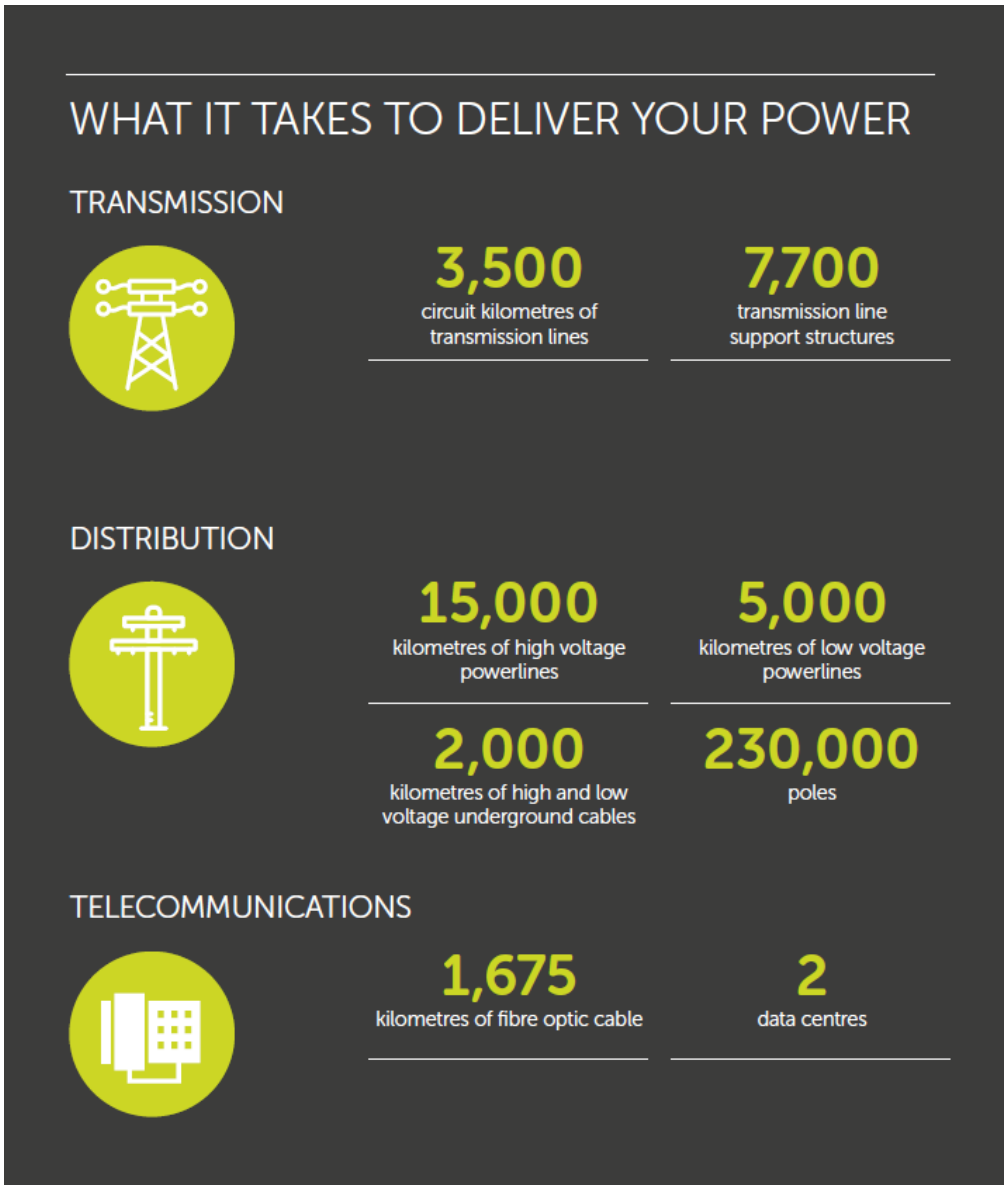
The widespread adoption of rooftop photo-voltaic (PV) systems by private customers has dramatically increased the use of the network for this purpose in recent years.

We also facilitate the transfer of electricity to and from mainland Australia within the NEM. The NEM operates on an interconnected power system that extends from Queensland to South Australia, including a connection to Tasmania via the Basslink interconnector. Basslink is a privately-owned under-sea cable between George Town in Tasmania and Loy Yang in Victoria and can transfer electricity in either direction.

TasNetworks also owns and operates a high-reliability telecommunications network. This network supports the operation of the electricity network, and we also provide communications services to other customers. We also own and operate non-network assets to support and facilitate the operation of the business. These assets include buildings, vehicular fleet and information systems.

Our shareholders have directed us to perform some non-commercial activities, primarily funding the 'grandfathered' solar feed-in-tariff payment to eligible customers, inspecting private poles on behalf of the State until a longer-term solution is implemented, and supporting the rollout of the National Broadband Network on the West Coast of Tasmania.

Any profits we make from delivering our services to our customers are returned back to Tasmanians in the form of returns and dividends paid directly to the State.



1.6 Subsidiary Companies

TasNetworks has two wholly-owned subsidiary companies:

- Auroracom Pty Ltd, which is a non-trading subsidiary that holds a telecommunications carrier licence and has in place a Nominated Carrier Declaration with TasNetworks; and
- Ezikey Group Pty Ltd, which is a non-trading subsidiary originally established for the commercialisation of the "Cable PI" device.

1.7 Document Structure

The remainder of this document is structured as follows:

Chapter 2: Shows how TasNetworks has developed an integrated asset management system framework, together with supporting processes and systems, to ensure that our performance objectives are consistently achieved.

Chapter 3: Discusses relevant aspects of TasNetworks' strategic asset management including stakeholder engagement, corporate objectives, asset management policy, asset management objectives, the regulatory framework, revenue determinations and investment planning.

Chapter 4: Provides an overview of the Tasmanian electricity supply system. It discusses the entities in the supply chain and their responsibilities. It points out those aspects of the Tasmanian electricity system that are distinctly different from mainland Australia power systems.

Chapter 5: Shows the roles and responsibilities within TasNetworks' organisation structure, and the organisational roles reporting within it.

Chapter 6: Shows how TasNetworks is building a high performance culture and high levels of employee engagement to support achievement of our business objectives and to enable us to be sustainable.

Chapter 7: Presents the risk management framework, the operational risk management process and how asset condition and risk is managed.

Chapter 8: Presents the electricity demand forecasts for the Tasmanian power system.

Chapter 9: Discusses TasNetworks' life-cycle approach to asset management and the resulting key asset strategies aimed at achieving our asset management objectives and corresponding corporate objectives.

Chapter 10: Describes the development of our Asset Management Plans, Area Development Plans and the Annual Planning Report.

Chapter 11: Focuses on the performance of the network in recent years. Also discusses an independent asset management (AM) maturity assessment and the resulting asset management improvement program.

Appendix A: Asset Management Policy

Appendix B: Zero Harm Policy

Appendix C: Glossary and Abbreviations – common electricity industry definitions and abbreviations provided to assist readers who may be unfamiliar with particular industry terminology.

2. Asset Management System Framework

2.1 Overview

Chapter 2 shows how we have developed an integrated asset management system framework, together with supporting processes and systems, to ensure that performance objectives are consistently achieved.

2.2 Asset Management System Framework

TasNetworks asset management system continues to be further developed in alignment with the ISO 55000 series of asset management standards with the aim of achieving the following benefits:

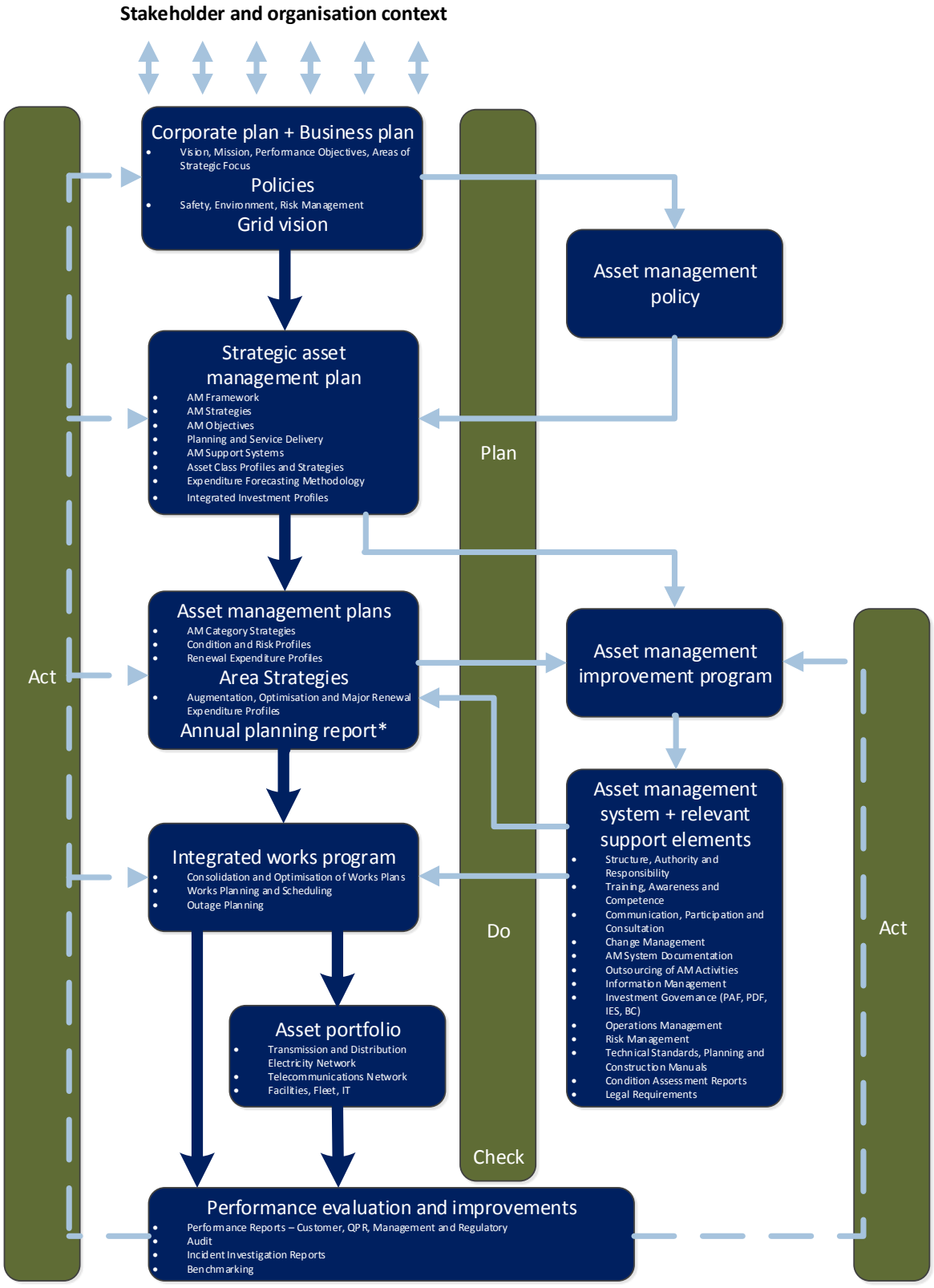
- Improved safety and environmental performance in line with our Zero Harm objectives;
- Lower asset management costs over the long term;
- Alignment of strategic initiatives across the asset management system;
- Increased engagement of employees, including leadership, communications and cross-disciplinary teamwork;
- Alignment of processes, resources and functional contributions;
- Better understanding and usage of data and information to provide consistent and informed decisions;
- Consistent, prioritised and auditable risk management;
- Improved asset management planning;
- Improved customer service, and maintain overall network performance;
- Increased auditability across the asset management life-cycle; and
- Reduced regulatory risk through implementing robust and demonstrable asset management governance processes.

The ISO 55000 series of standards are the internationally accepted standard for asset management. The ISO 55000 series comprises three separate standards:

1. ISO 55000:2014 provides an overview of asset management;
2. ISO 55001:2014 specifies the requirements for the establishment, implementation, monitoring and improvement of an asset management system; and
3. IS0 55002:2014 provides guidance for the application of the asset management system.

The asset management system framework is presented in Figure 1. This framework has been developed with strong alignment to ISO 55001, and in particular the relationship between the key elements of an ISO 55000 AM system. The ISO compliant framework aims to ensure that the systematic approach to asset management delivers prudent and efficient outcomes that meet both the Corporate Objectives and the Asset Management Objectives.

Figure 1 Asset management system framework



* The Annual Planning Report (APR) is a requirement of sections 5.12.2 and 5.13.2 of the National Electricity Rules (NER) and also satisfies a licence obligation to publish a Tasmanian Annual Planning Statement (TAPS). The APR is a compilation of information from the Area Strategies and the Asset Management Plans.

3. Strategic Asset Management Considerations

3.1 Overview

This chapter discusses relevant aspects of TasNetworks' strategic asset management including stakeholder engagement, corporate objectives, asset management policy, asset management objectives, the regulatory framework, revenue determination and investment planning.

3.2 Stakeholder Requirements

Our shareholders expect us to deliver an appropriate return on their investment. Our plans strike the right balance between lowest sustainable prices to customers and an appropriate return on investment in line with the regulatory allowances. To deliver on both these goals we have to continue to implement and achieve efficiencies.

To achieve the stakeholder requirements we have developed the following strategic goals:

- We care for our customers and make their experience easier;
- We keep safe, build trusting relationships, and enable our people to deliver value;
- We manage our assets to deliver safe and reliable services, while transforming our business; and
- We operate our business to deliver sustainable shareholder outcomes.

3.3 Stakeholder Engagement

TasNetworks works with our stakeholders to:

- Understand the issues we face;
- Help to identify options to address the identified issues;
- Influence what changes we make to the network;
- Help to clarify the decisions we must make; and
- Gain support for the decisions that we make.

We have a broad group of stakeholders who have many different contact points across the business. As a business, we have a consistent approach to engaging with our stakeholders, as well as driving our commitment and approach to building strong relationships.

We are continually looking to improve our engagement with our stakeholders and are supporting this with a formal, business-wide stakeholder engagement strategy, with the key objectives being to:

- Build a consistent approach to stakeholder engagement across the business;
- Ensure stakeholders have two-way communication mechanisms so their issues and feedback can be heard and considered;
- Proactively engage with all stakeholders to build two-way understanding in developing TasNetworks' strategic direction;
- Support our people with their stakeholder interactions; and
- Ensure we meet our regulatory requirements to consult and engage with our customers.

Our customers can be segmented into six distinct categories as shown in Figure 2.

Figure 2 TasNetworks' Customer Segmentation Model

TasNetworks has been undertaking extensive customer engagement sessions, and the AER has recently commended us for our efforts on customer engagement. In its decision on our latest revenue proposal, the Regulator noted:

> '…TasNetworks has taken important steps to engage with its customers in a very positive manner.'
>
> (AER, April 2017, *TasNetworks distribution final determination 2017–19*, p55).

3.4 Relationship with Organisational Strategic Objectives

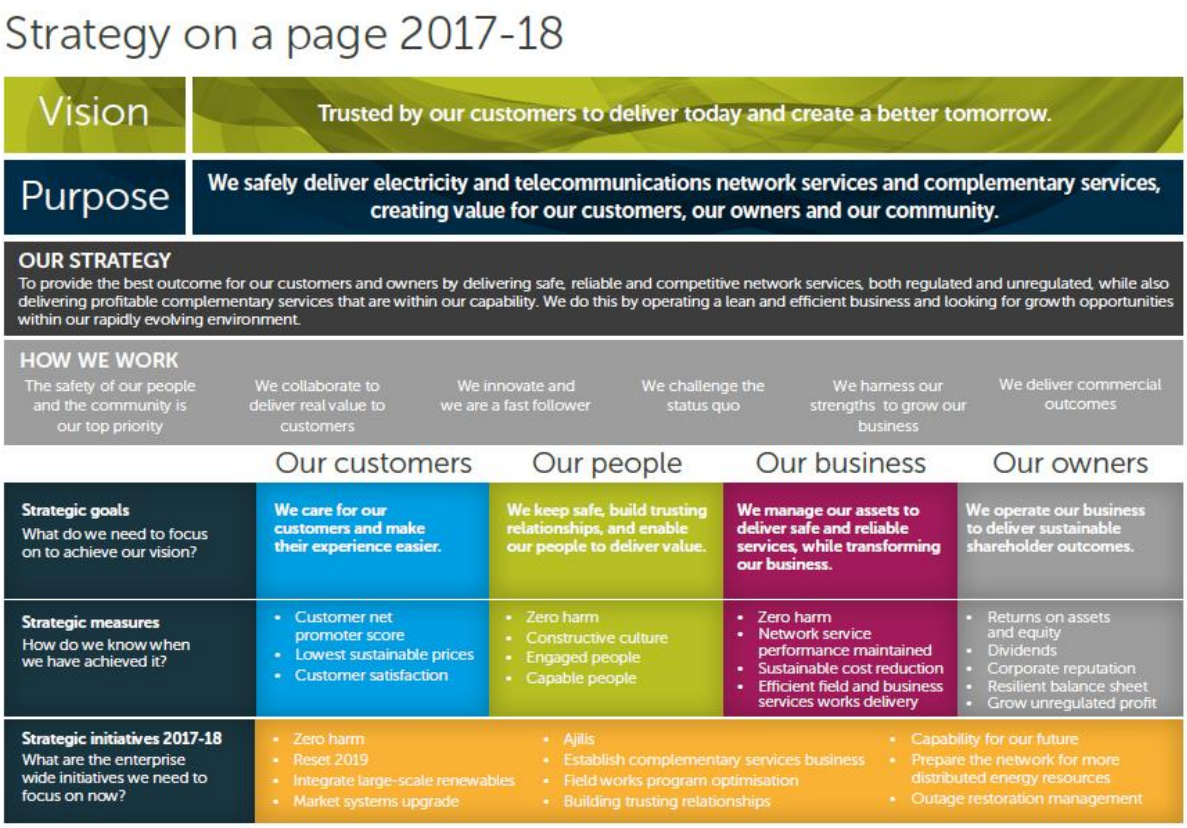
To deliver the customer requirements and strategic objectives TasNetworks will:

- Implement our 'Voice of the Customer' program and initiatives to deliver improved customer service, tailored to our customer segments;
- Provide predictable and sustainable pricing to our customers;

- Deliver a high-performance culture to enable change and deliver improved outcomes for our customers and our shareholders;
- Deliver a TasNetworks enterprise agreement that supports our strategic goals;
- Develop efficient, integrated business systems which enable our people to deliver value; and
- Develop our business excellence framework incorporating continuous improvement of our asset management systems, business processes and governance frameworks.

In Figure 3 below the organisations goals are summarised in the TasNetworks Corporate Plan 2017-18 to 2021-22 'Strategy on a page'. It also visually outlines how we will deliver on our strategic goals.

Figure 3 TasNetworks 2017-18 Business Strategy



3.5 Relationship to Other Functional Objectives

We also have a number of related, important issues that we are working through with our customers. These include:

- Our future distribution tariff strategy including our advanced meter *'emPowering You'* trial in the Brighton and Southern Midlands region;
- Improving our customer connection processes;
- The five-year distribution and transmission determinations for 2019-24, due to be submitted in January 2018; and
- Proactively leading and implementing actions identified in the Tasmanian Energy Strategy[1].

[1] Tasmanian Energy Strategy 'Restoring Tasmania's energy advantage', Tasmanian Government Dept. of State Growth, May 2015.

3.6 Asset Management Policy

To aid 'line of sight' and alignment of our asset management activities to our strategic goals, TasNetworks has approved the asset management policy, which is shown in Appendix A.

The AM policy applies to all TasNetworks assets and associated activities and is the overarching document that supports the AM system. The AM policy provides a critical platform for TasNetworks to deliver our vision to be trusted by our customers to deliver today and create a better tomorrow. Key factors that have been considered during the development of the AM policy include:

- Understanding the organisation and its context;
- Understanding the needs and expectations of stakeholders;
- Defining leadership involvement; and
- Organisational roles, responsibilities and authority.

Critical aspects of the AM policy are that it:

- Applies to all assets managed by TasNetworks;
- Applies to all stages of the asset life-cycle (stakeholder needs, demand analysis, strategic planning, technical requirements, works management, decommissioning and disposal, performance analysis);
- Is aspirational in some areas; and
- Is dependent on commitment from leadership.

3.7 Asset Management Objectives

The asset management objectives have been designed to align with the asset management policy and the organisational objectives, and thereby ensure clear 'line of sight'. The AM objectives state the outcomes required from the asset management system and the works program to ensure TasNetworks' strategic goals are met.

The asset management objectives focus on six key areas:

- Zero Harm will continue to be our top priority and we will ensure that our safety and environmental performance continues to improve, and our asset risks are managed in compliance with our Risk Management Framework. TasNetworks Zero Harm Policy is shown in Appendix B.
- Cost Performance will be improved through prioritisation and efficiency improvements that enable us to provide predictable and lowest sustainable pricing to our customers.
- Service Performance will be maintained at current overall network service levels, whilst service to poorly performing reliability communities will be improved to meet regulatory requirements.
- Customer Engagement will be improved to ensure that we understand customer needs, and incorporate their needs into our decision making to maximise value to them.
- Our Program of Work will be developed and delivered on time and within budget.
- Our asset management Capability will be continually improved to support our cost and service performance, and efficiency improvements.

3.8 The Regulatory Framework

TasNetworks operates under both jurisdictional and national regulatory regimes. As a participant in the NEM, we are required to develop, operate and maintain the electricity supply system in accordance with the National Electricity Rules (the Rules). In addition, there are local requirements that we need to comply with under the terms of our licences issued by the Tasmanian Economic

Regulator under the Tasmanian Electricity Supply Industry Act 1995. We are also subject to a number of industry-specific Tasmanian Acts and Regulations including (without limitation):

- The Tasmanian Electricity Code (the Code);
- Electricity Industry Safety and Administration Act 1997;
- Electricity Companies Act 1997;
- Electricity Wayleaves and Easements Act 2000;
- Electricity Ombudsman Act 1998; and
- Electricity Supply Industry (Network Planning Requirements) Regulations 2007.

The AER is responsible for the regulation of electricity transmission and distribution services in the NEM. This includes responsibility for determining the maximum allowable revenue for regulated electricity network service providers.

3.9 Revenue Determinations

The revenue we earn from providing monopoly transmission and distribution services is set by the AER. This is currently done separately for transmission and distribution services. We effectively prepare two proposals for the AER which outline our expenditure plans to efficiently provide network services for nominally five-year periods.

The Revenue Proposal for the Tasmanian electricity transmission network was submitted in May 2014 for our 2014-19 regulatory control period. The current Distribution Determination cycle commenced on 1 July 2017 for the 2017-19 regulatory control period. TasNetworks is continually seeking ways to provide services to its customers as efficiently as possible.

The merger of the distribution and transmission networks businesses to create TasNetworks has provided us an opportunity of also 'merging' the respective regulatory determination processes for both networks. We have worked to align the transmission and distribution determination processes for the 2019-24 regulatory control period via a two year distribution reset in 2017. The intended outcomes of merging the determination processes is to reduce costs through combined planning, contribute to our strategic objective of 'our business' and allow us to engage meaningfully with our customers on all network services offered by TasNetworks.

3.10 Integrated Investment Planning

Asset strategy management and asset planning considers all customer and other stakeholder requirements and determines appropriate solutions to ensure that the performance of the transmission and distribution system is maintained. The outcome of this activity is operational and capital works plans. To allow effective integration and conduct of its works plans, TasNetworks must develop an overall works plan, encompassing all projects and their impacts on the network and non-network assets.

The capital plan is a combination of area strategies and asset management plans for the various asset classes. These plans are conflated to develop an integrated investment plan. This ensures that opportunities are identified to minimise expenditure, for example:

- Asset renewals and maintenance at sites affected by augmentations are coordinated to minimise outages and rework;
- Maintenance is deferred or minimised for assets that are to be replaced by augmented assets; and
- Renewal and development expenditure project contracts are bundled to achieve economies of scale.

3.10.1 Investment Evaluation

TasNetworks has developed end-to-end process guidelines that specify the steps that need to be undertaken and key considerations during the investment evaluation of projects involving network assets. These guidelines provide assistance to personnel involved in the justification of investment projects by:

- Identifying the various types of projects;
- Specifying the need for each of these steps;
- Providing guidelines as to how these steps are to be implemented;
- Identifying the inputs and outputs to various steps of project justification; and
- Linking various systems, processes and tools, to provide a consistent basis for project justifications.

3.10.2 Gated Investment Framework

TasNetworks maintains a gated investment framework that outlines the governance structures guiding the evaluation and determination of capital investment decisions.

The framework demonstrates that TasNetworks has in place and applies the required technical, managerial and financial governance processes to ensure:

- Investments meet mandated legal and regulatory obligations in a cost-effective manner and comply with the specific capital expenditure objectives and criteria stipulated in the NER;
- Investments are aligned with justified development plans and strategies, provide a reliable electricity network service, add capacity efficiently to meet forecast load growth and cater for new connections to the transmission and distribution networks;
- Investments are aligned to asset management plans; and
- Capital expenditure is prudent and results from a demonstrably prudent and efficient asset investment and management governance framework.

3.10.3 Timing and Deliverability of Works Program

TasNetworks optimises its proposed works program in terms of capital and operating tasks. In particular, the optimisation of the timing and sequencing of asset renewal projects takes into account a number of factors, including the costs and benefits of aligning asset renewal with augmentation or connection projects or with maintenance activities. In particular, optimisation is undertaken to:

- achieve sustainable shareholder returns and customer prices;
- ensure the achievement of corporate objectives;
- maintain performance;
- provide acceptable risk profile across all assets; and
- ensure efficient delivery of the works program.

Optimisation is also undertaken across the entire asset base, both network and non-network. Timely delivery of the capital works program is essential to minimise the likelihood of additional operating expenditure to sustain assets beyond their expected service lives where run-to-failure is not employed.

3.10.4 Investment Funding Requirements

The actual and forecast integrated investment funding requirements by investment type, for managing the transmission system are as shown in Figure 4.

Figure 4 Transmission funding requirements

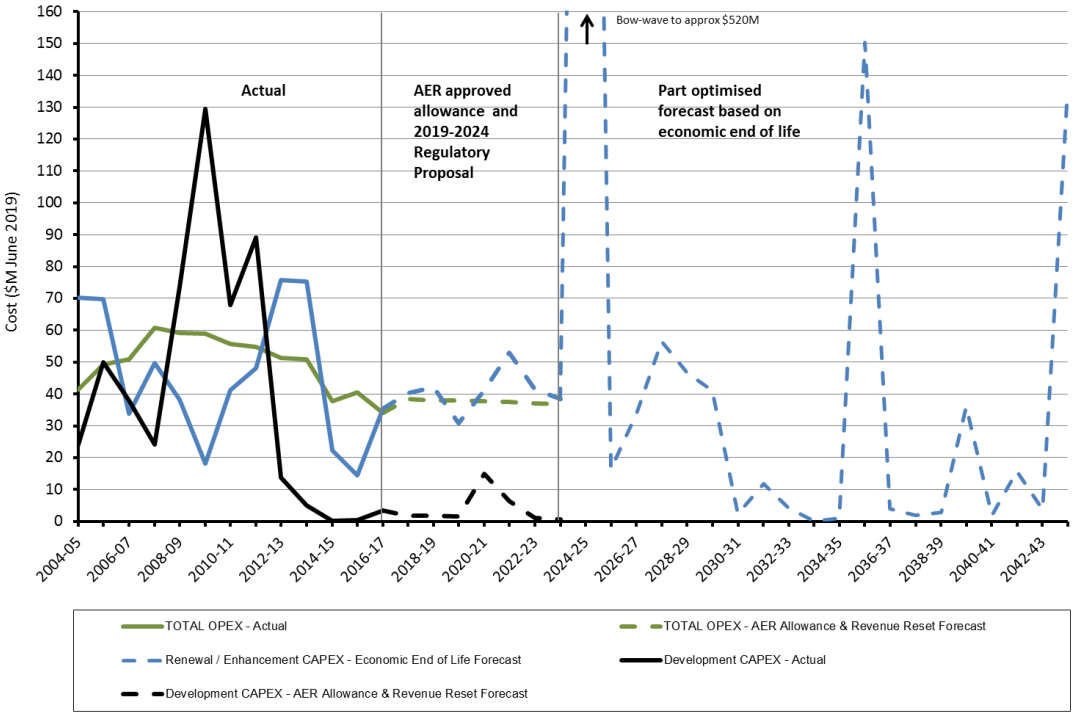


Figure 4 shows that over the past three years TasNetworks has been reducing its total actual transmission spend. This reduction in total spend is largely attributable to a significantly reducing development spend in recent years due to a decline in transmission customer connections, more efficient asset utilisation and reducing Tasmanian load.

Figure 4 also shows that the previous expanded renewal program to the transmission network peaked in 2012/13 and has subsequently declined to a reduced level of approx. $40M p.a over the next seven years. We have also been rigorously pursuing reductions to operating costs, limiting increases to less than CPI, and forecast to reduce operating costs in real terms to provide lower costs to customers, and ongoing returns to shareholders.

The actual and forecast integrated investment funding requirements, for managing the distribution system are as shown in Figure 5 by investment type.

Figure 5 Distribution funding requirements

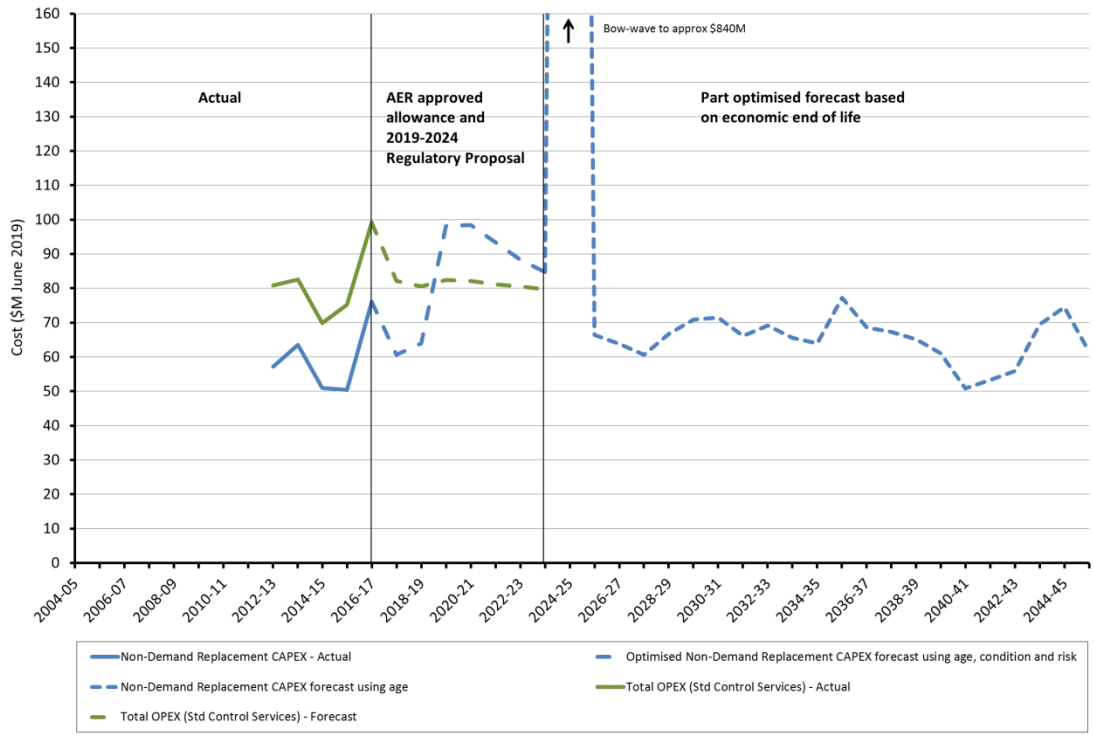


Figure 5 shows that over the previous two to three years TasNetworks has been reducing its total actual distribution spend whilst in 2016-17 we were required to temporarily increase spending to manage unacceptable safety risks (eg. bushfire mitigation) that we became aware of. Like transmission, we have also been limiting increases to our operating costs, to provide stability in pricing to customers and ongoing returns to shareholders.

Figure 5 also shows that the replacement program to the distribution network is proposed to increase over the 2019-24 regulatory control period to manage safety related risks driven by:

- pole renewal requirements;
- bushfire mitigation standards;
- enhanced vegetation management to combat increased bushfire and outage risks;
- enhanced service connection inspection and renewal; and
- improvements to our storm response.

3.10.5 Key Forecasts

Table 1 below illustrates our key forecasts from 2017-18 through to 2021-22[2], including the end of year result for 2016-17[3]:

- Profit after tax – $39.7 million in 2017-18;
- Returns to Government – $130.4 million in 2017-18 (includes $50 million equity transfers);
- Total assets – $3.3 billion;
- Operating expenditure – $152.6 million in 2017-18;
- Capital expenditure program – $206.3 million in 2017-18; and
- Borrowings: $191 million increase over forecast period to 2021-22.

[2] From TasNetworks Corporate Plan July 2017
[3] From TasNetworks Annual Report 2016-17

Table 1 TasNetworks Forecasts 2017-18 through to 2021-22

Performance Measure	End of year 2016-17	Forecast 2017-18	Forecast 2018-19	Forecast 2019-20	Forecast 2020-21	Forecast 2021-22
Total revenue ($m)	552.2	471.1	479.2	491.9	509.5	526.8
EBITDA ($m)	375.3	305.3	323.0	337.6	352.3	364.7
Profit After Tax ($m)	93.9	39.7	43.9	48.7	51.4	54.1
Dividends ($m)	72.6	74.9	27.9	32.2	36.4	38.4
Total Returns to Government ($m)	176.2	130.4	59.1	67.7	81.2	85.0
Operating Expenditure ($m)	154.7	152.6	150.5	154.3	158.2	162.1
Capital Expenditure ($m)	208.8	206.3	199.3	198.7	215.5	238.6
Total equity ($m)	944.1	925.8	992.4	1061.1	1129.7	1200.6
Total Assets ($m)	3265.0	3386.5	3480.1	3576.8	3685.1	3812.2
Total Debt ($m)		1872.5	1895.9	1907.6	1934.9	1977.2
Key Financial Ratios						
Return on Assets %	6.7%	4.3%	4.4%	4.5%	4.5%	4.6%
Return on Equity %	10.1%	4.3%	4.6%	4.7%	4.7%	4.6%
Gearing ratio %	65.4%	66.9%	65.6%	64.3%	63.1%	62.2%
Pre-tax interest cover		1.7	1.8	1.8	1.9	1.9
Borrowings ($m)						
Increase (decrease) in Borrowings	36.5	86.3	23.4	11.6	27.4	42.3

3.10.6 Financial Forecast Summary

The financial forecasts, and associated key issues, show that:

- Our profit after tax will be lower but increasing over the forecast period. Our profitability outlook also reflects an underlying plateauing in demand for traditional network services in Tasmania;
- Our total returns to government are declining over the forecast period due to lower forecast returns from our regulated services reflecting the low interest rate environment, increased interest costs to service higher debt levels, and rising depreciation resulting from our investment in short life assets. Returns to Government are based on the increased dividend payout ratio over the planning period in line with Treasury's dividend policy – ie. 80 per cent in 2016-17 and 90 per cent in 2017-18 onwards;
- Our recent distribution revenue decision, together with our current transmission revenue allowance, results in lower network charges for almost all small business and residential customers. This continues TasNetworks' contribution to downward pressure on electricity prices;
- Underlying operating cash flows (EBITDA) are holding over the longer term, reflecting our continued focus on achieving sustainable cost reductions;
- Debt levels are forecast to peak at nearly $2.0 billion during the forecast period. In the short term we are forecasting to borrow to fund the business' capital structure and meet our capital investment requirements; and
- A total of $395 million in debt transfers has been assumed by TasNetworks between inception on 1 July 2014 and 2016-17. Borrowings increase by $191 million over the forecast period to

2021-22. Despite the additional debt, and associated borrowing costs, TasNetworks' key financial indicators remain robust.

3.11 Asset Management Information System

3.11.1 Introduction

The TasNetworks Asset Management Information System (**AMIS**) is a combination of people, processes, information and technology applied to provide the essential outputs for effective asset management. These outputs include: managed risk, enhanced network performance, enhanced compliance, effective knowledge management, effective resource utilisation and optimum infrastructure investment.

AMIS is a tool that interlinks asset management processes through the entire network asset life-cycle (see Figure 15).

3.11.2 AMIS Objectives

The key objectives of the AMIS are to assist the business in sustaining and improving overall performance of the transmission and distribution networks, so that the organisational and AM objectives are achieved, by undertaking the following activities:

- Ensuring holistic asset information is collected, maintained and readily accessible to support evidence-based asset management decision making;
- Enhancing the visibility of, accessibility to and trust in asset information across the business; and
- Developing effective AMIS improvement practices that support the life cycle asset management business functions in accordance with ISO55000:2014 and the IIM manual[4] 2015.

Successfully achieving these objectives will enable compliance with the requirements of the Corporate Plan and Asset Management Policy by significantly improving the quality, completeness, integrity and consistency of asset information, systems and processes at all levels.

[4] International Infrastructure Management Manual, Version 4.0, 2015

3.11.3 AMIS Portfolio and Capabilities

Previous AMIS plans have resulted in significant increases in network asset information holdings across the business, which has highlighted the importance of a centralised and robust TasNetworks AMIS.

On the back of these plans, the following outcomes are targetted for delivery:

- Development of a single, life-cycle based, total Asset Management System to manage the long-term capital and maintenance work programs for network assets including the ability to review and compare baseline plans;
- Further development of a number of asset information and related standards and systems, refer to the AMIS Improvement Program of work;
- Further development of an integrated asset performance reporting system using an integrated Business Intelligence reporting framework;
- Further development of an integrated Condition Based Risk Management System to provide TasNetworks with an industry leading approach to asset renewal decisions; and
- Further improvements to the asset commissioning and decommissioning process; specifically updating and maintaining the Asset Register.

The AMIS business process portfolio is being progressively expanded and it is intended that these be reviewed and incorporated in the AMIS Improvement Program where appropriate. For details of the AMIS Improvement Program see section 11.8.1.

3.11.4 Future Strategies for AMIS

Future strategies to manage the AMIS include, but are not limited to:

- Continue to embed the current systems, tools, applications and processes across the business to enable their full utilisation;
- Develop and extend asset information management and analysis capabilities across the business to enable effective evidence-based decision making;
- Ongoing management of the Ajilis release 2 project for SAP implementation to ensure core network asset and works management functions continue to support business asset management operations;
- Continue to work closely with the business to understand emerging and future asset management requirements and ensuring sound governance over AMIS development and utilisation; and
- Data management strategy to address remaining asset information holdings and to allow expansion of the CBRM system.

Specific targetted strategies include:

- Vegetation management system (VMS) replacement;
- Geographic information system (GIS) replacement;
- A combined asset breakdown structure for both transmission and distribution networks; and
- Data integrity standards for all asset categories.

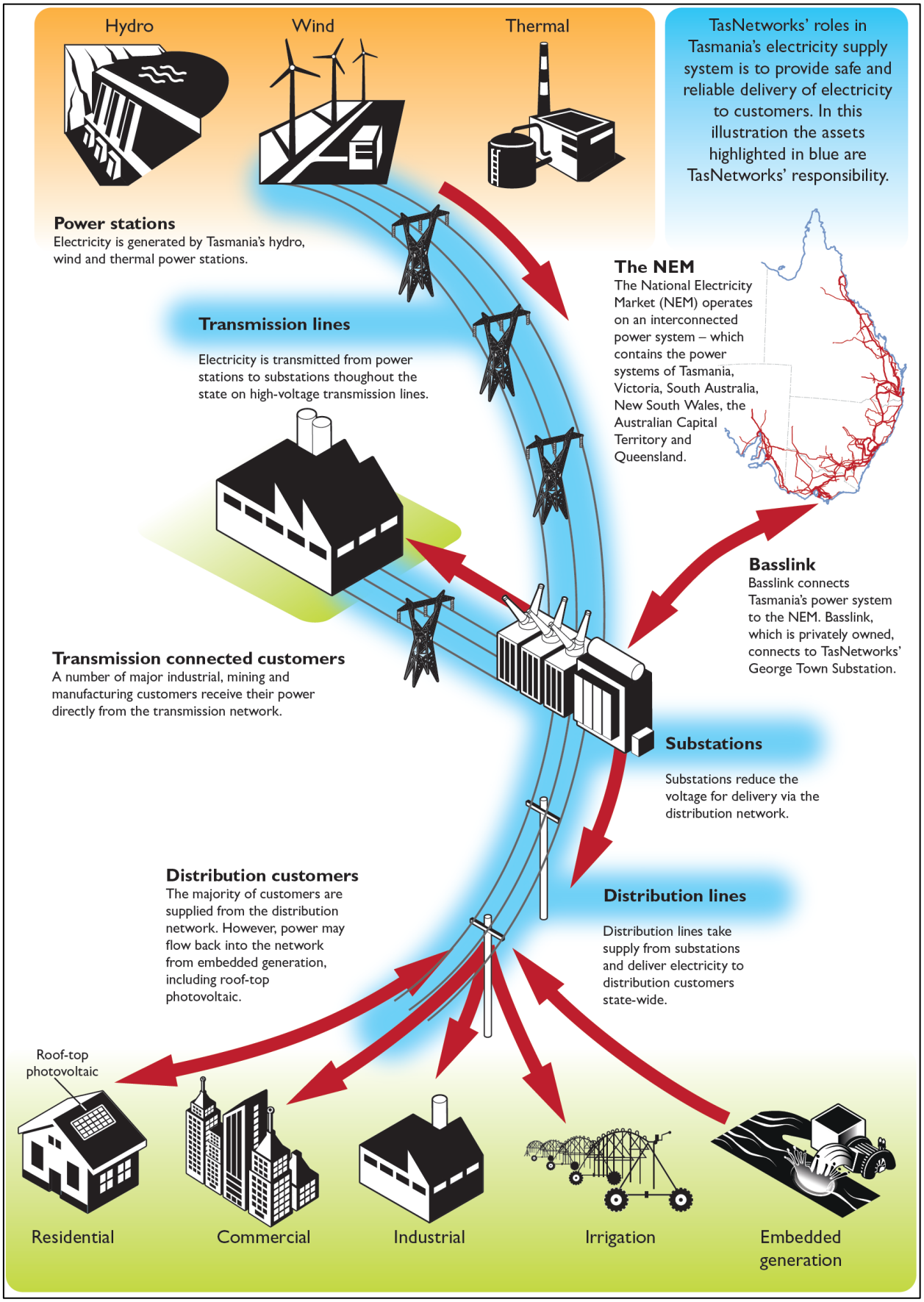
4. The Tasmanian Power System

The Tasmanian power system comprises:

- Power stations and wind farms that generate large-scale electricity;
- An extra-high-voltage transmission network that transmits electricity from generators to the distribution network and large industrial and mining customers, and permits electricity exchange with mainland Australia through Basslink;
- A distribution network that supplies industrial, commercial, irrigation and residential electricity customers;
- Embedded generation, which is small-scale generation connected typically by customers, within the distribution network;
- Retailers that provide energy services to customers; and
- End use consumers of electricity.

The Tasmanian power system is shown pictorially in Figure 6, and our area of responsibility within the power system is as highlighted in blue.

Figure 6 Tasmania's power system



4.1 Transmission Network

4.1.1 Transmission Network Overview

We are responsible for transmission network services on mainland Tasmania, and this is provided through the Tasmanian transmission network.

The Tasmanian transmission network comprises:

- A 220 kV bulk transmission network that provides corridors for transferring power from several major generation centres to major load centres and Basslink;
- A peripheral 110 kV transmission network that connects smaller load centres and generators to the bulk transmission network; and
- Substations at which the lower voltage distribution network, and large industrial loads, are connected to the 110 kV or 220 kV transmission network.

Most loads are concentrated in the north and south-east of the state. Bulk 220 kV supply points are located at Burnie and Sheffield (supplying the north-west coast), George Town, Hadspen (supplying Launceston and the north-east), and Chapel Street and Lindisfarne (supplying Hobart and the south-east) substations. Smaller load centres are supplied via the 110 kV peripheral transmission network.

Substations in the Tasmanian transmission network transform voltages between transmission voltages, between transmission and distribution voltages, or both. Our substations also connect generators to the transmission network, provide network switching, and provide supply to those customers connected directly to the transmission network. Connection points between our transmission and distribution networks are provided at 43 substations. These are known as terminal substations and supply the distribution network at 44, 33, 22, 11 and 6.6 kV. Switching stations provide network switching capabilities, allowing the transfer of power throughout the transmission network. Some switching stations also connect generation to the network.

Table 2 provides a summary of key parameters of our transmission network infrastructure.

Table 2 Transmission network infrastructure

Asset	Quantity
Substations	49
Switching stations	6
Circuit kilometres of transmission lines	3,554
Route kilometres of transmission lines	2,342
Circuit kilometres of transmission cable	24
Transmission line support structures (towers and poles)	7,742
Easement area (Ha)	11,176

Figure 7 shows the geographical layout of the Tasmanian transmission network along with our planning areas.

Figure 7 Tasmania's electricity transmission network

4.1.2 Generation Customers

There are currently five generating companies which have power stations connected to the Tasmanian transmission network:

- AETV Pty Ltd[5];
- Hydro Electric Corporation (Hydro Tasmania);
- Musselroe Wind Farm Pty Ltd;
- Woolnorth Bluff Point Wind Farm Pty Ltd; and
- Woolnorth Studland Bay Wind Farm Pty Ltd.

Mainland generators also supply energy to the Tasmanian transmission network via Basslink. A number of other small generators that are connected within the distribution network, termed embedded generation, are also licensed to operate in Tasmania. Very small embedded generation, such as roof-top photovoltaic systems, do not require a generating licence but must still have a connection agreement with TasNetworks.

All large generators sell electricity to a central market: the NEM. AEMO is responsible for electricity consumption and flow in the NEM and coordinates the dispatch of generators so that the power supplied into the network, at any instant, matches the total being consumed. The interconnected nature of the NEM allows electricity to flow across state borders, which means electricity can be sourced from whichever generators can supply it at the lowest cost. AEMO is also responsible for power system security in the NEM.

Battery of the Nation

On 15 March 2017, the Federal Government announced a $2 billion expansion of the Snowy Hydro scheme which would add 2 000 MW of energy capacity to the NEM through increasing the scheme's pumped hydro capability.[6] Subsequent to this announcement, the Australian and Tasmanian Governments announced on 20 April 2017 that ARENA was assessing applications from Hydro Tasmania to support feasibility work into several new projects to enhance opportunities from Hydro Tasmania's generation assets in the context of supporting capacity constraints in the NEM.[7] Potential projects include redeveloping the Tarraleah scheme to increase production by up to 210 GWh per year, enhancing production from Gordon Power Station and exploring the potential of several new pumped hydro energy storage schemes that could deliver up to 2 500 MW of pumped hydro capacity. We are working with Hydro Tasmania in its ARENA application.

While these feasibility studies are largely focused on increasing the capacity of the Tasmanian system to support the NEM, some of these potential enhancements to the Tasmanian system (if found to be feasible) have the potential to reduce the State's annual on-island energy deficit.

[5] AETV Pty Ltd owns Tamar Valley Power Station and is a wholly-owned subsidiary of Hydro Tasmania.
[6] https://www.pm.gov.au/media/2017-03-16/securing-australias-energy-future-snowy-mountains-20
[7] https://www.hydro.com.au/about-us/news/2017-04/supporting-australia%E2%80%99s-energy-transition

Energy security

The Tasmanian Government established the Tasmanian Energy Security Taskforce to identify ways to help future proof Tasmania's energy security. The taskforce was established following the energy security situation in Tasmania in 2016 resulting from historically low inflows to hydro water storages and the outage of the Basslink interconnector. We supported the taskforce in its assessment process, and in June 2017 the taskforce released its final report.

Diesel generators at Port Latta substation

The key findings, with regard to electricity network planning and operation, include:

- *"Tasmania's electricity energy security in the short term is assessed as being* ***Managed****.*[8] *Tasmania's electricity reliability is* ***Resilient*** *due to the number and diversity of generators, and a network that generally performs well against independent assessments."*
- *"Tasmania's electricity energy security in the medium and long term is assessed as* ***Managed****."*
- *" The Taskforce estimates that Tasmania currently has an annual energy deficit between on-island generation and Tasmanian consumption of between 700 GWh and 1 000 GWh, based on long-term averages.This means Tasmania relies on interconnection with the mainland, though variability in inflows provides opportunities to export energy."*
- *"While the risk of low inflows into Hydro Tasmania's dams can be managed in most instances (through drawing down the 'stock' of water held in storage, Basslink imports, gas generation and wind generation) the 2015-16 energy security event demonstrates that Tasmania's energy security is severely tested by concurrent adverse events."*
- *"Tasmania has experienced four energy security events this century that have been classed as low probability.This recent history indicates that two or more separate low probability events can occur within a short period."*
- *"Hydro Tasmania's interim storage targets of between 30 and 40 per cent, together with the return of Basslink and higher inflows, have improved Tasmania's energy security at least over the next year."*
- *"Until additional generation to address Tasmania's annual on-island energy deficit is proven reliable and adequate, gas generation* [ie.Tamar Valley Power Station] *will continue to serve as the primary backup energy generation source for the Tasmanian energy sector."*
- *"Based on how interconnectors (particularly subsea interconnectors) have performed historically in other jurisdictions, and having now experienced a six month outage, there is sufficient evidence to consider a six month outage of Basslink to be a scenario that should be planned for."* And *"There is insufficient evidence to suggest that a longer outage of 12 months or more is a plausible scenario that should be specifically planned for at this time. However, the risk of a subsea Basslink outage extending beyond six months appears to be greater until all ordered spares are delivered in early 2019."*
- *"Climate change projections relevant to energy security include … an increase in extreme events that may affect electricity infrastructure (e.g.bushfires, intense rainfall events and flooding)."*

More information is available from the Department of State Growth.[9]

[8] The Taskforce's energy security assessment ratings are defined in Chapter 15 of its final report available at https://www.stategrowth.tas.gov.au/energy_and_resources/tasmanian_energy_security_taskforce

[9] https://www.stategrowth.tas.gov.au/energy_and_resources/tasmanian_energy_security_taskforce

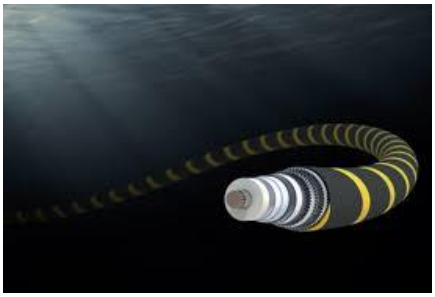
4.2 Basslink

Basslink Pty Ltd is a Market Network Service Provider in the NEM. Basslink Pty Ltd owns, operates and maintains the Basslink interconnector, a High Voltage Direct Current (HVDC) electrical interconnector between Victoria and Tasmania.

Basslink has a continuous sending end capacity of 500 MW and a short term sending end capacity of 630 MW when exporting electricity from Tasmania to Victoria. Power flow into Tasmania is limited to 478 MW. These figures are maximum limits. Basslink has a non-operational zone between 50 MW export and 50 MW import at all times.

Basslink is also able to transfer frequency control ancillary services (FCAS) between the mainland and Tasmania. Currently, FCAS must be sourced within Tasmania due to constraints on Basslink[10].

Second Bass Strait interconnector



The Australian and Tasmanian Governments' Joint Feasibility Study of whether a second electricity interconnector between Tasmania and Victoria would help to address long-term energy security issues and facilitate investment in renewable energy was released on 13 April 2017.[11] It provides an assessment of whether a second electricity interconnector is likely to be an economically efficient investment which could support energy security and reliability in the NEM and the efficient transition of the NEM to a lower emissions generation mix.[12]

The study recommended that the Tasmanian Government should develop a detailed business case when one or more of the following preconditions are realised:

- AEMO concludes in a future National Transmission Network Development Plan (NTNDP) that a second electricity interconnector would provide significant positive net market benefits under most plausible scenarios;
- additional interconnection is approved for construction between South Australia and the eastern states; and/or
- there is a material reduction in Tasmanian electricity demand

As well as the opportunities a second interconnector would bring, a key focus for us is understanding the impact it would have on the electricity network and existing customers in Tasmania. Network augmentations and protection schemes would be required to facilitate a second interconnector.

[10] For further detail see TasNetworks Annual Planning Report.
[11] Tamblyn J, 2017, *Feasibility of a Second Tasmanian Interconnector.*
[12] In the study, the term 'economically efficient' refers to an investment which, if made, would be efficient in the long-term interests of electricity consumers in the NEM, meaning that its expected benefits to consumers would outweigh its expected costs

4.3 Distribution Network

4.3.1 Distribution Network Overview

We are responsible for the distribution of electricity to homes and businesses on mainland Tasmania and Bruny Island.[13]

The Tasmanian distribution network provides supply to over 280,000 customers and comprises:

- A sub-transmission network in greater Hobart, including Kingston, and one sub-transmission feeder on the west coast of Tasmania that provide connection points for the high voltage network in addition to terminal substations;
- A high voltage network of feeders[14] that distributes electricity from terminal and zone substations to the low voltage network and a small number of customers connected directly to the high voltage network; and
- Distribution substations and low voltage feeders providing supply to the majority of customers in Tasmania.

Feeders are classified as supplying rural and urban areas, and tend to have the following differing characteristics.

1. Rural areas generally have low load, low customer connection density, and smaller rural population centres that are remote from supply points. Feeders supplying rural areas tend to cover wide geographic areas and can have a total route length between 50 km and 500 km. The significant route length creates a high exposure to external influences such as storm damage and lightning strikes. Additionally, rural feeders are generally radial in nature, with limited ability to interconnect with adjacent feeders. These two characteristics tend to result in more frequent and longer duration interruptions to supply. The majority of feeders supplying rural areas are operated at 22 kV. Rural areas supplied at 11 kV are generally those on the outer areas surrounding greater Hobart, Kingston and the Huon. Planning issues on feeders supplying rural areas are characterised by voltage and power quality issues which is due to the feeder length and disturbing loads e.g. pumping load.
2. Urban areas have high load and customer connection density. Feeders supplying urban areas are generally much shorter than rural feeders. They tend to have more underground distribution, and more interconnections with other urban feeders. Consequently, restoration following interruptions to supply is usually quicker than in rural areas. Feeders supplying urban areas of greater Hobart, Kingston and a pocket of the Burnie commercial area, are operated at 11 kV. Those in Launceston, Devonport and Burnie are operated at 22 kV. Feeders supplying urban areas are generally capacity constrained and have issues with high fault level.

Table 3 provides a summary of key parameters of our distribution network infrastructure.

[13] The provision of electricity supplies on the Bass Strait Islands is managed by Hydro Tasmania.
[14] The term 'feeder' is the common name used to describe distribution lines.

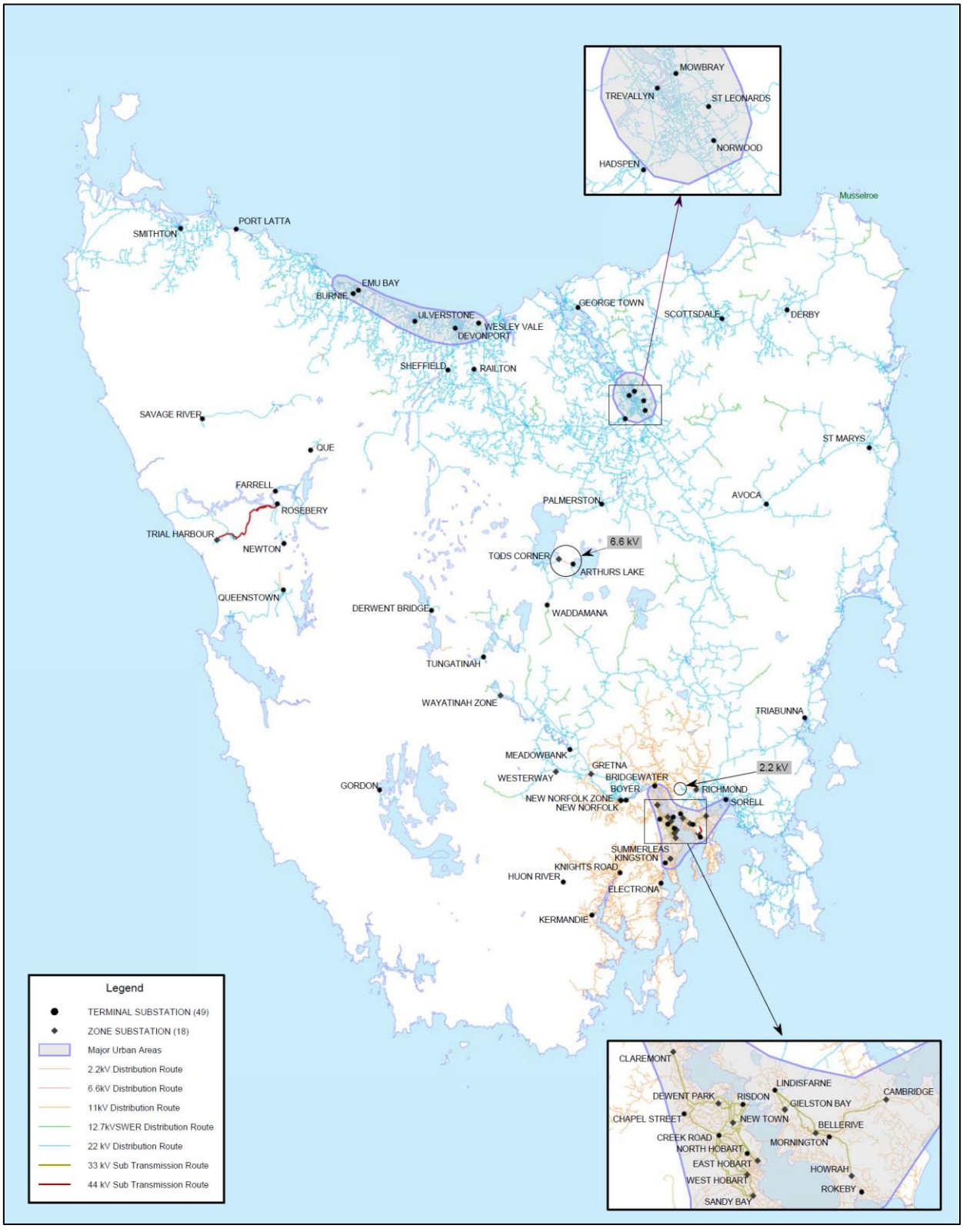
Table 3 Distribution network infrastructure

Infrastructure	Nominal Voltage (kV)	Quantity
Connection Points		
Sites	44, 33, 22, 11 and 6.6	46
Sub-transmission feeders	44, 33 and 22	27
Minor zone source feeders[15]	22 and 11	6
Distribution feeders	22, 11 and 6.6	273
Zone Substations		
Major	44, 33 and 22	14
Zone distribution feeders	22 and 11	135
Minor	22 and 11	3
Zone distribution feeders	22 and 11	8
Distribution Substations		
Overhead		30,214
Ground-mounted		2,300
Route Data[16]		
High voltage overhead	6.6 to 44	15,234 km
High voltage underground	6.6 to 44	1,237 km
Low voltage overhead[17]	0.4	4,945 km
Low voltage underground	0.4	1,265 km
Poles	All voltages	229,996

Figure 8 presents a geographical overview of the high-voltage distribution network by voltage, supplying rural and urban areas.

[15] Includes minor zone alternate-supply feeders
[16] Includes TasNetworks owned assets only
[17] Excludes customer service lines

Figure 8 Tasmania's electricity distribution network



4.4 Telecommunications Network

We also provide a telecommunications network service within Tasmania. The telecommunications network supports operation of the electricity network interfacing protection, control and data, telephone handsets and mobile radio transceivers. It also serves customers in the electricity supply industry and is utilised by other parties under commercial agreements. The telecommunications assets comprise: communications rooms and associated ancillary equipment within substations and

administrative buildings, optical fibre on transmission and distribution lines, digital microwave radios and associated repeater stations, and some power line carrier equipment.

In support of our telecommunications network, a number of telecommunications circuits are provided via a third party network. This is generally outside our network's coverage area and includes all interstate services.

The AERs draft ring-fencing guideline has the potential to impact on the telecommunications network business. This is presently being worked through in conjunction with the State Government and the AER with the aim of seeking less onerous requirements to more efficiently meet the needs of Tasmanian customers.

4.5 How are we different

The Tasmanian electricity system has the following features which make it unique in the NEM.

4.5.1 Small load

The transmission network median demand during 2015-16 was approximately 1,150 MW, and spends approximately 50 per cent of the time between 1,100 and 1,300 MW. The practical minimum demand is approximately 850 MW, and forecast to reduce over coming years as increasing PV generation reduces summer day demand.

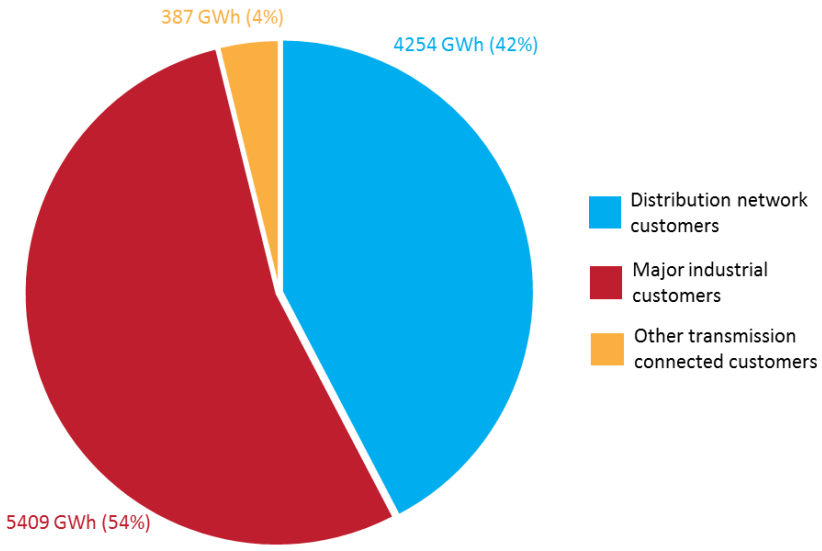
The largest generating system in Tasmania which connects via a single transmission line is rated at 168 MW, and there are five more generating units which are effectively rated at 144 MW each. These generators each have the capacity to supply a much larger portion of the state's load compared with the largest generating units in other NEM states. This gives rise to larger frequency deviations in Tasmania than occur in mainland NEM regions. Consequently, Tasmania's Frequency Operating Standards differ from those of the mainland. The technical implications of this are discussed in the Annual Planning Report.

4.5.2 Customer load base

The majority of the electrical energy consumed in Tasmania is by the large customers directly connected to the transmission network. We have ten load customers who are directly connected to the transmission network. Collectively they consumed approximately 58 per cent of the electrical energy in Tasmania and contributed to approximately 43 per cent of the state-wide peak demand in 2015-16. Energy consumption from transmission-connected customers is dominated by four major industrial customers consuming over 50 per cent of the total energy consumed. Figure 9 presents the relative energy consumption in 2015-16 supplied from the transmission network.

As major industrial and other transmission connected customers consume a significant portion of energy transferred through the transmission network, their operation can have a significant impact on the power system. Changes to the transmission-connected customer base, such as a permanent reduction in load, would alter the normal operation of the power system and impact on such things as power flow and utilisation of the transmission network. We continue to engage with our customers and be cognisant of their operations in our planning activities.

Figure 9 Relative energy consumption supplied from the transmission network in 2015-16

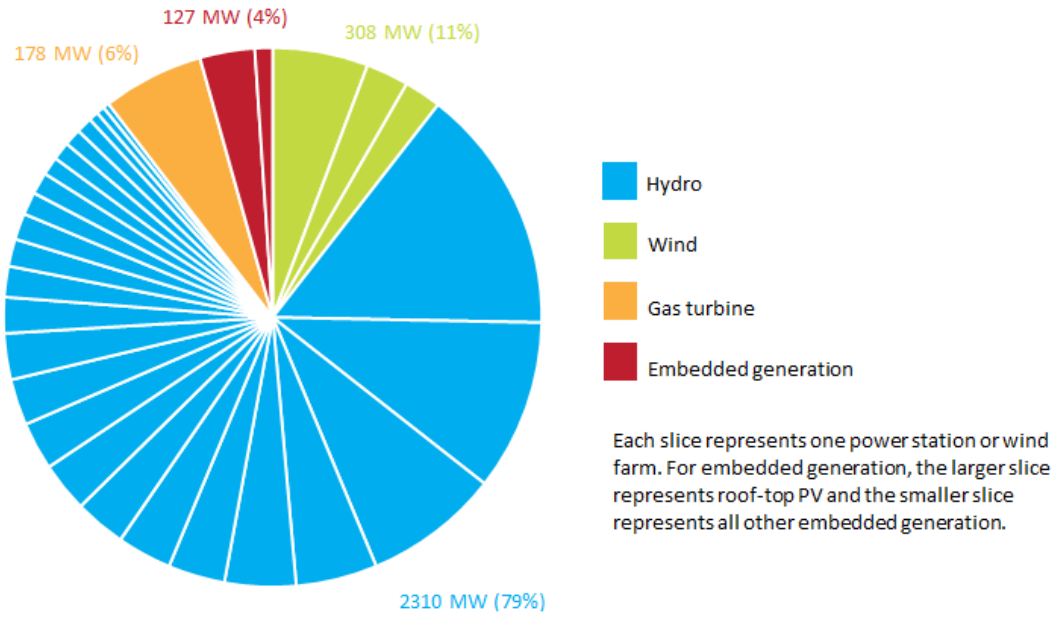


4.5.3 Hydro generation dominated

Figure 10 shows the relative composition of the generators located in Tasmania. Power generation is dominated by hydro generating units, which are dispersed throughout Tasmania. The dominance and geographic diversity of hydro generation has the following impacts:

- Hydro generating units are much slower to respond to frequency deviations than steam generating units, the dominant source of generation in the NEM. This compounds the frequency deviation impacts caused by the high generator size to system load ratio. Providing sufficient frequency control ancillary services (FCAS) can be problematic in Tasmania;
- The geographic dispersion of a large number of smaller sized generating units means that relatively more transmission infrastructure, per MW generated, is required compared with other states; and
- Tasmania's electricity network has traditionally been energy constrained not capacity constrained. That is, there is always sufficient generation capacity available to meet short term load peaks, but sustained low rainfall can give rise to difficulties in meeting the state's long-term electric energy needs.

Figure 10 Generation capacity by type



4.5.4 Windy location

Tasmania is an inherently windy state, being located in the Roaring Forties latitudes. There is sufficient wind resource to suggest an expansion of wind generation in the state is possible. This needs to be balanced however against the technical difficulties associated with integrating wind generators into a small power system with the characteristics described above.

4.5.5 Single non-regulated interconnector to other NEM regions

Tasmania's only connection to the remainder of the NEM is via Basslink, a privately owned HVDC market network service provider. This contrasts with mainland NEM regions, which are all interconnected via regulated interconnectors. Further details of Basslink are provided in Section 4.2.

4.5.6 Single regulated transmission and distribution network service provider

TasNetworks is the only provider of transmission and distribution network services in the state, as outlined in section 1.4. This integrated level of service provision is unique in the NEM.

5. Organisational Roles and Responsibilities

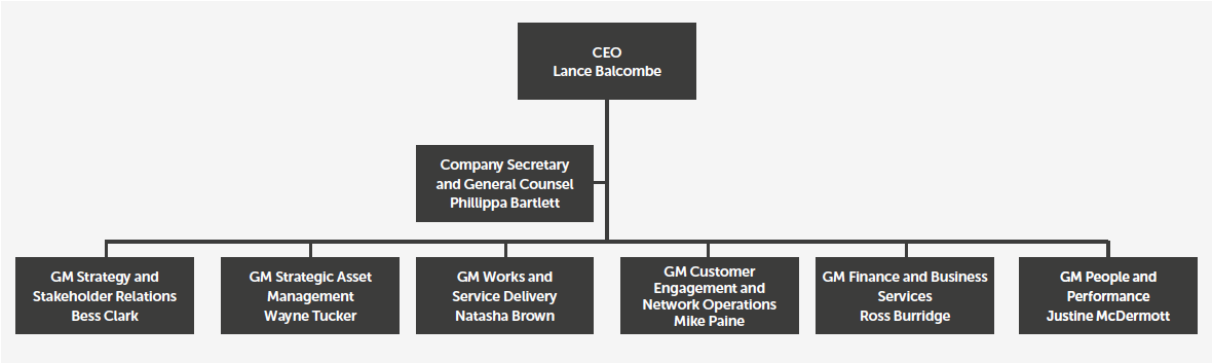
5.1 Overview

Chapter 5 discusses the organisational management structure and their roles and responsibilities.

5.2 Organisational Structure

Figure 11 shows the organisational management structure of TasNetworks.

Figure 11 Management structure



The organisational structure of TasNetworks is based around seven groups, with their responsibilities being as follows:

Company Secretary and General Counsel

The Company Secretary and General Counsel has responsibility for Board and corporate governance, legal services and wayleaves.

Strategy and Stakeholder Relations

This group is responsible for corporate strategy, business performance, strategic risk, economic regulation, pricing strategy and frameworks, market reform activities, external and internal communications, brand strategy, government and shareholder relations, and stakeholder engagement.

Strategic Asset Management

Strategic Asset Management is responsible for the asset management framework, asset strategy and planning, network analysis and planning, operational and power system technology, smart networks and demand side and other new technologies.

Works and Service Delivery

Works and Service Delivery is responsible for asset stewardship, including design and estimation, works program management and reporting, project and program works delivery, contract management, field operations, works schedule and dispatch, safety and environment policy, strategy and implementation, the TasNetworks Training Centre, and quality accreditation processes.

Customer Engagement and Network Operations

This group is responsible for network operations and the Control Centre, network access management, large customer and market relationships, retailer management, the Customer Contact Centre, connection point management and charging, meter data management and publishing, billing enquiries and dispute resolution, and telecommunications asset, network and customer management.

Finance and Business Services

Finance and Business Services is responsible for treasury, corporate modelling, financial reporting, risk management and insurance, procurement, fleet, property and facilities, accounts payable and receivable, audit, corporate IT and information management.

People and Performance

This group is responsible for human resources strategy, leadership and capability, human resources policies (excluding health, safety and environment), industrial relations, recruitment, performance management systems, learning and development, advice and support, and payroll and timekeeping.

6. Leadership and Culture

6.1 Overview

TasNetworks is seeking to better understand our future capability requirements as we transition towards a customer-led business model. To facilitate ongoing change, we are investing in the development of our leaders at all levels as well as our culture and engagement. This chapter shows how we are building a high performance culture and high levels of employee engagement to support achievement of our business objectives and enable us to be sustainable. As leader behaviour is known to drive culture, we are investing in the development of our leaders at all levels to build self-awareness and leadership capability, focusing on communication, teamwork, business improvement and change.

We offer leadership development through the following programs and initiatives:

- Workforce of the future program;
- TasNetworks' Leadership Team development program (Levels 1 and 2);
- Switched on Leaders Program (Level 3 and experienced level 4 leaders);
- Empowering Leaders Program (Less experienced level 4 leaders and level 5);
- Team development workshops with discrete leadership teams; and
- Quarterly leader forums.

The capacity of TasNetworks to implement the asset management strategy discussed in this document will rely on the continued leadership, commitment and involvement of TasNetworks management and staff. Leadership will form the major influence in the development and application of this strategy together with the strategic and operational continuous improvement plans.

To ensure success and a positive change in TasNetworks asset management practices, leadership will be paramount across the entire organisation. The CEO, the leadership team and all leaders aim to champion TasNetworks ongoing commitment to sustainable asset management in their actions and messages to staff, as well as effective mentoring.

6.2 Training and Developing our People

The workforce of the future program is a whole of business approach moving our business towards a constructive culture by investing in leadership programs, measuring culture and engagement and building capability throughout our business. Building capability that aligns with our external business environment, is a key foundation in creating competitive advantage.

We invest approximately $4 million per annum in training and developing our people across the whole business in a range of ways. Our Mornington Training School delivers a range of important development opportunities for our field based people, including safety and first aid training and live line training. All of our people participate in achievement and development planning and the planned development program is implemented each year.

6.2.1 Leadership Development

We currently have a number of initiatives to support the development of the TasNetworks culture through leadership. The Empowering Leaders Frontline Program is one of these initiatives aimed at supporting leadership development.

The purpose of the program is to provide participants with a greater understanding of the business, their role as a TasNetworks leader and themselves, as well as equipping them with core leadership skills. The program has been developed with input from across the business and subject matter experts are supporting the program through presentations and participation to facilitate sharing. The

latest intake of this program is our sixth, and comprises 10 of our people from all areas of the business.

6.2.2 Culture Change

Culture goes to the heart of our organisations' make-up. It reveals what you're really asking of your people and how it affects their performance, motivation and job satisfaction – providing a foundation for successful, sustainable cultural change in a uncertain business environment.

We measure the impact of leadership development and associated culture change through a biennial culture survey. The first survey was run in December 2014 using the Organisational Culture Inventory. The outcomes of the survey defined TasNetworks' initial culture, identified opportunities for improvement, and established a baseline to measure the impact of improvement activities.

The results from our latest survey show that we are making good progress with all four constructive styles improved, and all eight aggressive and oppositional styles declining. Changing the culture of an organisation is not easy and progress is sometimes slow, especially in the early stages of a merger. However, our improvements to date demonstrate that we're on the right track with our employee engagement already well above the industry benchmark.

7. Risk Management

7.1 Overview

The effective management of risk is central to the core business and efficient management of TasNetworks. Our approach to risk management involves managing to achieve an appropriate balance between realising opportunities for gains while minimising adverse impacts. Risk management is an integral part of good management practice and an essential element of good corporate governance.

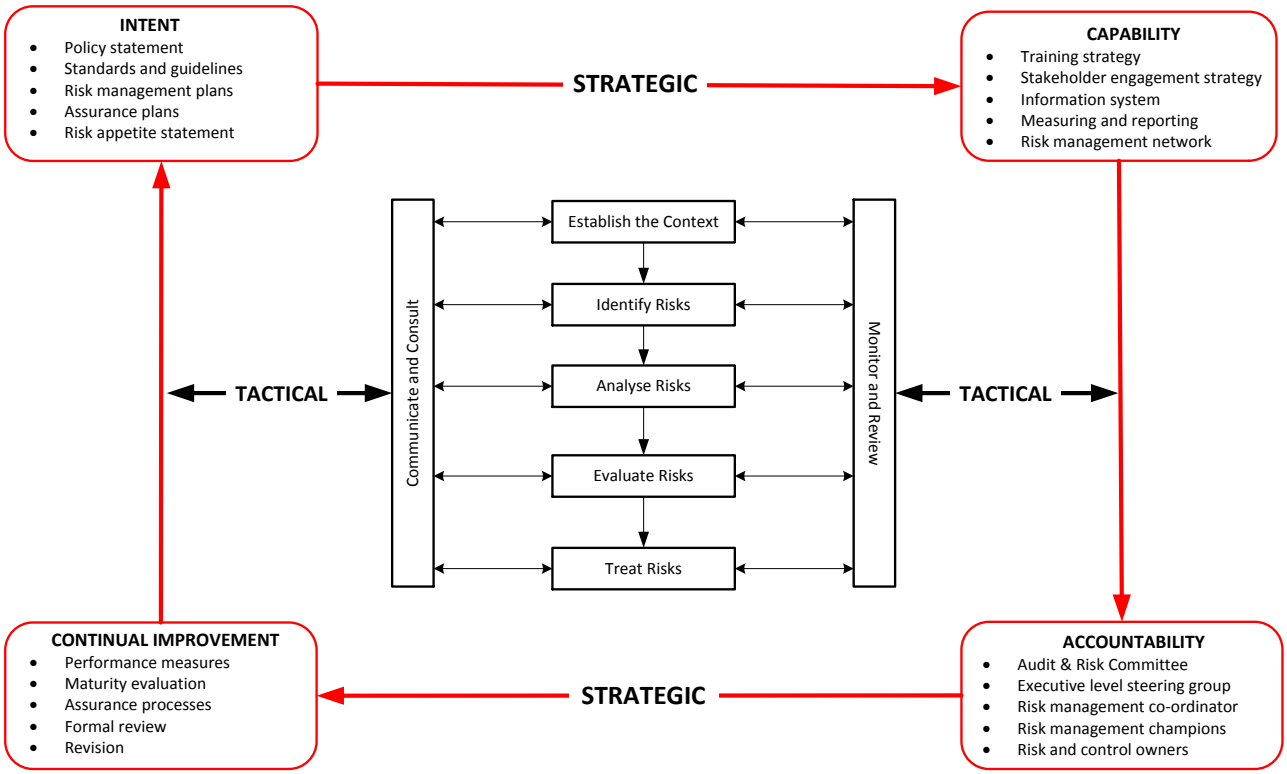
An integral part of how TasNetworks operates is the identification and treatment of risk, so all our stakeholders prosper. Our ability to deliver electricity and telecommunications network services and create value for our customers, owners and our community is significantly influenced by the effectiveness of our management of risk. We aim for risk management to become part of the culture, embedded into our operating philosophy, business practices and processes.

The Risk Management Policy is the overarching document that provides guidance on risk management practices. It is a high-level document that clearly establishes expectations in relation to risk management. The responsibilities, structures and processes established to ensure TasNetworks achieves its risk management objectives are detailed within the Risk Management Framework.

7.2 Risk management framework

The risk management framework sets out our management of the effects that uncertainty has on achieving our vision and strategic objectives. The framework also facilitates compliance with legislation, rules, codes, guidelines and various industry standards. Figure 12 shows the risk management framework with both its strategic and tactical (operational) components.

Figure 12 Risk Management Framework



7.3 Risk management system

Through our Ajilis business transformation project we have recently implemented our new 'Governance Risk and Compliance' (GRC) system which is an integrated application module of our SAP

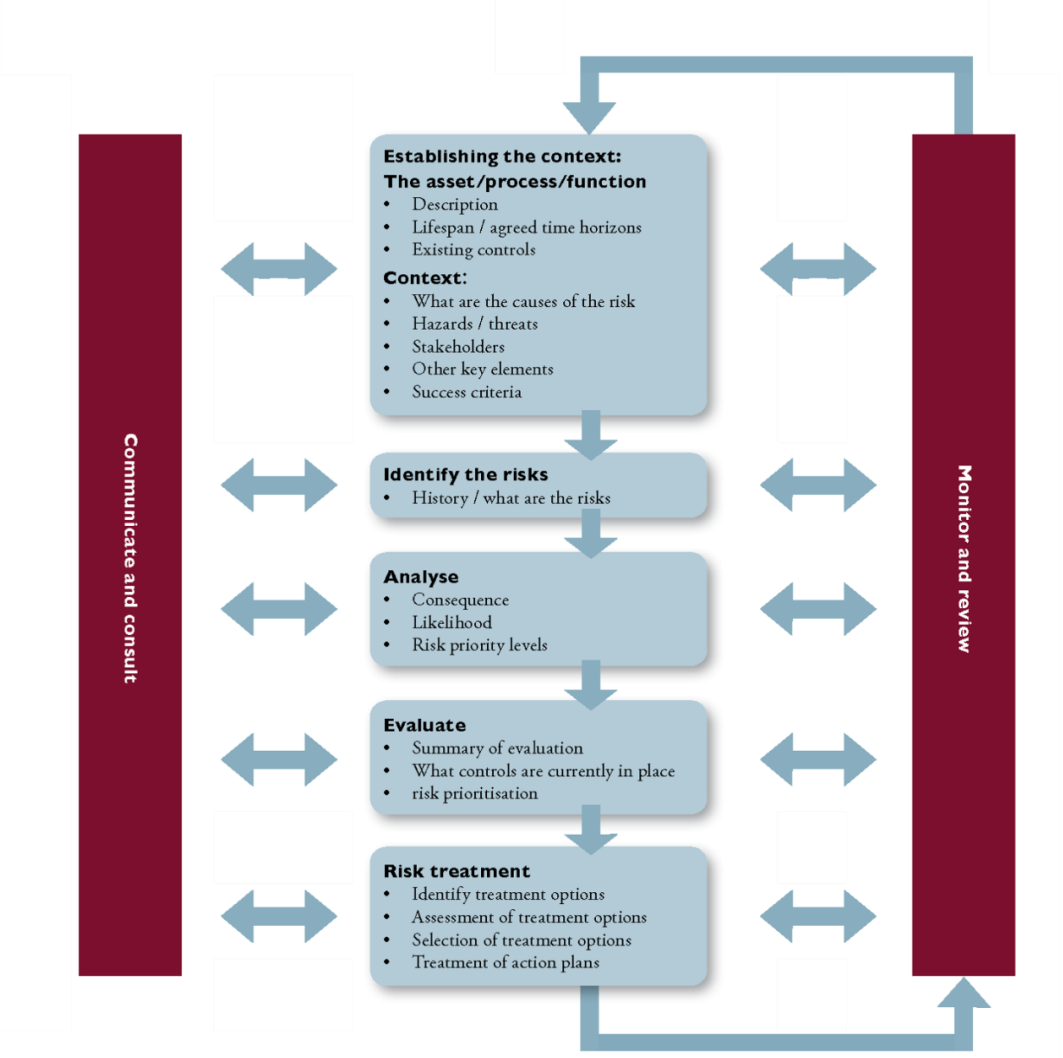
Enterprise Management System. The GRC module covers risk management processes and reporting across TasNetworks.

Further details of the Ajilis business transformation project and the SAP Enterprise Management System are provided in Section 9.6.13.

7.4 Operational risk management

In accordance with AS/NZS ISO31000:2009 Risk management – Principles and guidelines, Figure 13 shows the operational process undertaken by TasNetworks when managing risk.

Figure 13 Risk Management Operational Process



7.5 Asset condition and risk

Some of our assets are older than those of our network peers, and a key focus for us is to manage the associated asset risk due to poor condition effectively to achieve our asset management service and cost performance objectives.

With regard to asset condition and risk, we will continue to set service-based targets for assets within our AMPs to balance the risk of asset failure and the associated reliability impacts with cost.

We are also pursuing strategies to:

- expand the use of condition based risk management across key asset categories; and

- continue to develop and implement processes for capturing, registering, assessing, and tracking asset related risks and associated risk controls and treatments to better match service performance with our customer requirements. For further information refer to section 3.11.

Table 4 provides an overview as to which management techniques are applied by TasNetworks in managing the risks of each asset category in our asset base.

Table 4 TasNetworks asset category management overview

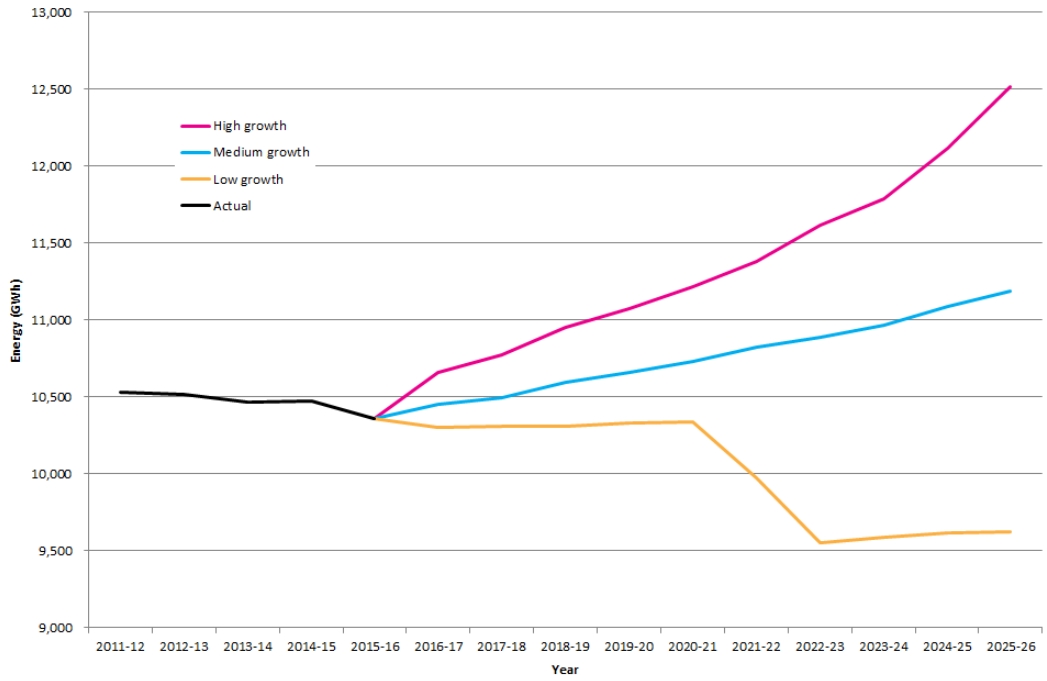
How are assets managed?																							
Assets	Past							Present							Future								
	Run to failure	Subject Matter Expert (SME)	Time based (Age)	Reliability centered maintenance (RCM)	Condition based	CBRM		Run to failure	Subject Matter Expert (SME)	Time based (Age)	Reliability centered maintenance (RCM)	Condition based	CBRM		Run to failure	Subject Matter Expert (SME)	Time based (Age)	Reliability centered maintenance (RCM)	Condition based	CBRM	
Distribution Assets																							
Overhead lines																							
Structures		✓			✓						✓	✓						✓	✓	✓			
Conductors		✓			✓					✓	✓	✓						✓	✓	✓			
Switchgear	✓	✓			✓			✓			✓	✓						✓	✓				
Transformers	✓	✓			✓			✓			✓	✓			✓			✓	✓				
Vegetation		✓			✓						✓	✓						✓	✓				
Protection & Control																							
Zone sub protection relays		✓			✓							✓							✓				
Zone sub DC systems		✓			✓							✓							✓				
Zone sub SCADA		✓			✓							✓							✓				
Distribution sub relays		✓			✓							✓							✓				
Distribution DC systems	✓	✓								✓							✓						
Distribution sub ancillary	✓	✓						✓											✓				
Recloser protection	✓	✓						✓				✓							✓				
Recloser DC systems	✓	✓								✓							✓						
Fault indicators	✓									✓							✓						
Regulators	✓											✓							✓				
Zone substations																							
Site		✓	✓						✓	✓						✓	✓						
Transformers		✓	✓		✓				✓	✓		✓				✓	✓		✓	✓			
Switchgear		✓	✓		✓				✓	✓		✓				✓	✓		✓	✓			
Dist Substations																							
Site		✓	✓						✓	✓						✓	✓						
Transformers	✓	✓	✓		✓			✓	✓	✓		✓			✓	✓	✓		✓				
Switchgear		✓	✓		✓				✓	✓		✓				✓	✓		✓				
UG Network																							
Cables - LV	✓				✓			✓				✓			✓				✓				
Cables - HV	✓				✓			✓				✓			✓				✓				
Cables - Oil filled 33kV		✓	✓		✓				✓	✓						✓	✓		✓				
Furniture	✓				✓			✓							✓				✓				
HV Regulators																							
Site		✓	✓		✓				✓	✓		✓				✓	✓		✓				
Regulators		✓	✓		✓				✓	✓		✓				✓	✓		✓	✓			
Transmission Assets																							
Communications																							
Radio Bearers		✓			✓							✓								✓			
Optical Fibre Bearers		✓			✓							✓								✓			
Multiplexers		✓			✓							✓								✓			
Prog Logic Controllers		✓			✓							✓								✓			
Ethernet Devices		✓			✓							✓								✓			
Server Infrastructure		✓			✓							✓								✓			
Telephony Hardware		✓			✓							✓								✓			
Rectifiers		✓			✓							✓								✓			
Batteries		✓			✓					✓		✓					✓			✓			
Civil Infrastructure		✓			✓							✓								✓			
Protection & Control																							
Busbar		✓	✓										✓							✓			
Feeder		✓	✓										✓							✓			
Transmission line		✓	✓										✓							✓			
Transformer		✓	✓										✓							✓			
Capacitor Bank		✓	✓										✓							✓			
SCADA		✓	✓										✓							✓			
Substations																							
Transformers (power)			✓							✓ (maintenance)		✓	✓ (renewed)					✓					
EHV circuit breakers			✓							✓ (maintenance)			✓ (renewed)					✓					
HV circuit breakers			✓							✓ (maintenance)			✓ (renewed)					✓					
EHV Disconnectors & Earth switches			✓							✓ (maintenance)			✓ (renewed)					✓					
EHV CT's			✓							✓ (maintenance)			✓ (renewed)							✓	✓		
EHV VT's			✓							✓ (maintenance)			✓ (renewed)							✓	✓		
Power cables			✓							✓ (maintenance)		✓	✓ (renewed)							✓	✓		
Site infrastructure					✓							✓								✓	✓		
Transmission lines																							
Towers					✓							✓									✓		
Conductor assemblies					✓							✓									✓		
Insulator assemblies					✓							✓									✓		
Foundations					✓							✓	✓								✓		
Easements					✓							✓									✓		

8. Future Demand Requirements

8.1 Tasmanian Energy Forecast

Figure 14 below presents actual and forecast electrical energy generation required to meet consumption demand in Tasmania to 2026 for the medium, high and low growth scenarios. This is the electrical energy generated at power stations and wind farms connected to the transmission network, and includes losses incurred in the delivery to customers.

Figure 14 Forecast of total Tasmanian electrical energy sales



Energy generation to meet Tasmanian demand has reduced by 6 per cent since its peak in 2007-08. This is primarily attributed to a reduction in industrial and commercial production, as well as increased penetration of roof-top photovoltaic and other embedded generation, and increased energy efficiency in homes and businesses. Contributing to low energy generation in 2015-16 was load reductions by transmission-connected customers to assist with maintaining energy storage levels during Tasmania's energy security situation in 2016.

We forecast a recovery in energy generation at 0.8 per cent per annum to 2026 in the medium growth forecast with forecast economic growth.

The forecast average annual growth for the low scenario is 0.2 per cent – excluding the step-change from the hypothetical reduction in major industrial load between 2021 and 2023 assumed in this scenario. The forecast average annual growth for the high scenario is 1.8 per cent. This is based on more favourable economic conditions with an increase in major industrial load, including a new large customer connecting to the transmission network.

9. Life-cycle Strategies

9.1 Overview

This chapter discusses TasNetworks life-cycle approach to asset management and the resulting key asset strategies aimed at achieving our asset management objectives (see section 3.7), and corresponding corporate objectives.

9.2 Life-cycle approach

The goal of infrastructure asset management is to meet a required level of service in the most cost-effective manner, through the prudent and efficient management of assets for present and future customers. The key elements of infrastructure asset management are:

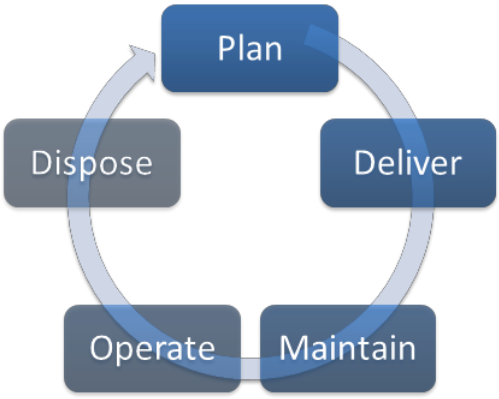
- Adopting a life-cycle approach;
- Developing cost-effective management strategies for the long term;
- Providing a defined and agreed level of service;
- Monitoring performance;
- Understanding and meeting the impact of growth through demand management and infrastructure investment;
- Managing risk associated with asset failures;
- Sustainably using physical resources; and
- Continually improving asset management processes and practices.

Ageing and potentially unreliable assets are managed as part of our overall asset management strategy. The focus of this strategy is to ensure that replacement of assets is determined on asset condition and risk rather than age alone. In developing strategies in relation to potentially unreliable assets we take a holistic approach to asset renewals, augmentations and decommissioning across both transmission and distribution networks. We ensure that our asset management plans align with our development plans to drive the most efficient outcome with a balance between cost, risk and performance.

A formal approach to the management of assets is essential to providing services in the most cost-effective manner. This enhances TasNetworks ability to demonstrate its approach to asset management to customers and other stakeholders (particularly economic regulators).

Our approach to asset management is centred on asset life-cycle management. There are five stages in the asset life-cycle as shown in Figure 15.

Figure 15 Asset Management Life-cycle



9.3 Life-cycle strategies

Each phase of the life-cycle has a corresponding life-cycle strategy, which describes our approach to the particular activities in that stage, objectives relevant to that stage, and strategies for providing performance to required levels. The five life-cycle strategies (Planning, Delivery, Maintenance, Operations, and Disposal) are summarised below.

- Planning covers Capex planning, from need identification, evaluation and approval, through to handover to delivery for implementation;
- Delivery covers implementing capital works (including detailed design, procurement, installation, and commissioning) and the dismantling and decommissioning of assets;
- Maintenance covers our approach to maintaining assets, including the types of maintenance employed and how the work is managed;
- Operations covers operation of the assets, including real-time operational control, situational awareness, outage coordination, and contingency planning; and
- Disposal covers activities relating to the disposal and divestment of assets and the disposal of waste material.

9.4 Asset strategies and plans

The majority of our asset management activities are managed at an asset category (or asset fleet) level. In some cases a number of asset categories that have common characteristics and functions have been grouped into a single asset category strategy plan. The asset category strategy plans are known as Asset Management Plans (AMPs) and are discussed further in Section 10.1.

9.5 Site strategies

In addition to our asset category based life-cycle approach to asset management, we also develop a number of site based strategies. These are used to integrate and optimise asset category based activities at particular substations, lines, and circuits to assist in developing both short-term and long-term replacement, redevelopment and/or augmentation plans for each site.

9.6 Key asset management strategies

We are continuing to refine our asset management strategies, to prioritise our expenditure to manage risks and ensure that our assets are effectively managed across their life-cycle. The following are a selection of the key asset management strategies.

9.6.1 Network Innovation Strategy

The electricity industry is undergoing significant change, much of which is being driven by disruptive technologies. With this disruption to the status quo, our network innovation strategy aims to ensure that TasNetworks continues to maximise the benefits of the existing networks to Tasmanian customers. The principle objectives driving the strategy being to:

- facilitate customer choice;
- facilitate customer interaction; and
- increase network efficiency.

We recognise that customers want more choice. While some simply want a low cost and reliable electricity service, others are seeking a greater range of supply and service offerings. We are committed to facilitating our customers' ambitions in this regard.

Industries such as insurance, banking, airlines, and couriers have all sought to maximise their interactions with customers through digital interaction. We also recognise the value that can be

derived from facilitating such customer interaction. For customers, these benefits would include up to date information on outages, updates on emerging issues, and practical advice on technology choices. TasNetworks benefits through building greater engagement and trust with our customers.

A cost effective and efficient network is essential to maximise the sustainability of the network. Many new and innovative technologies are available to address existing and emerging issues. The key issues being:

- fault and emergency costs;
- network security;
- penetration of renewables;
- localised peak demand and voltage issues;
- risk of asset stranding from uncertain load growth;
- expensive edge-of-grid assets; and
- accurate and timely data for decision making – especially in the Distribution network.

We have selected initiatives to achieve the innovation objectives, with each initiative having alignment with one or more of the innovation objectives. The initiatives include:

- advanced distribution automation system;
- remote area power supplies;
- tariff trial;
- network intelligence project;
- residential battery technology;
- commercial and industrial demand management;
- electric vehicles; and
- power quality corrective actions.

These initiatives are described in further detail in our APR.

Bruny Island Battery Trial

We found the perfect location on one of Tasmania's beautiful islands to run a residential battery trial. Bruny Island was selected because of the isolated nature of the local electricity network and the island's unique pattern of demand peaks. An underwater cable that connects the island to the network can get overloaded at peak times (due to an influx of tourists at holiday times) and needs back-up from a diesel generator.

The Bruny Island trial will show how residential batteries can be put to their best use in the future to reduce the peak loading on the underwater cable and avoid using the diesel generator (for the mutual benefit of our customers and our network). This project received funding from the Australian Renewable Energy Agency as part of its Research and Development Program. More information can be found on the trial website http://brunybattery trial.org/.

9.6.2 Network transformation

The role of the electricity network is changing. Historically, power flow was one-way from large scale generation, via the transmission and distribution networks, to customers. While the majority of people rely on the network for electricity supply, its role is changing. Within the last 10 years, small-scale distributed generation – predominately roof-top photovoltaic – has grown to become common place, and energy storage via batteries is close to becoming an economic proposition to average households. These, along with other factors, are combining to reduce demand on the network and also providing for power transfer back into the network.

To capture the role of the changing network into the future, CSIRO and Energy Networks Australia (ENA) have partnered to develop an Electricity Network Transformation Roadmap[18]. The purpose of the roadmap states "the Electricity Transformation Roadmap project will help guide the transformation of Australia's electricity networks over the 2017–27 decade toward a customer oriented future." Successful implementation of the roadmap activities over the next decade "can achieve a positive energy future for Australian energy customers enabling choice, lower costs, high security and reliability and a clean electricity system to 2050." We are participating with the CSIRO and ENA in this process.

We have developed our own roadmap to 2025 to ensure we adapt to the changing operating environment and continue to provide the most cost effective services to our customers. We have engaged with our customers on the details of our roadmap in the first half of 2017. The initiatives included in the roadmap will inform our revenue proposal for the 2019–24 regulatory period.

We have taken this further to develop a network transition plan for our network and Tasmania, which is detailed below.

Network transition plan

We have prepared a network transition plan to capture and articulate the changing role of the electricity network over the coming 10 to 15 years. Complementing CSIRO and ENA's Electricity Network Transformation Roadmap and focussing on our network and Tasmania, it captures what we will do over that period to facilitate an efficient and orderly transition of the network into its new role in a changing energy sector. The aspiration is to manage an orderly and efficient transition of the network so that existing connected parties and new customers are not adversely impacted, and that any additional costs associated with that transition are appropriately allocated.

Key influences in the changing role of the network are:

- Tasmania – we have the smallest, oldest and fastest ageing population in Australia and a low level of economic diversity compared to the national average. Economic growth in Tasmania is required to drive job creation and increase population. The Tasmanian power system is also unique with low demand, generally dispersed generation sites and high concentration of demand with four major industrial customers consuming more than 50 per cent of state electrical energy.
- minimal load growth –previously continuing growth in electricity demand now cannot be relied on. Electrical energy sales have declined since 2009–10 and the Tasmanian maximum demand peaked in 2008. Although beginning to recover, growth in maximum demand is no longer a key driver for network augmentation.
- price sensitivity of customers – the prices paid for electricity by Australian households increased on average 72 per cent, in real terms, between 2003 and 2013. In Hobart, prices increased by 20 per cent between 2007 and 2012. Due to high winter consumption and the low availability and take-up of gas, Tasmanian households have the highest average consumption and weekly spend on electricity in Australia. In Tasmania, network charges contribute approximately half the domestic power bill.

[18] http://www.energynetworks.com.au/electricity-networktransformation-roadmap

- growth of embedded generation – the number of small-scale embedded generators in Tasmania has increased dramatically since 2008, from virtually zero to approximately 96 MW of installed capacity at over 27,000 locations. This growth is forecast to continue. The impact of this is the traditional load profiles and one-way flow of electricity is changing.
- increase in non-synchronous generation – most new small-scale and large generation connecting to the network is non-synchronous, eg roof-top photovoltaic and wind. Traditional generation, such as hydro and thermal rotating plant, is synchronous. There are significant differences in how synchronous and non-synchronous generation operate following a fault on the network, with synchronous generation generally supporting operation of the network. New solutions are required to ensure increasing non-synchronous generation connecting to the network does not negatively impact network security.
- growth in energy storage – the technology supporting domestic energy storage is on the cusp of becoming an economic proposition to average households. Once this occurs, it will add to embedded generation in further changing network load profiles and the flow of electricity.

Our role under the transition plan is to ensure we continue to listen to, and be influenced by, our customers, ensuring lowest sustainable prices, protecting existing customers, and maximising the capability of the network to host new generation sources.

9.6.3 Southern Transmission Rationalisation Strategy

The southern transmission system is a critical part of the Tasmanian transmission system in that it:

- Connects 946 MW of installed generation capacity;
- Supplies approximately 700 MW of load including the greater Hobart area; and
- Forms a critical connection through Waddamana Substation to the northern transmission system, and subsequently to the Victorian region of the National Electricity Market via the Basslink interconnector.

The southern transmission system includes most of the earliest transmission lines of the 110 kV network, which originated from Tarraleah Power Station in 1938. This 110 kV network was constructed as the main grid at the time to support the existing 88 kV network from Waddamana that has since been retired. The southern transmission system also includes some of the earliest transmission lines of the 220 kV network, which originated northwards from Waddamana Power

Station (now Waddamana Substation) in 1957, and was extended southwards to Chapel Street in the early 1960s.

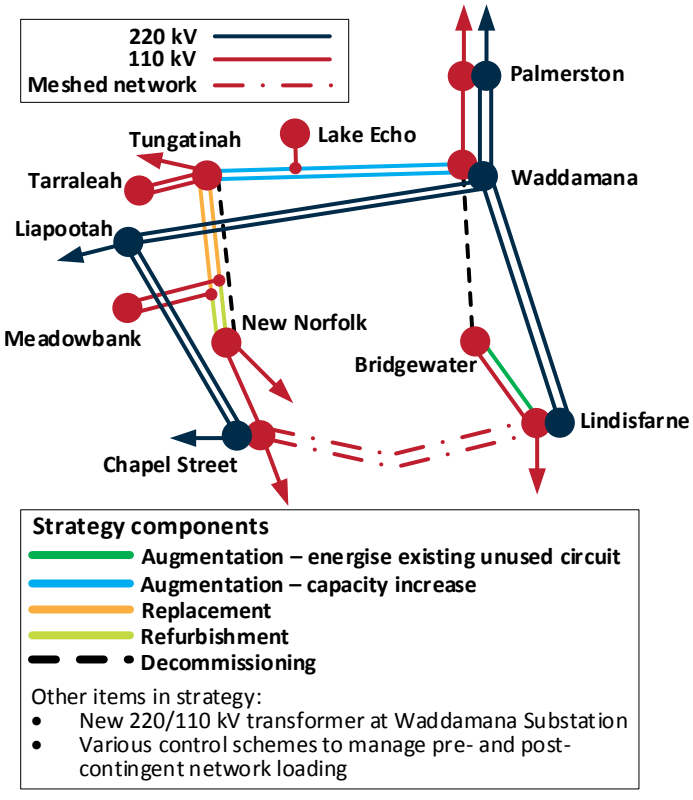
The construction in 2011 of the Waddamana-Lindisfarne double circuit 220 kV transmission line (with a summer/winter nominal rating of 420/500 MVA per circuit) has provided a secure 220 kV transmission network to southern Tasmania and relieved constraints that existed on the Liapootah–Chapel St 220 kV transmission corridor. This has reduced the requirement of the southern 110 kV network for bulk transmission purposes, and with the majority of these lines approaching end of life with asset health degrading and operational risks increasing, these factors result in a prospective $108Million refurbishment program or $186Million replacement program (like-for-like) over the next 25 years.

This forecast expenditure has driven the need for us to consider if a program of network rationalisation can deliver better value and service to Tasmanian electricity users in the long term.

To address the age and condition issues associated with the southern 110 kV transmission network, we are developing a long term fully integrated strategy to rationalise the southern 110 kV transmission network. This strategy aims to move the main grid function to the 220 kV transmission network, as far as possible, through the introduction of a strategically located connection between the 110 kV and 220 kV transmission networks in the central highlands of Tasmania. This will facilitate the decommissioning of end-of-life 110 kV lines and the refurbishment/replacement of remaining re-functioned 110 kV lines, resulting in lower transmission losses, increased network efficiency and reliability, reduced circuit length, reduced risk and lower life cycle cost.

Decommissioning the Waddamana–Bridgewater Junction 110 kV transmission line was identified as the first stage of a strategy to rationalise the southern 110 kV transmission network over coming years. It provides the most economical path to manage the network against the strategies assessed, including maintaining the existing network. Our preferred strategy is shown in Figure 16, with the intent to provide at least the existing network capacity to load and generation customers.

Figure 16 Southern Transmission Rationalisation Study Area and Strategy Components



9.6.4 Wood pole management strategy

The management strategy for the wood pole assets aims to ensure that the risks associated with asset failure remain within TasNetworks risk appetite statement. To assist with managing wood pole risk, we have commenced:

- trial installation of a small number of new technology non-combustible high strength poles primarily focussed on key locations within the high bushfire consequence area.
- trials of non-destructive testing of wood pole integrity; and
- deoxyribonucleic acid (DNA) testing of soft rot fungi and symbiotic bacteria for assessing rot-rate risk and bio-control options for treated wood poles. This is being conducted in conjunction with the University of Tasmania.

9.6.5 Distribution ground mounted switchgear replacement strategy

This strategy involves replacement of distribution ground mounted switchgear in poor condition that has the potential to cause an unacceptable safety risk.

9.6.6 Threatened bird strategy

Each year a small but significant number of Tasmanian threatened bird species are injured or killed by electric shock as a result of flying into powerlines or perching on power poles. The issue of birds being killed by electric shock as result of flying into powerlines is a problem faced by distribution companies all over the world.

As a business, we care about Tasmania's birdlife and have made a commitment to minimise our impact on the environment through our Zero Harm program. To help reduce the number of threatened birds of prey injured or killed by our network, TasNetworks has a five-year Threatened Bird Strategy in place.

The strategy focuses on three core areas; building knowledge and awareness, mitigation and voluntary offset. The third area, voluntary offset, includes supporting the rehabilitation of injured birds through partnerships with wildlife sanctuaries.

9.6.7 Network climate change strategy

In regard to Climate Change in the Australian context, the CSIRO states:

> "Change is occurring against the background of high climate variability, but the signal is clear. Air and ocean temperatures across Australia are now, on average, almost a degree Celsius warmer than they were in 1910, with most of the warming occurring since 1950. This warming has seen Australia experiencing more warm weather and extreme heat, and fewer cool extremes. There has been an increase in extreme fire weather, and a longer fire season, across large parts of Australia".
>
> (CSIRO, 2014)

The ENA has identified that the Australian energy network sector is particularly exposed to a changing climate, including single extreme climate related phenomena such as storms, heatwaves and bushfires, as well as significant more gradual changes in the weather regime.

To ensure that climate impacts are adequately accounted for in our decision-making, we have identified the following priority impacts with potential to affect our transmission, distribution, and telecommunications networks:

Electricity Transmission Network

Maximum Wind Gust
- Direct damage
- Damage from vegetation

Maximum Temperature
- Reduced transmission capacity

Storm Intensity
- Increased outages per event

Electricity Distribution Network

Precipitation
- Flooding of assets

Maximum Wind Gust
- Direct damage
- Damage from vegetation

Maximum Temperature
- Reduced distribution capacity
- Increased number of asset overloading failures

Bushfire Weather Conditions
- Increased potential for asset damage from bushfires

Telecommunications Network

Maximum Wind Gust
- Direct damage

Storm Intensity
- Increased outages per event

Bushfire Weather Conditions
- Increased potential for asset damage from bushfires

For each of the above priority impacts we have assessed the risks and determined key strategies to mitigate the risks. The strategies include:

- trialing non-burnable poles at selected high value pole locations in the High Bushfire Consequence Area (HBCA);
- trialing fire-resistant paint for selected poles in the HBCA, and other high criticality/high fire danger locations outside the HBCA;
- updating the HBCA map;
- updating our overhead distribution line design and construction manual to include the latest AS/NZS7000 design compliance requirements;
- monitoring for any increase in weather extremes; and
- monitoring for any increase in occurrence of asset overloading failure rates.

9.6.8 Bushfire mitigation strategy

Bushfire initiated by our electricity infrastructure presents a significant risk to the business, public safety and property. We have identified the risk of bushfires started by our assets or operations as one of the highest risks to the business. The risk of "*Major bushfire start is attributed to TasNetworks assets and/or work practices, leading to fatality or permanent impairment of a member of the public*." is included within TasNetworks' Key Risk Profile as 'Risk 10'.

To mitigate this risk we have developed a bushfire mitigation strategy, contained within our Bushfire Mitigation Management Plan. The key strategic objectives of the Bushfire Mitigation Strategy and Management Plan are to:

- ensure no significant fires are started by TasNetworks' assets or activities undertaken by TasNetworks' staff and contractors;
- ensure no significant safety or environmental incidents occur as a result of bushfire mitigation activities;
- minimise cost to the community to a sustainable level;
- achieve compliance with the relevant legislative, regulatory and statutory requirements;
- demonstrate commitment in carrying out corporate and community responsibilities;
- ensure procedures are in place for managing liaison with external organisations;
- establish performance measures, targets and reporting framework for bushfire mitigation; and
- ensure a formal, documented management framework is in place for bushfire mitigation that includes mechanisms for review and continual improvement.

Our bushfire mitigation position is: *"To minimise the risk of fire ignition by at-risk distribution and transmission networks by ensuring our bushfire mitigation strategies and plans are aimed at protecting the lives and property of our employees and members of the community, and are aligned with industry best practice where applicable."*

To achieve this position, we will continue to:

- minimise the risk of fire ignitions from distribution network assets that could become a bushfire threatening public safety and property;
- ensure activities undertaken by TasNetworks' staff and contractors minimise the likelihood of fire ignition;
- comply with legislative, regulatory and statutory requirements;
- minimise the frequency and length of disruptions to the general public when responding to bushfires threatening or impacting the distribution network;

- consider the safety of the community as a whole and employees engaged in the provision of services;
- ensure activities are managed in a way that minimises impact on the environment; and
- regularly review and develop management frameworks to ensure compliance with policies at the lowest sustainable cost.

9.6.9 Improve our response to faults and emergencies

This strategy involves increased installation of loop automation and fault indicators on key distribution feeders to improve restoration response based on our customers identifying this as a key factor. Also see 9.6.14 below.

9.6.10 Network reliability strategy

Transmission network reliability is measured in terms of the number of Loss of Supply (LOS) events that occur during a calendar year. We have an obligation to monitor and report against service measures and objectives to national (AER) and state Office of the Tasmanian Economic Regulator (OTTER) regulatory bodies, and to customers such as Hydro Tasmania and major industrials.

In meeting these requirements we actively undertake:

- Performance monitoring;
- Performance benchmarking;
- Incident investigations; and
- Implementation of service improvement initiatives.

Distribution network reliability is a measure of performance with regard to frequency (number of events) and duration of unplanned interruptions to our customers. We have an obligation under the Code to manage the reliability performance of our network and to mitigate any reliability impacts on our customers and the broader Tasmanian community.

We have developed a service performance improvement strategy to manage our reliability obligations. This strategy takes into account numerous requirements and inputs which are shown in Figure 17.

Figure 17 Reliability strategy considerations

Our reliability strategy seeks to:

- Maintain current overall network reliability performance in accordance with the principles of the economic incentive scheme whilst providing lowest sustainable prices and maximising value to our customers;
- Ensure compliance with regulation, codes and legislative requirements;
- Manage our risk profile to maintain a safe and reliable network, now and into the future with respect to cost effectiveness and reliability; and
- Reduce total outage costs for the network.

The strategy does not preclude enhancing network reliability where community, feeder or circuit performance is inadequate or where asset risk is unacceptably high. Specific focus areas presently underway include:

- Community zero harm;
- Consac and service cables (shock hazard);
- Distribution overhead line aerial inspections;
- Hobart CBD distribution strategy.

It is proposed that all reliability activities will be managed within the levels approved for reliability maintenance or improvement in the respective regulatory control period.

9.6.11 Asset Management Improvement Program (AMIP)

Information on this strategy to improve asset management maturity can be seen in section 11.8. This strategy also includes the Asset Management Information System (AMIS) Improvement Program (Refer sections 3.11 and 11.8.1).

9.6.12 End to end (E2E) works management strategy

E2E was a business change project to update and align the transmission and distribution CAPEX and OPEX works management processes and accountabilities of the Strategic Asset Management, and Works & Service Delivery teams. The revised works management processes and accountabilities are now in place and assisting the achievement of works program completion targets.

9.6.13 Ajilis

Ajilis is a business transformation project that is a key initiative of TasNetworks' Our Business Strategy, and will assist in achieving one way of doing things at TasNetworks. Ajilis, will streamline decision-making, improve operational processes, and provide us with an integrated IT platform based on SAP.

In February 2017, the Ajilis team successfully deployed release one of the project on time and on budget. We're already seeing the benefits of more efficient ways of working, benefits that will result in continuing cost savings for our customers. The project team has now switched its focus to release two of the project which is focused on enterprise asset management and will provide our workforce with much improved mobility tools. Release two is due for implementation March 2018.

9.6.14 Operational support systems upgrade

This strategy aims to increase the capability of the SCADA and Network Control systems of the distribution network in response to the increasing level of innovation strategies and customer requirements being placed on it, eg. faster outage restoration. In this regard, we recently upgraded our distribution control room system from paper-based to a fully digitised computer system. Gretaer real-time visibility of our distribution network allows us to improve network service and reliability for our customers.

10. Management Plans Development

10.1 Asset Management Plans

Asset Management Plans (AMPs) cover the existing asset base and are prepared for each significant asset category. They identify the performance issues and risks presented by each asset type within the category and define specific life-cycle strategies and actions that must be undertaken to sustain asset and system performance. The AMPs also summarise the asset operating and capital expenditure requirements for each asset category.

Where appropriate, AMPs are supported by detailed condition assessment reports and maintenance standards to ensure transmission and distribution system assets are appropriately maintained and the detailed condition, and associated risk, of selected assets is well defined and understood.

The AMPs are available within TasNetworks intranet site, The Zone, and cover all TasNetworks asset classes including:

Transmission Network

- AC distribution system
- DC distribution system
- EHV circuit breaker
- EHV disconnector and earth switch
- Gas insulated switchgear
- Power cable
- Structures and busbars
- Surge arrestor
- EHV busbar protection
- HV substation protection
- System protection and monitoring
- Transmission line protection
- Transmission line conductor assemblies
- Transmission line support structures
- Circuit rating and weather monitoring
- Capacitor bank
- Earthing and lightning protection
- EHV current transformer
- EHV post insulator
- HV switchgear
- Power transformer
- Substation site infrastructure
- Voltage transformer
- EHV capacitor bank protection
- SCADA systems
- Transformer protection
- Transmission protection and control
- Transmission line insulator assemblies
- Transmission line support structure
- Transmission line easements

Distribution Network

- Conductors and hardware
- Ground mounted substations
- Metering Type 6 (Regulated)
- Overhead Line Structures
- Pole mounted transformers
- Public lighting
- Underground system
- Connection assets
- HV regulators
- Metering (Unregulated)
- Overhead switchgear
- Protection and control
- SCADA and automation
- Zone substations

Transmission and Distribution Network combined

- Bushfire mitigation
- Vegetation

Telecommunications Network

- Bearer network
- Ethernet systems
- Network management systems
- Site infrastructure
- Telephone system

Operational Support Systems

- Network operations
- Emergency response
- Asset management information system (AMIS)
- Service performance

Non Network

- Information Technology
- Facilities
- Vehicular Fleet

10.2 Area Strategies

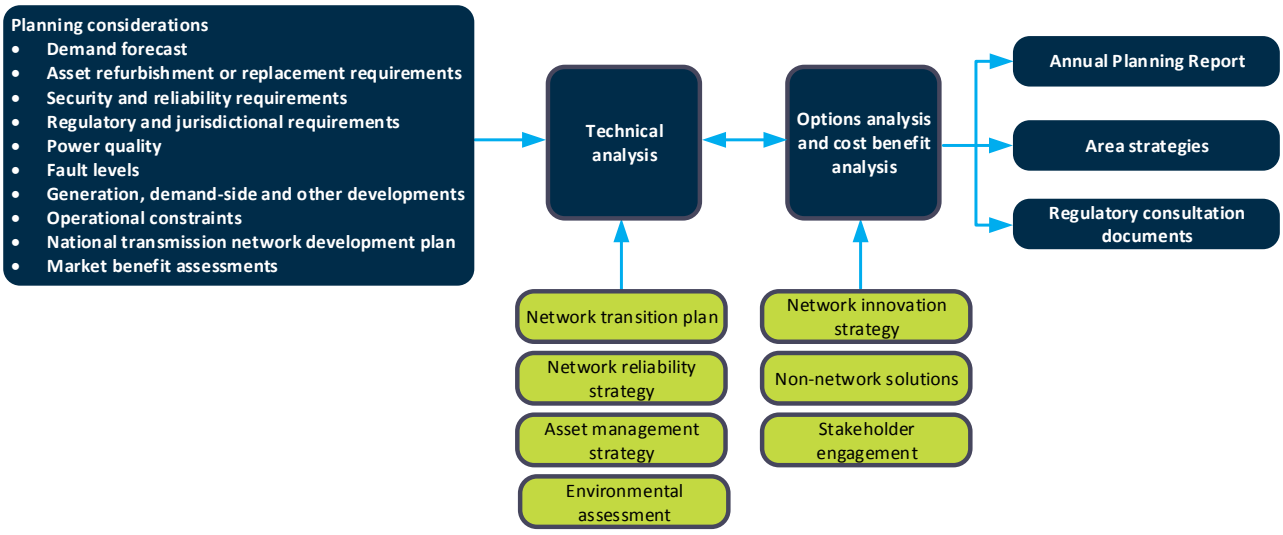
TasNetworks transmission and distribution system development program predominantly comprises of augmentation projects that provide new or modified connection points for customers, respond to increased local demands on the electricity system, or enhance security or quality of supply.

Our planning and capital investment activities are guided by customers and external agencies, including NER requirements established by the Australian Energy Market Commission (AEMC), requirements from the AER, OTTER and Tasmanian Department of State Growth. As a customer focussed organisation, customer consultation is a significant influence to system planning, providing innovative opportunities to defer or avoid unnecessary asset investment.

We conduct system planning studies to determine the expected future operation of the transmission and distribution system in detail over at least a 15 year period. The outputs of the planning process are documented in the area strategies, as shown in figure 18. From these area strategies, the projects that are required to meet Tasmanian and national electricity supply requirements for the forthcoming five year period are published in TasNetworks' Annual Planning Report (APR). Further details of the APR are contained in 10.3 below.

An overview of the network planning process, and its key inputs, is shown in Figure 18.

Figure 18 Overview of the Network Planning Process



The area strategies are available within our intranet site, The Zone, and cover the seven planning areas of Tasmania, as well as a core-grid strategy for the transmission backbone and inter-area limitations.

10.3 Annual Planning Report

We produce the APR to provide information on the planning activities we have undertaken in the past year. We conduct an annual planning review to analyse the existing network and consider its future requirements to accommodate changes to load and generation, and whether there are any limitations in meeting the required performance standards. We then look for opportunities for innovative solutions to address any emerging issues. We do this in consultation with our customers and in accordance with our relevant regulatory obligations.

The APR presents the outcomes of these planning studies, in accordance with our obligations under clauses 5.12.2 and 5.13.2 of the National Electricity Rules (the Rules) for the publication of Transmission and Distribution Annual Planning Reports. The APR also incorporates the requirements of our Tasmanian Annual Planning Statement, required under clause 15 of our transmission licence issued under the Electricity Supply Industry Act 1995 and as set by the Office of the Tasmanian Economic Regulator (OTTER). We are required to publish the APR by 30 June each year, in accordance with clause 5.12.2(a) and 5.13.2(a)(1) of the Rules and in conjunction with clause 8.3.2 of the Tasmanian Electricity Code (the Code).

In addition to these requirements, we present further information to better inform stakeholders about the issues and opportunities in our network. We provide this information so that stakeholders are aware of:

- the capability of our network to transfer electrical energy;
- how the network may affect their operations;
- the locations that would benefit from supply capability improvements or network support initiatives; and
- locations where new loads or generation could be readily connected.

We actively investigate alternate options to traditional network augmentation or straight like-for-like equipment replacements to address issues. Our intent is that the APR provides existing and potential new customers and non-network solution providers with preliminary information to prompt discussion on opportunities for solutions to address issues.

The APR covers a 10-year planning period, however some aspects are based on shorter planning periods. Distribution line overload determinations are based on a 2-year planning horizon, as loading in the distribution network is dynamic and loads are often easily transferable between circuits.

11. Performance Evaluation and Improvement

11.1 Overview

Chapter 11 focuses on the performance of the network in recent years. Firstly, we present information about performance benchmarking by the AER. We then present information about the reliability of the transmission and distribution networks, and our performance against our target thresholds.

11.2 How We Compare

The AER uses benchmarking to measure and compare the operating efficiency of electricity transmission and distribution networks. We are using the AER's benchmarking data to understand how we compare with other network businesses and what we need to do better. In addition, the AER uses total cost and operating cost benchmarking to help to set expenditure allowances.

Figure 19 below illustrates that the AER's operating cost benchmarking places us mid-range of the Australian distribution networks over the period of 2006 to 2016, whilst Figure 20 illustrates that the AER's total cost benchmarking places us at the top of the Australian transmission networks over the period of 2006 to 2016. Our merger efficiencies and transformation program are starting to show benefit with our relative performance improving since last reported in SAMP 2015 – with distribution improving from 0.73 to 0.75, and transmission improving from 0.89 to 0.92.

Figure 19 Distribution operating cost benchmarking using AER draft 2017 benchmarking data - AER Stochastic Frontier Analysis Model, raw efficiency scores (the best performer has the highest score)

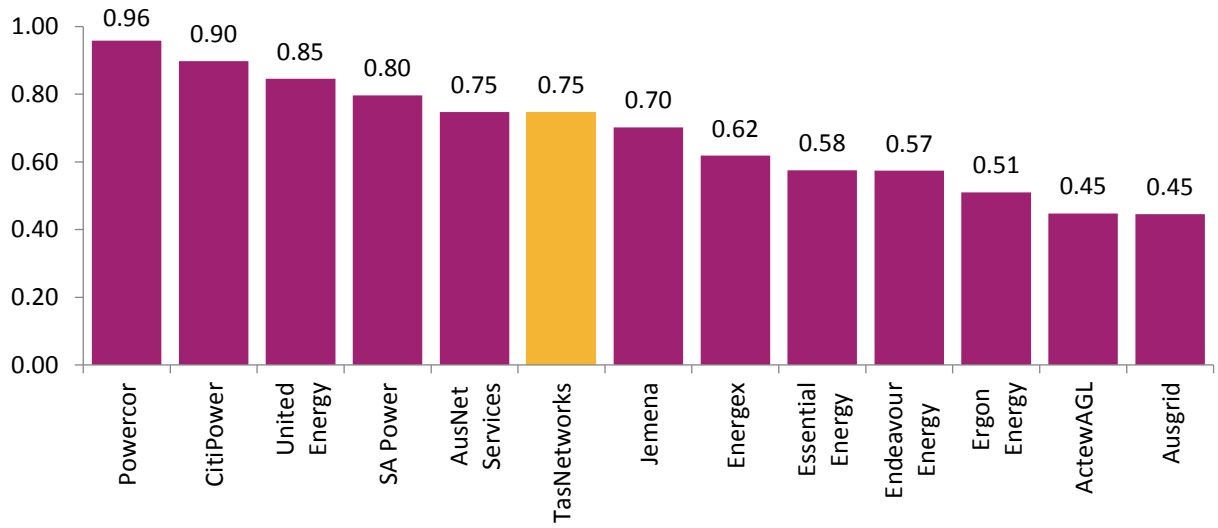
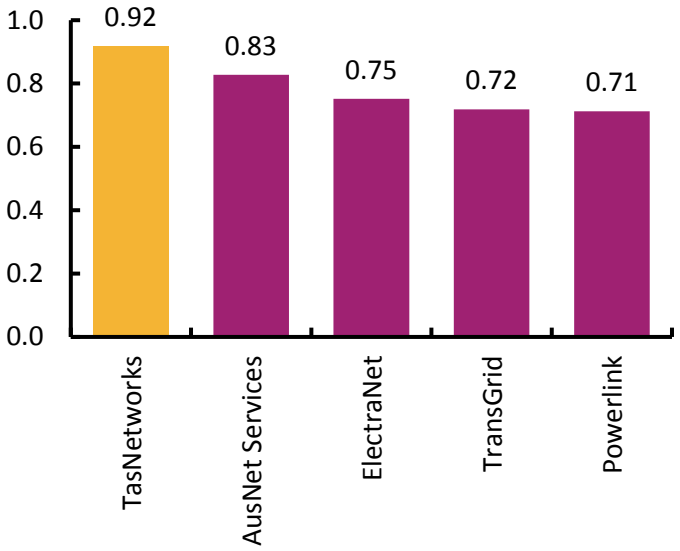


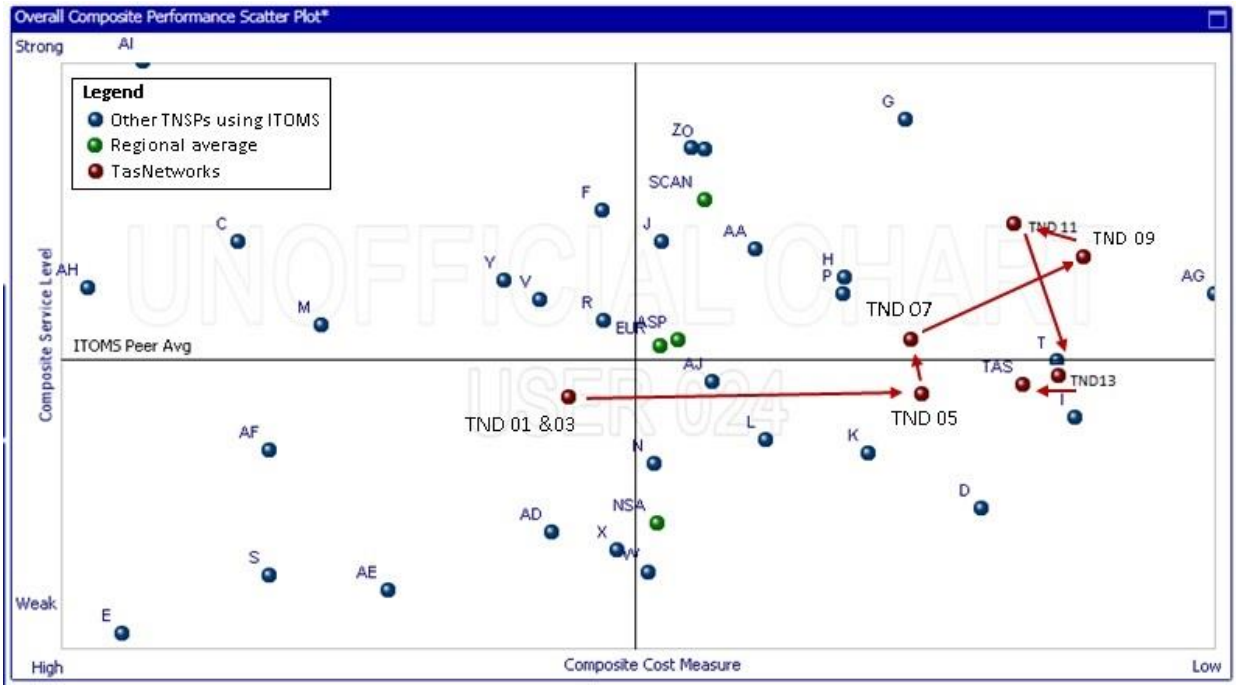
Figure 20 Transmission total cost benchmarking using AER data – Multilateral Total Factor Productivity Model[19] (the best performer has the highest score)



In addition to AER benchmarking, we participate in the biennial International Transmission Operations and Maintenance Study (ITOMS) benchmarking exercise. The ITOMS exercise involves the collection of operational asset, system and financial data to produce business level performance indicators. Our performance is benchmarked against other TNSPs both in the Australia/South Pacific region and across the world. Typical outcomes from this benchmarking exercise include sharing best practice asset management regimes and identifying various aspects of our maintenance practices that are either performing well or poorly in comparison with other similar TNSPs.

Figure 21 presents TasNetworks overall benchmarked performance against all other ITOMS participants for the last seven reporting periods.

Figure 21 ITOMS transmission operating performance benchmarking



[19] Sourced from 'AER Annual Benchmarking Report, Electricity TNSPs', dated November 2017.

The TND identifier denotes Transend Networks, and TAS denotes TasNetworks. The international benchmarked averages (cost and service) are shown as the centre crosshairs, and the regional averages are shown as green circles marked NSA (North/South America), EUR (Europe), ASP (Australia South Pacific), and SCAN (Scandinavia).

Figure 21 shows that although our 2015 performance is basically unchanged compared to 2013 performance, our benchmarked cost performance over time is still considerably better than both the international and Australia South Pacific benchmarked averages, and our service performance has remained very close to the international and Australia South Pacific benchmarked averages.

We will continue to keep abreast of advances in asset and system performance improvement and reporting initiatives not only through continued participation in these benchmarking exercises, but also through ongoing close cooperation and sharing of information with counterparts in other TNSPs.

11.3 Tasmanian Supply Reliability

Reliability of supply is a key indicator in measuring network performance and is an indicator of the impact of supply interruptions to customers. We measure the duration, frequency and impact of supply interruptions using different measures for the transmission and distribution networks. We continually analyse the performance of our electricity network and regularly report to the OTTER and the AER against our measures. Our performance against the reliability targets set by the AER is a key component of our service target performance incentive scheme (STPIS).

The following sections provide information on network reliability targets and historical performance.

11.4 Transmission Reliability

Transmission network reliability is monitored and reported to the AER and OTTER in terms of the number of loss of supply (LOS) events that occurred during the year[20]. Loss of supply is measured in 'system minutes' and is calculated by dividing the total energy (MWh) not supplied to customers during an event by the energy supplied during one minute at the time of historical Tasmanian maximum demand[21].

The AER sets our target for the number of loss of supply events allowed per year as part of each regulatory control period. Since 2009 the target has been 15 or less events greater than 0.1 system minute and 2 or less events greater than 1.0 system minute. Table 5 below presents the loss of supply performance of the transmission network against the targets.

Table 5 Transmission network reliability performance

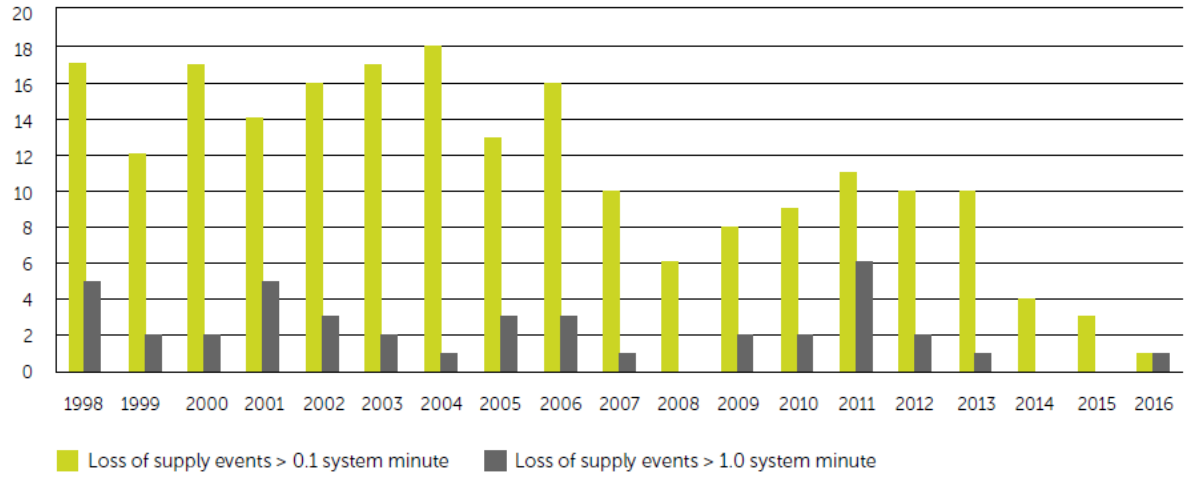
Performance Measure	Target	2011	2012	2013	2014	2015	2016
Number of LOS events >0.1 system minute	≤15	11	10	10	4	3	1
Number of LOS events >1.0 system minute	≤2	6	2	1	0	0	1

Figure 22 below shows the strong improvement in loss of supply performance of the transmission network over the long term by calendar year.

[20] Reporting to the AER and OTTER is by calendar and financial year, respectively.

[21] An event of one system minute equates to approximately 31.2 MWh of unserved energy.

Figure 22 Transmission Loss-of-Supply Events – Long Term Trend



11.5 Distribution Reliability

Reliability in the distribution network is measured in frequency and duration and reported as averages termed SAIFI and SAIDI totalled over a 12-month period. SAIFI is the System Average Interruption Frequency Index (measured in number of interruptions) whilst SAIDI is the equivalent measure for duration (measured in minutes). A SAIFI of two indicates that, on average, all customers in an area of study experienced two loss of supply events during the year. A SAIDI of 10 minutes indicates that, on average, those customers experienced a cumulative loss of supply for 10 minutes during the year.

For the purposes of measuring distribution supply reliability, Tasmania has been divided into 101 supply reliability communities. Each community is categorised into one of five supply reliability categories:

- Critical infrastructure (1 community);
- High density commercial (8);
- Urban and regional centres (32);
- High density rural (33); and
- Low density rural (27).

The Tasmanian Electricity Code (the Code), enforced by OTTER, specifies the reliability performance standards for both the supply reliability communities and categories. We are required to use reasonable endeavours to ensure that each supply reliability community and category meet these standards. In addition, the AER sets thresholds for the supply reliability categories (not communities) each regulatory control period as part of our performance incentive scheme. These are set based on our actual performance in the preceding five years, with the intention that we maintain our reliability performance. We report distribution reliability to OTTER on a quarterly and financial year basis, and to the AER on a financial year basis.

We are pursuing aligning our different reliability requirements and reporting frequency to promote efficiency.

The following sections report our distribution reliability performance against the thresholds set by the Code and by the AER since 2011-12.

11.5.1 Performance against the Code standards

Supply Reliability Categories

Tables 6 and 7 present our performance for reliability categories for SAIFI and SAIDI, respectively, against the standards specified in the TEC. This performance is as we provide to the TEC as part of our

normal reporting process. The standards exclude outages caused by third-party faults and customer plant, and the transmission network.

Table 6 SAIFI supply reliability category performance

Supply Reliability Category	Standard (interruptions)	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Critical infrastructure	0.20	0.22	0.27	0.21	0.34	0.25	0.35
High density commercial	1.00	0.27	0.43	0.47	0.33	0.26	0.14
Urban and regional centres	2.00	1.03	0.92	0.85	1.25	1.24	1.14
High density rural	4.00	2.29	2.36	2.18	2.94	3.12	3.01
Low density rural	6.00	3.72	3.49	3.11	4.04	3.86	3.49

Table 7 SAIDI supply reliability category performance

Supply Reliability Category	Standard (minutes)	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Critical infrastructure	30	25	30	16	57	34	27
High density commercial	60	32	77	43	27	23	12
Urban and regional centres	120	85	94	164	169	141	140
High density rural	480	259	269	521	582	521	530
Low density rural	600	498	547	740	931	725	659

Supply Reliability Communities

In addition to performance requirements for supply reliability categories detailed above, the Code also sets performance standards for the supply reliability communities within the categories. Table 8 and Table 9 present our performance for the 101 supply reliability communities against the SAIFI and SAIDI standards, respectively. The tables present the standards specified in the TEC for each community across the five categories, and the number of communities in each category that is not meeting the standard.

Table 8 Number of poor performing communities (SAIFI)

Supply Reliability Category (number of communities)	Standard (interruptions)	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Critical infrastructure (1)	0.2	1	1	0	1	1	1
High density commercial (8)	2	0	0	0	0	0	0
Urban and regional centres (32)	4	1	2	3	3	4	3
High density rural (33)	6	3	2	6	4	2	4
Low density rural (27)	8	2	1	2	0	1	1
Total (101)		7	6	11	8	8	9

Table 9 Number of poor performing communities (SAIDI)

Supply Reliability Category (number of communities)	Standard (minutes)	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Critical infrastructure (1)	30	0	1	0	1	1	0
High density commercial (8)	120	1	3	0	0	1	0
Urban and regional centres (32)	240	5	5	12	13	10	6
High density rural (33)	600	3	4	11	13	5	7
Low density rural (27)	720	6	6	14	12	8	11
Total (101)		15	19	37	39	25	24

11.5.2 Performance against AER Standards

At the commencement of each distribution regulatory control period, the AER, as part of our revenue determination, sets standards for distribution network reliability. These standards form part of our service target performance incentive scheme (STPIS) and are calculated on our actual performance for the preceding five years. The standards set by the AER exclude planned outages to the network, major event days, outages caused by customer plant and certain third-party faults.

Table 10 and Table 11 present our performance for reliability categories for SAIFI and SAIDI, respectively, against the standards specified by the AER measured by 'connected kVA'. These standards were set for our 2012 to 2017 distribution regulatory control period.

Table 10 SAIFI supply reliability category performance (AER)

Supply Reliability Category	Standard (2012–17) (interruptions)	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Critical infrastructure	0.22	0.26	0.17	0.13	0.19	0.16	0.25
High density commercial	0.49	0.21	0.30	0.32	0.27	0.19	0.10
Urban and regional centres	1.04	1.01	0.82	1.21	0.85	0.97	0.84
High density rural	2.79	2.20	2.21	3.00	2.10	2.61	2.58
Low density rural	3.20	3.36	3.00	4.65	2.77	3.22	2.89

Table 11 SAIDI supply reliability category performance (AER)

Supply Reliability Category	Standard (2012–17) (minutes)	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17
Critical infrastructure	20.79	16.90	4.65	6.83	23.29	14.57	4.84
High density commercial	38.34	13.57	33.61	27.66	23.22	11.37	4.97
Urban and regional centres	82.75	67.55	64.19	101.89	76.88	78.06	64.79
High density rural	259.48	206.15	203.25	289.29	239.17	254.26	263.68
Low density rural	333.16	383.44	358.41	533.00	360.34	370.53	356.79

The low density rural supply reliability category is the only category with continued below standard SAIDI performance (ie. interruption duration). This reflects the continued challenges in restoring supply to the communities in this category, due to the large geographical areas covered by the high voltage feeders and limited alternate supply options.

11.6 Tasmanian Supply Reliability Summary

As detailed in Section 9.6.1, our reliability strategy includes maintaining overall network reliability performance while ensuring compliance with our relevant requirements. As per our asset management objective on performance, the reliability strategy does not preclude enhancing network reliability where performance is inadequate or where asset risk is unacceptably high. We have maintained good reliability performance of the transmission network in recent years. This resulted from a focus on continual service improvement with many initiatives included in operational and capital programs. This included the following initiatives:

- improving our incident investigation and remediation process;
- incentive schemes to improve performance;
- improved maintenance practices; and
- targeted replacement of unreliable assets.

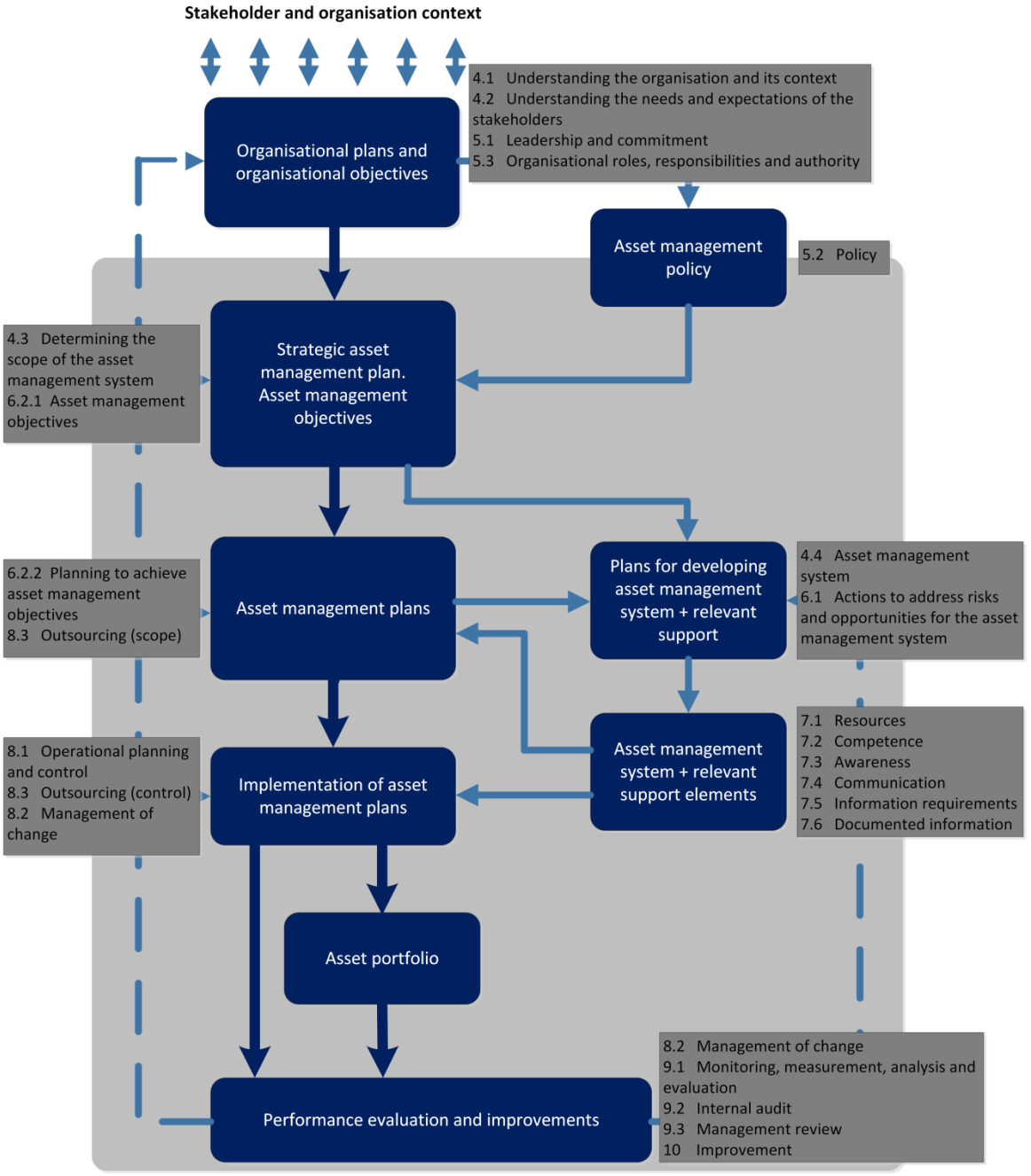
Reliability performance of the distribution network has been trending down in the last two years. Following investment in the 2007 to 2012 regulatory control period to improve reliability, we have adjusted our investment in recent years with a focus on maintaining reliability levels. However, reliability in a number of communities and categories has not met the target standards in the last two years, predominantly due to a number of Major Event Days and other weather events. The SAIDI measure is most affected by these events as they tend to affect a number of reliability communities and there are limited resources to attend to these concurrent faults, thereby lengthening the restoration times. A network reliability strategy is in place to address the poor performing communities (Refer section 9.6.10).

11.7 Asset Management Maturity

We recently commissioned an independent AM maturity assessment against the requirements of ISO 55001:2014. This work was completed in July 2017.

The objective of the maturity assessment was to determine our current level of AM process and system sophistication since the business merger in July 2014. The maturity assessment was completed for transmission and distribution network assets, communications assets and dedicated AM system assets. The ISO 55001:2014 assessment framework and structure can be seen in Figure 23 which shows the ISO 55002:2014 relationship between the key elements of an asset management system, together with the related ISO 55001 clauses.

Figure 23 ISO 55002:2014 Relationship between Key Elements of an Asset Management System and related ISO 55001:2014 clauses



Note 1 Only the primary connections are shown to avoid over complexity.
Note 2 This does not aim to repeat the distinction between asset management and an asset management system: it is a connections view showing directions of influence.
Note 3 The grey highlighted box designates the boundary of the asset management system.

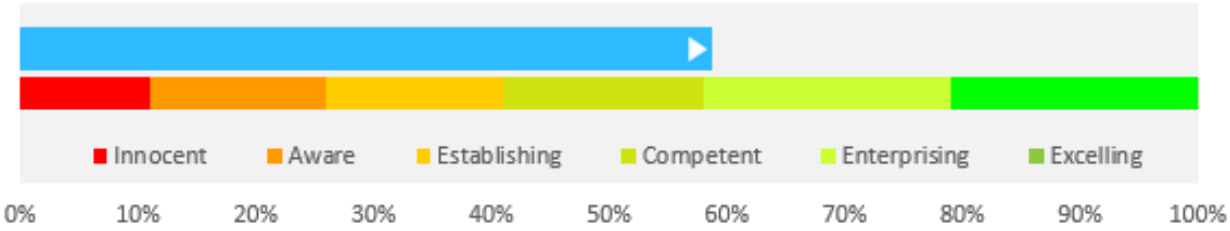
11.7.1 Assessment Findings

The AM maturity assessment ratings are categorised against the following six maturity levels:

Innocent	The organisation is not aware of the principle or benefits to be derived from the application of this activity or practice.
Aware	The organisation lacks a stable environment to support this activity, however is aware of the general principles and benefits. Conduct is ad hoc/reactive. There is no or little evidence of documented processes resulting in poor predictability of outcome and processes are not repeatable. No structure is in place and there is heavy dependence on individuals skills and motivations.
Establishing	The organisation provides a more stable environment, processes are documented and repeatable. However, whilst processes are defined for their purpose, they are still mostly reactive (not known and understood), no real commitment from the organisation. Activities are generally based on previous experience.
Competent	The organisation provides a stable environment, processes are documented and repeatable. Commitment from the organisation is demonstrable and activities are assured to conformity with the processes and their goals. Output is measured, managed proactively, outcomes are qualitatively predictable.
Enterprising	The organisation provides a stable environment, processes are well defined, understood and implemented. Tasks, responsibilities and authorisations are well defined and communicated, targets for quality are set and results are measured (performance measurement). Deviating behaviour is immediately addressed. Process is controlled and managed, outcomes are quantitatively predictable. Inputs to this process come from other well controlled processes. Outputs go to other well controlled processes.
Excelling	The organisation provides a stable forward thinking environment. Processes drive quality improvements and new business opportunities beyond the process. There is evidence of successful innovation, quality management and continuous improvement activities. The organisation is able to address the causes of process variation and adapt itself and identify success factors and contribute to the organisation's success.

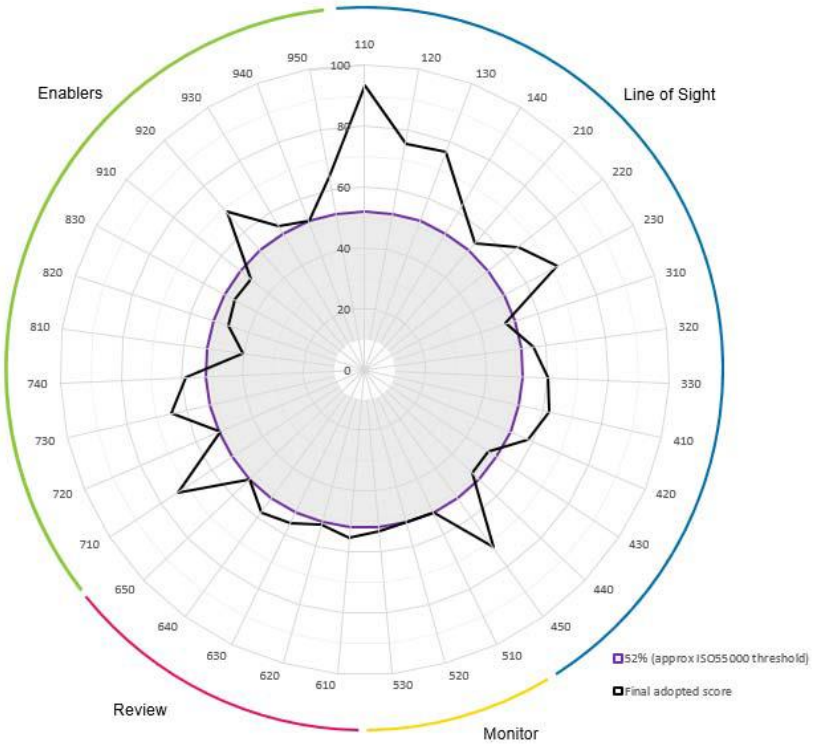
The 2017 assessment resulted in a current competency score of 59 per-cent, which indicates we are in the lower end of 'Enterprising' AM performance as presented in Figure 24 below.

Figure 24 Asset management competency score



The current competency score of 59 per-cent is considered a significant achievement, as an overall improvement in most competency levels was observed since the previous assessment in July 2014. The assessment also enabled a baseline competency level to be established for our AM, which is presented in Figure 25. The purple circle defines the level required by all categories for ISO 55001:2014 competency.

Figure 25 Asset management competency levels



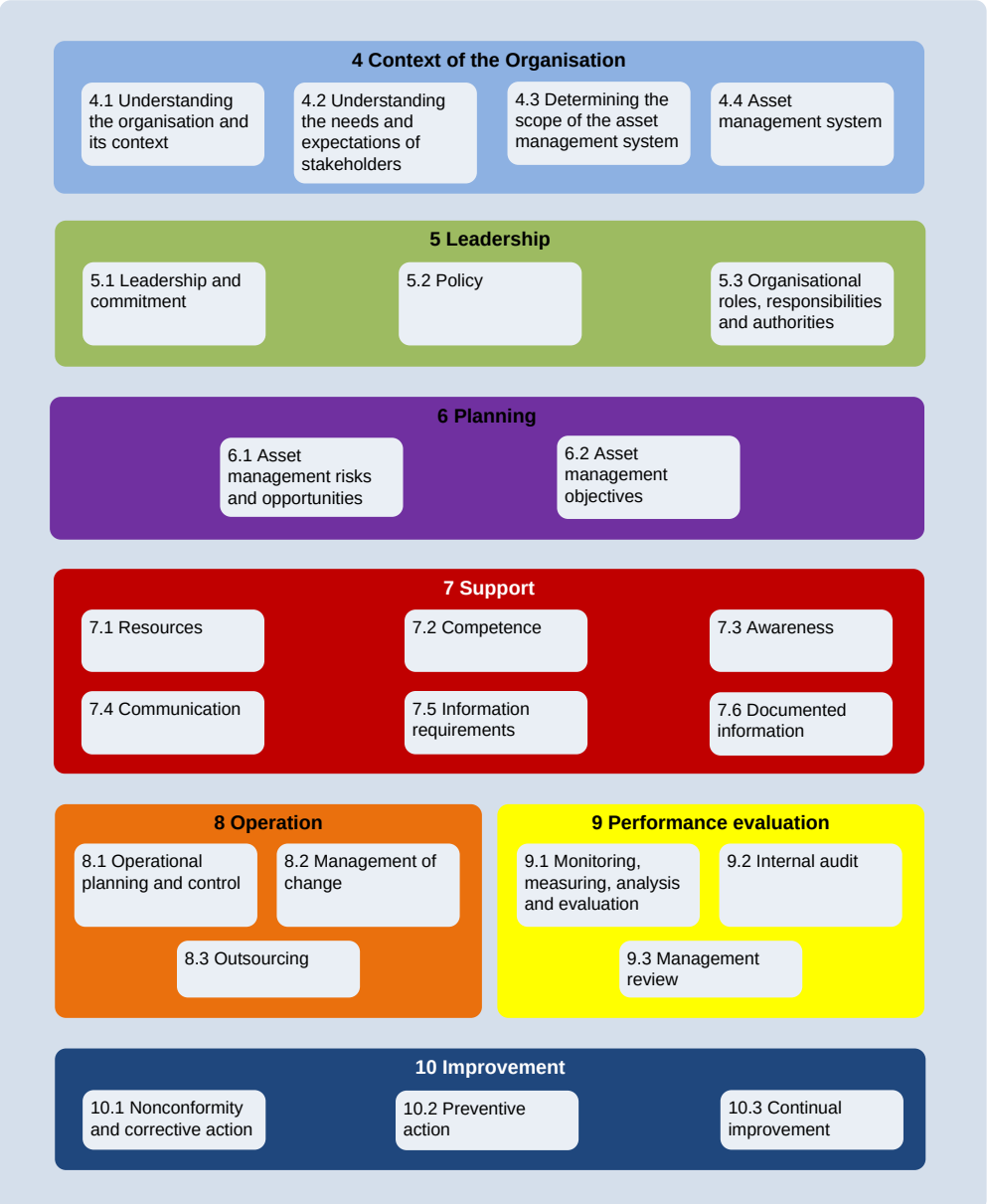
The AM system work that has been ongoing and not completed to date with the Ajilis Release 2 project is not reflected in the competency score and competency levels. On practical completion of the Ajilis release 2 project it is anticipated that the AM competency score and associated competency levels will increase further, particularly in the 'Enablers' zone of Figure 25 above.

11.8 Asset Management Improvement Program

The July 2014 AM maturity assessment enabled a gap to be quantified, and outlined a prioritised AM improvement program which has been used as a key input into the development of our AM improvement program. The AM improvement program elements and activities have been structured to ensure alignment with ISO 55001:2014, as shown in Figure 26 below[22].

[22] Figure 26 diagrammatically depicts ISO55001:2014 Asset Management – Management Systems – Requirements, and clauses 1, 2 and 3 are superfluous and are omitted for clarity

Figure 26 Asset management improvement program elements and sub-elements



The AM improvement program is targeted to improve AM maturity to the level necessary to achieve 'competence' maturity level[23] of ISO 55001:2014 over a period of approximately five years. Formal accreditation to ISO 55001:2014 is not the key goal at this time.

Since the initial assessment in 2014 we have made good progress in completing most of the improvement actions that were identified and included in the AM improvement program. Some actions remain outstanding and require further work, while others will be completed when the new enterprise management system SAP is implemented through the Ajilis release 2 project. The key activities delivered to date have been:

- Update of the AM policy;
- Alignment of AM objectives to organisational objectives;
- Update of the Strategic Asset Management Plan;
- Consumer and stakeholder engagement in development of future expenditure programs;

[23] Equates to a minimum target level of the purple circle in Figure 25 for every AM system element.

- AM document framework development and implementation;
- Alignment of AM plans to ISO55000 requirements for all assets; and
- Development of a common end-to-end works management process.

11.8.1 Asset Management Information Systems Improvement Program

This program, as a key component of the above AM improvement program, identifies and outlines the approach for addressing areas of improvement regarding network asset information and the related systems, tools and applications as well as business processes and procedures. The program includes areas that require improvement as identified by the AM maturity assessment, as well as other areas of opportunity that have been identified by the business.

The program has been developed with consideration of ISO55001:2014 requirements. It is intended that the program will serve as an ongoing framework for continual improvement of network asset information holdings, with the recommended timeframe for implementation aligning with that of the overarching AM improvement program.

The program will deliver a wide range of improvement initiatives essential to support effective and efficient asset management. The Asset Management Information System Improvement Program (AMISIP) is described further in the Asset Management Information System AMP document referred to in section 3.11.

As outcomes of the program are progressively completed they will be used to continuously update and improve the TasNetworks AMIS AMP. The outcomes will also become enablers for other TasNetworks projects and innovations to deliver additional value across the business.

Appendix A – Asset Management Policy

Asset Management Policy

TasNetworks delivers electricity and telecommunication network services, creating value for our customers, our owners and the community.

This Asset Management Policy applies to all TasNetworks assets and associated activities. Our team members and contractors must comply with this policy and will be supported, resourced, and trained to follow this policy and associated documentation.

Consistent with our vision and purpose, we strive for excellence in asset management and are committed to providing a safe working environment, value for our customers, sustainable shareholder outcomes, care for our assets and the environment, safe and reliable network services, whilst effectively and efficiently managing our assets throughout their life-cycle.

To achieve this commitment, together we will:

- manage our assets to meet the strategic goals, measures and initiatives outlined in the Corporate Plan;
- comply with relevant legislation, licences, codes of practice, and industry standards;
- apply contemporary condition assessment and risk management techniques to identify and effectively manage risks and opportunities, including at a portfolio level;
- continually adapt, benchmark and improve asset management strategies and practices and apply contemporary asset management techniques, consistent with industry best practices;
- develop and continually improve asset management processes and systems to optimise asset management efficiencies and decision making processes;
- adopt the lowest whole-of-life cost solutions for investment in asset creation, replacement or refurbishment projects;
- operate assets safely within prescribed limits and apply dynamic ratings where appropriate;
- maintain a complete and accurate register and documentation system of all our assets;
- prepare and maintain high quality asset management plans, standards, guidelines and procedures;
- ensure our team members are trained, authorised and competent to undertake their work activities;
- work closely with internal and external service providers and contractors to ensure that work performed on assets is consistent with the relevant standards and this policy; and
- undertake periodic audits to ensure assets are being managed in accordance with this policy and the asset management framework, plans, standards, guidelines and procedures.

Lance Balcombe
Chief Executive Officer

Dr Dan Norton AO
Chairman

This policy forms part of TasNetworks' asset management system and framework, which is maintained in accordance with Australian and International standard AS/NZS ISO 55001:2014.

TasNetworks
Delivering your power

Appendix B – Zero Harm Policy

Zero Harm Policy
Health, Safety, Environment and Quality

ZERO HARM

TasNetworks delivers electricity and telecommunication network services, creating value for our customers, our owners and the community.

Zero Harm is about looking after ourselves, our workmates, our contractors, the community and the environment at all times. It is about raising awareness and focusing on behaviours to continually improve the way we work at TasNetworks.

This Zero Harm Policy applies to all TasNetworks activities. Our team members and contractors must comply with this policy and will be motivated, resourced, and trained to follow this policy and associated standards and procedures.

Our Zero Harm goals are:

- No harm to our people and the public
- Minimising our impact on the environment

We will actively engage and consult with our people, our customers and other relevant stakeholders to achieve Zero Harm. Achieving Zero Harm requires ongoing and unwavering commitment from all TasNetworks team members and contractors.

This commitment means you are responsible for:

- Working safely – demonstrating a strong safety culture and positively intervening in at-risk situations
- Working in accordance with the law and TasNetworks' policies, procedures and work practices
- Demonstrating care for the environment in the way you work

To achieve this commitment, together we will:

- Carefully plan and manage our impacts, proactively identify and manage risks so far as is reasonably practicable to prevent harm
- Intervene, delay or stop activities that have the potential to cause injury, ill health or adverse environmental impacts, including pollution, until effective controls are in place
- Actively encourage each other to improve health, safety, general wellbeing and fitness and ensure employees are supported when injured or ill, regardless of whether the injury or illness occurred at work or at home
- Ensure our team members are trained, authorised and competent to undertake their work activities
- Seek out, identify and implement opportunities that create value by integrating sustainability principles into our activities, using resources efficiently, minimising waste and physical impacts
- Take responsibility for the quality of our work and participate in achieving quality outcomes for our customers
- Actively report all health, safety and environmental incidents, issues or concerns, including near-hits, and recommend solutions to health, safety, environment and quality issues
- Set and regularly review health, safety, environment and quality objectives and targets to achieve continual improvement, monitor performance and recognise and reward achievements

Our standards and procedures are designed to follow best practice codes and support compliance with the law.

We manage health, safety, environment and some key business processes within an integrated management system. We will not compromise on Zero Harm while working to meet our customers' needs and delivering quality outcomes.

Lance Balcombe
Chief Executive Officer

Dr Dan Norton
Chairman

This policy forms part of TasNetworks' integrated health, safety, environment and quality management system, which is maintained and externally certified in accordance with Australian and International standards (AS/NZ 14801:2001, AS/NZS ISO 14001:2015 and AS/NZS ISO 9001:2015). October 2016.

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Appendix C – Glossary and Abbreviations

Glossary

The definitions provided here are common electricity industry definitions, provided to assist readers who may be unfamiliar with particular industry terminology.

Terms marked [R] are also formally defined in Chapter 10 of the National Electricity Rules (the Rules). The definitions given below may be different from the Rules definitions. For the purposes of interpreting the requirements of the Rules, the formally defined terms within the Rules should be used.

Basslink	A privately owned undersea cable connecting the Tasmanian electricity network to that of mainland Australia. Basslink is described in Section 4.2
Bay	The suite of electrical infrastructure installed within a substation to connect a specific incoming transmission line, distribution feeder, transformer or generator to the main body of the substation.
Code	Refers to the Tasmanian Electricity Code. The Code addresses Tasmanian jurisdictional interests which are not dealt with by the Rules.
Distribution network	The suite of electrical infrastructure assets required to transmit power from the transmission network to the consumer. [R]
Embedded generator	A generating unit that is directly connected to the distribution network as opposed to the transmission network. [R]
Energy generated	The total amount of electrical energy injected into the transmission network to meet the Tasmanian energy sales. It comprises the energy sent out from Tasmania's power stations, plus the energy imported via Basslink, minus energy exported to Basslink. It includes network losses but excludes power station auxiliary loads.
Energy sales	The total amount of electrical energy consumed in Tasmania for a particular period.
ESI Regulations	Reference to the Electricity Supply Industry (Network Planning Requirements) Regulations 2007.
Guaranteed Service Level scheme	A payment scheme where our retail customers are compensated for prolonged and excessive interruptions to their supply.
kilo-volt	One kilo-volt equals 1,000 volts. See also: voltage.
market network service provider	A network service provider whose network links two connection points located in different NEM regions, the power transfer between which can be independently controlled and dispatched via the central dispatch process. The network must not be the subject of a revenue determination by the Australian Energy Regulator. Basslink is the only MNSP in the NEM. [R]
network	The apparatus, equipment, plant and buildings used to convey, and control the conveyance of, electricity to customers. See also: distribution network; transmission network. [R]

non-network solution	A solution to a network issue that does not require the construction of a network augmentation. Examples include electronic control schemes and demand side management.
Rules	The National Electricity Rules
substation	An installation of electrical infrastructure at a strategic location on the network to provide the functions of voltage transformation, switching and voltage conversion. [R]
switching station	A substation without transformers, operating at a single voltage level.
transition station	Refers to the network location where a transmission circuit transitions from underground cable to overhead transmission line, or vice versa.
transmission network	The suite of electrical infrastructure required to transmit power from the generating stations to the distribution network and directly connected industrial consumers. In Tasmania, the transmission network comprises the network elements that operate at voltages of either 220 kV or 110 kV, plus the equipment required to control or support those elements. [R]
voltage	The force which causes electrical current to flow. [R]

Abbreviations

Acronym	Description
AC	Alternating Current
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
APR	Annual Planning Report
DC	Direct Current
DNSP	Distribution Network Service Provider
EHV	Extra High Voltage
ESI	Electricity Supply Industry
GSL	Guaranteed Service Level
GWh	Gigawatt hour
Ha	Hectare
HV	High Voltage
Hz	Hertz
kA	Kiloamps
kV	Kilovolts

Acronym	Description
LEOY	Likely end of year
LOS	Loss of Supply
MAIFI	Momentary System Average Interruption Duration Index
MED	Major Event Days
MD	Maximum Demand
MNSP	Market Network Service Provider
MV	Medium Voltage
MVA	Megavolt Amperes
MW	Megawatts
MWh	Megawatt hour
NEM	National Electricity Market
NER	National Electricity Rules
OTTER	Office of the Tasmanian Energy Regulator
PV	photovoltaic [solar generation system]
REC	Renewable Energy Certificate
RET	Renewable Energy Target
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control And Data Acquisition
SPS	System Protection Scheme
STPIS	Service Target Performance Incentive Scheme
TNSP	Transmission Network Service Provider