Strategic Asset Management Plan – Manual No. 15

Delivering energy services that customers value through excellence in asset management

SA Power Networks

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EXECUTIVE GENERAL MANAGER NETWORK MANAGEMENT MESSAGE

I am pleased to present our Strategic Asset Management Plan. The plan outlines our strategic direction and priorities for electricity distribution assets. These assets play a significant role in delivering energy services that our customers value.

As an organisation that strives for excellence in asset management, we are not just maintaining and improving our assets but also planning how to best use them in the future — in line with our customer and stakeholder expectations.

The success of this plan lies in our ability to incorporate our shared goals in the day-to-day operations of SA Power Networks, for the benefit of both the organisation and the customers we serve. It is the intention that this plan will play an active role in supporting delivery of excellence in asset management.

The implementation of this plan will be underpinned by our Asset Management Transformation Program as well as supporting documents and processes such as asset management plans, annual budgets, key performance indicators and staff performance management for on-ground implementation.

I look forward to working with our key stakeholders inside and outside of the business to achieve the objectives and strategic priorities set out in this plan.

Matthew Napolitano

A/Executive General Manager Network Management

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Document Version

Version	Date	Notes

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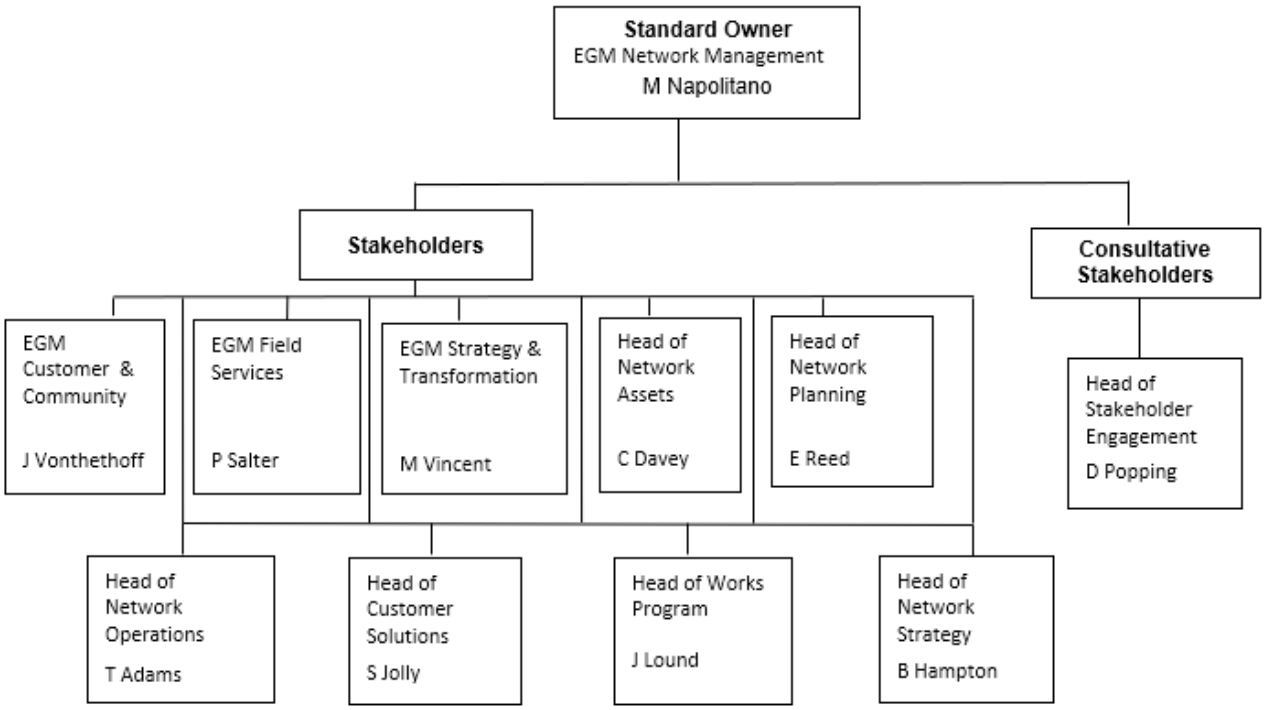
OWNERSHIP OF STANDARD

Name of Standard/Manual:	Strategic Asset Management Plan – Manual No. 15
Standard/Manual Owner	Title: A/EGM Network Management Name: Matthew Napolitano
Standard Last Reviewed	September 2023
Standard Last Issued	-
Review Period	2 years
Next Review Due	September 2025

STANDARD/MANUAL OWNERSHIP STRUCTURE



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Abbreviations

AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AMS	Asset Management System
AMSC	Asset Management Steering Committee
DFA	Distributed Feeder Automation
DNSP	Distribution Network Service Provider
ESCoSA	Essential Services Commission of South Australia
NEM	National Electricity Market
OTR	Office of the Technical Regulator
PV	Photovoltaic
RCP	Regulatory Control Period
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SAMP	Strategic Asset Management Plan
SCADA	Supervisory Control and Data Acquisition
SRMTMP	Safety, Reliability, Maintenance and Technical Management Plan
USAIDI	Unplanned System Average Interruption Duration Index
USAIFI	Unplanned System Average Interruption Frequency Index

Glossary

Asset Management Steering Committee: an executive level steering committee with membership from the functional areas of the business, working to embed, integrate, monitor, support and report on the development and implementation of asset management practices at SA Power Networks

Bushfire risk area category: areas across the state are classified as either non-bushfire risk areas, medium bushfire risk areas or high bushfire risk areas depending on the potential impact of a bushfire in that area

Corrosion zones: zones across the state are classified as either low, medium, high or extreme corrosion zones depending on the corrosive properties of the air in that area

Consumer energy resources: energy resources such as solar PV and battery storage that are distributed throughout the network

Distribution network: from connection points shared with the transmission company (ElectraNet) and extending to the customer's point of supply, the distribution network is made of the sub-transmission system, substations, the high voltage distribution network and the low voltage network

Levels of service: measures of the performance of services that customers experience such as average outage duration, time to respond to enquiries and accuracy of outage information

Major event day: a day on which the daily system average interruption duration exceeds a threshold value. This usually happens during major storms or other major system disturbances. Outages occurring on a major event day are excluded from the Service Target Performance Incentive Scheme.

Stakeholder: any individual, business or other party who can affect or be affected by our actions and performance

Value: the quantified measure of the benefit of undertaking an investment

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Executive summary

As our State's primary distribution network service provider, SA Power Networks plays an important role in our community, managing the distribution network that delivers electricity to over 900,000 homes and businesses across South Australia.

The network assets through which we deliver this service cover over 178,000km^2 with a total route length of approximately 90,000km and a total replacement value in the order of $65 billion.

This SAMP outlines the challenges we face and how we plan to manage these assets and improve our asset management capabilities. It aims to outline how we balance the investment required to maintain a safe and reliable network and ensure we can accommodate the changing ways customers are using energy, with the very real need to keep our costs down.

Our customers and stakeholders

SA Power Networks customers and stakeholders are widespread, diverse and evolving. We serve almost the entire population of South Australia and as the state develops the number of customers we serve continues to grow.

Our customers' and stakeholders' expectations are changing rapidly as technological changes sweep through the energy industry. They want to be able to use the network in new ways and be both exporters as well as consumers of energy. They want us to provide better information about outages and predicted restoration times, and they want to understand our costs better.

Above all, our customers want us to:

1. maintain safety and reliability;
2. deliver good service;
3. enable the clean energy transition; and
4. keep the price as low as possible, and play our part in improving equity.

Our assets and key strategic issues we face

SA Power Networks has the oldest fleet of assets in the National Electricity Market and the lowest rate of replacement. As the network deteriorates we risk an increasing number of electricity assets failing in-service resulting in power outages, safety incidents and bushfires. This risk will be made worse in coming decades by climate change.

To continue to deliver the level of service our customers and community expect will require increased investment in asset replacement as well as an increased sophistication in our approach to Asset Management.

Coinciding with the gradual deterioration of our assets, the demand on our network will increase in the coming decades. The Australian Energy Market Operator (AEMO) notes in its 2022 forecast for electricity demand that demand will increase by approximately 20% over the next decade through the take up of electric vehicles and broader electrification with the shift from gas to electricity.

While peak demand growth is not new (the network experienced significant growth in the 1990s and 2000s driven by the adoption of reverse cycle air conditioning), the nature of the electricity flows on the network will be dramatically different. The coming growth in demand will be a more complex challenge than the growth in previous decades driven by a relatively predictable steady growth in summer peak demand.

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The continued growth in rooftop solar is also expected to contribute to significant reverse flows in the network, overloading parts of the network and creating challenges in managing reverse peaks.

Given the capacity of the network changes throughout the year this more dynamic flow and changing capacity will require additional sophistication in our approach to demand forecasting, capacity planning and solution development.

In addressing these challenges, the investment in our network is expected to continue increasing – with additional investment in both asset replacement and augmentation of the network. Our workforce planning and sourcing strategies are appropriately considered to address these challenges while processes, systems and tools that were appropriate for delivering smaller volumes of large-scale projects will need to adapt to larger volumes of work to ensure we can plan and deliver our work as efficiently as possible.

Our response

In response to these challenges and to meet our corporate objectives we aim to employ good asset management practices that deliver our business objectives for the benefit of our customers and stakeholders.

Our Asset Management is informed by our recently developed Asset Management 2035 Vision aligned with the corporate Strategic Directions 2035.

We **focus** on what our **customers and stakeholders** value. The **outcomes** we seek to deliver through our assets reflect the needs of our customers and stakeholders. We combine this with **evidence-based decision making** to inform our response and develop **optimal works planning and delivery**.

We achieve this through **an aligned organisation** and by **continually innovating and adapting** how we do things by empowering our people, investing in our asset management system, and piloting and trialling new technologies and concepts.

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1 Introduction

SA Power Networks provides a fully managed service of delivering electricity that is safe and reliable. We monitor the distribution network 24/7, connect new customers, ensure the network has the capacity to support demand for load and export services, manage safety risks, address reliability and quality of supply issues, promptly restore supply when outages do occur, keep customers informed, and comply with all Acts and regulations.

1.1 Purpose

This SAMP aims to align our asset management activities across the business to deliver the most value to our customers and stakeholders. It does this by outlining the operating environment and the challenges we face in delivering the service now and into the future, and the overarching strategies we are implementing to deliver a valuable service to customers.

> *Our asset management practices aim to maximise value for all stakeholders of the network*

1.2 Scope

This SAMP covers the SA Power Networks electricity distribution network assets and the associated systems that are used in the provision of regulated distribution network services, comprising:

- sub-transmission system;
- zone substations;
- distribution network including the high and low voltage network and service lines;
- mobile plant; and
- telecommunication and control centres and their associated facilities.

The SAMP does not include non-network related assets such as business and commercial telecommunications systems, motor vehicles, properties, office buildings and building equipment (e.g. furniture, computers). It also excludes unregulated network assets.

1.3 Audience

The intended audience for this plan is:

- senior management, asset managers and other staff who play a role in the delivery of electricity service to our customers;
- customers and other stakeholders wanting to understand how we manage our assets;
- shareholders, to provide assurance and explain governance of our asset management practices; and
- regulators, to clarify our approach to the Australian Energy Regulator (AER), Essential Services Commission of South Australia (ESCoSA) and Office of the Technical Regulator (OTR).

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1.4 Relationship with other plans and strategies

Several SA Power Networks plans and strategies are related and inform the Strategic Asset Management Plan:

- **Strategic Plan and other corporate strategies:** details our strategic direction, key priorities and core areas of focus, and sets the overarching direction for the organisation.
- **Network Strategy:** defines our long-term vision for our Network and how we will operate
- **Asset Management Policy:** sets out the principles we apply to our asset management activities.
- **Regulatory Proposal(s)** summarises our business plans with a focus on a specific five yearly regulatory control period submitted to the AER for decision.
- **Distribution Annual Planning Report:** informs National Electricity Market (NEM) regulators, participants and stakeholders about the existing and forecast system limitations on our distribution network; preparation of this document is a regulatory requirement.
- **Safety, Reliability, Maintenance and Technical Management Plan** (**SRMTMP):** details the management framework, key procedures and associated performance indicators for the safety and technical management of SA Power Networks electricity infrastructure through its life cycle; preparation of this document is a regulatory requirement.
- **Detailed strategies, plans, manuals, policies, processes and procedures:** gives detailed guidance for maintenance and day-to-day operation activities.

Figure 1 shows the relationship between these plans and strategies.

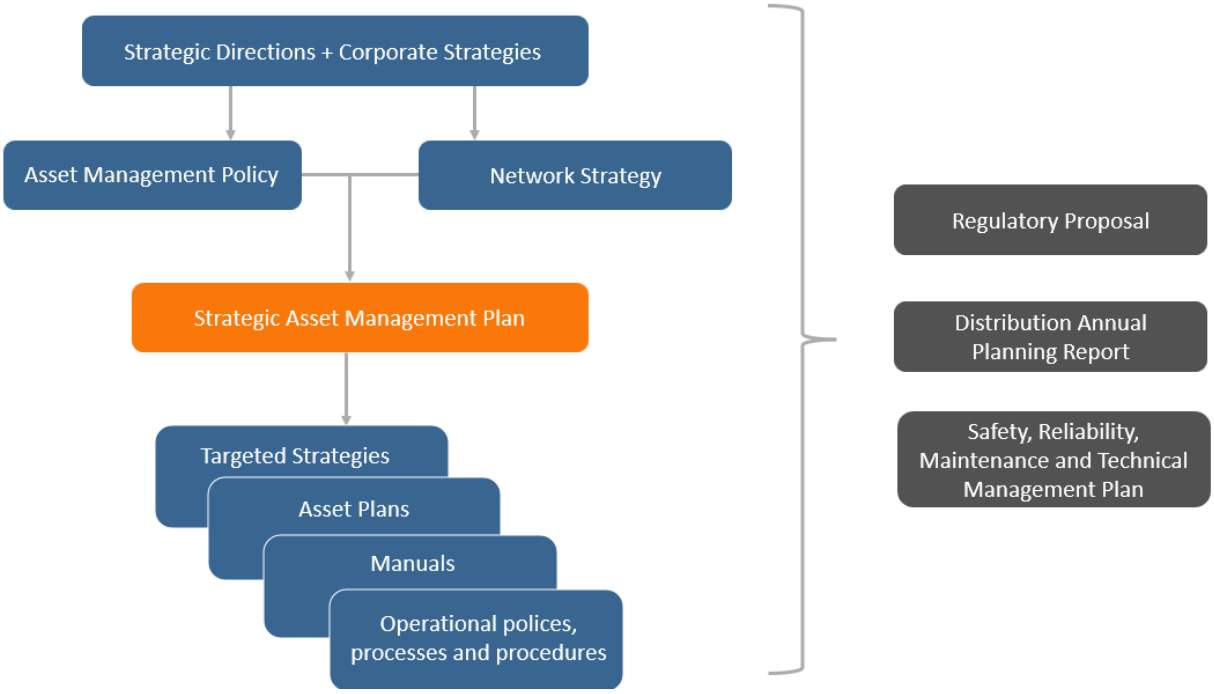

Figure 1: **Strategic Asset Management Plan relationship to other SA Power Networks plans and strategies**

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2 Strategic Direction, Governance and Regulation

The business objectives and direction of SA Power Networks guide its approach to asset management.

Strategic Directions	• Our vision is to lead the transformation of energy services for a sustainable future. • Our asset management system links our actions to our corporate direction and objectives
Network Strategy	• Outlines our 10-year vision and key strategies to help us adapt, evolve and deliver in a decade of unprecedented disruption in the energy sector
Asset Management Policy	• Our asset management policy governs our asset management activities
Asset Management Vision	• Our Asset Management Vision outlines how we will achieve our corporate Strategic Direction aligned with the Network Strategy
Risk appetite	• Our Risk Appetite Statement addresses key risk areas and provides guidance on the nature and extent of risk the board is willing to take. • Provides direction to the business on ow risk should be evaluated in decision making.
Governance	• Our cross-functional asset management steering committee oversees our asset management activities • Our quality management system is ISO 9001:2015 certified • We are actively aligning with the ISO 55000 Asset Management System standard

2.1 Strategic Directions

SA Power Networks Group has developed a long-term Strategic Direction[1] which seeks to guide the business as it navigates the challenges and opportunities likely to present during the next 15 years to 2035.

The Strategic Direction considers:

- our strong foundation of business performance;
- our emerging challenges and opportunities;
- key strategic choices that must be made to ensure we best leverage our strong existing capabilities to address these challenges and opportunities;
- a refined purpose, vision and values – aligned to those choices;
- the areas upon which we'll need to focus to achieve our refined vision, and the key outcomes we seek to deliver in these areas over 5, 10 and 15-year horizons;
- the key shifts and outcomes that the Strategic Direction will deliver for stakeholders, and over what timeframes; and
- the governance framework we'll need to put in place to ensure we remain on track

The infographic below outlines the strategic shifts we need to make to embrace the future.

[1] For more detail please refer to the Strategic Direction 2035

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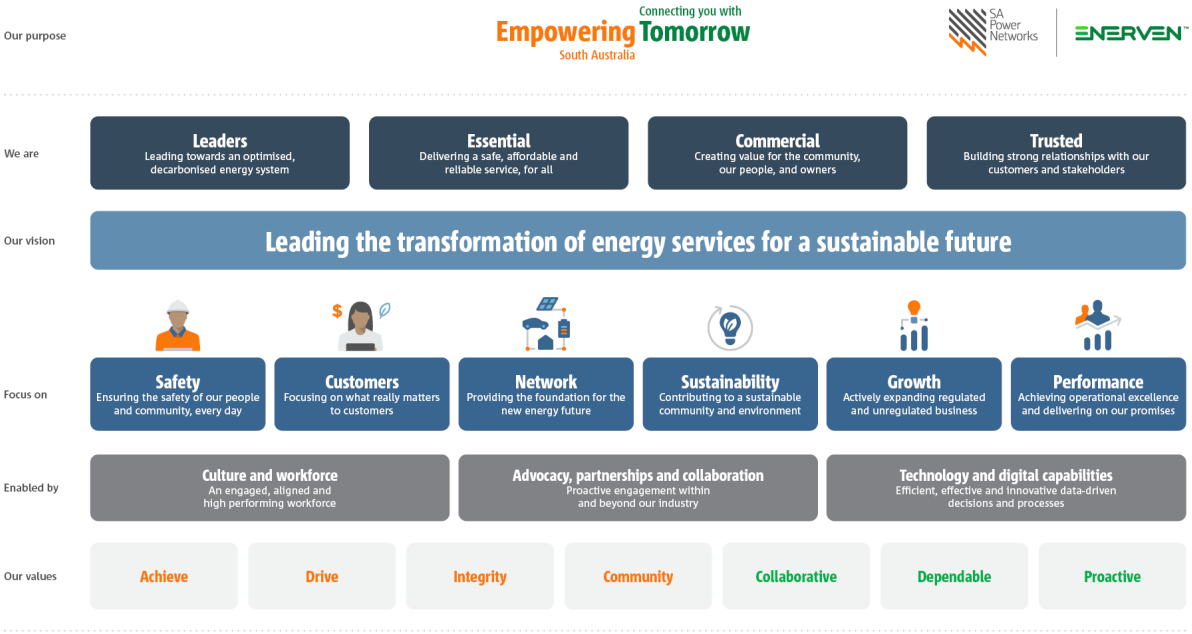

Figure 2: SA Power Networks strategic plan infographic

2.2 Network Strategy

Our Network Strategy[2] describes how we will play our part to enable a well-managed transition to a distributed energy future and support the state's vision to achieve net 100% renewable electricity by 2030, while continuing to provide safe, reliable, affordable power to the community.

It comprises the three key strategic themes of empowering our customers, enabling the energy transition and maintaining a sustainable foundation; enabled through our continued courage to lead industry at a time of significant change, and by the proven dedication and expertise of our people.

[2] For more detail please refer to the Network Strategy

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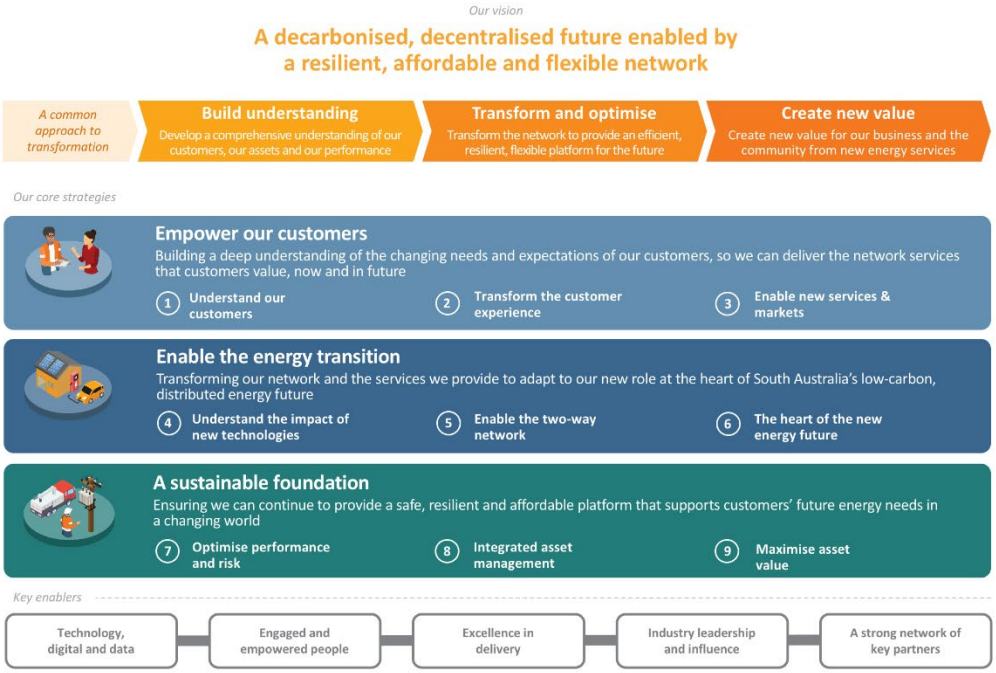

Figure 3: SA Power Networks network strategy vision

2.3 Asset management policy

The asset management policy[3] applies to all SA Power Networks assets and associated activities, and supports excellence in asset management and delivery of essential services.

Our asset management policy states that we will employ good asset management practices that:

- provide a safe environment for employees, contractors and the community;
- are guided by the Corporate Strategic Plan;
- are driven by the levels of service that customers value;
- ensure we comply with our regulatory obligations;
- deliver a prudent risk based approach; and
- foster continuous improvement.

2.4 Asset Management Vision

The Asset Management Vision[4] supports the Strategic Direction in realising SA Power Networks Vision. It supports the implementation of organisational strategies by influencing how end-to-end asset management is implemented across the entire lifecycle of the network. It provides guidance to the Asset Management Improvement Plan.

[3] For more detail please refer to the latest Asset Management Policy
[4] For more detail please refer to the latest Asset Management Vision

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Figure 4: SA Power Networks asset management 2035 vision

The key themes outlined in our vision are:

1. Customer and Stakeholder Focus
2. Outcomes Driven
3. Evidenced Based Decision Making
4. Optimal Works Planning & Delivery
5. An Aligned Organisation
6. Continually Innovating & Adapting

These themes help shape our Asset Management and are detailed further in section 8.

2.5 Risk appetite

Our Risk Appetite Statement[5] draws together how and where SA Power Networks makes explicit its appetite and tolerance for risk in guiding key decisions made by the Board and senior management.

The Board takes a 'zero tolerance' approach to wilful or negligent behaviours towards work health and safety policies and directives that potentially put the safety of staff, customers and other stakeholders at risk.

The Board also has a reducing tolerance for bushfire risk relative to previous years consistent with community expectations and our legal obligations to take all reasonable steps. Management is expected to monitor and evaluate our bushfire risk exposure and identify the optimal mitigation plan. SA Power Networks is then expected to be fully compliant with the adopted bushfire management plans.

[5] For more detail please refer to the latest Risk Appetite Statement

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The Board has an appetite to operate existing assets within the full range of their engineering specification based on adopting a risk-based approach to operating and maintaining assets.

2.6 Governance

Asset Management Steering Committee

The Asset Management Steering Committee is an executive level group whose membership spans the functional areas of the business, primarily Strategy & Transformation, Innovation & Technology, Network Management and Field Services. Its purpose is to embed, integrate, monitor, support and report on the development and implementation of asset management practices at SA Power Networks.

The steering committee has been established to ensure our asset management efforts are customer centric, aligned and coordinated across the business.

Financial Control

SA Power Networks exercises financial control through its strategic planning process and associated budgetary control, delegations of financial authority with respect to incurring expenditure on behalf of SA Power Networks and procurement authority with respect to the acquisition of goods and services.

The purpose of delegations of financial authority are to ensure that an individual's authority is commensurate with an individual's responsibility and accountability. This ensures that the appropriate individuals have the ability to manage effectively.

The financial approval process provides authority for a specific activity to be undertaken and evidence that funds are available. Financial approval must be obtained prior to the commitment of any expenditure on internal or external resources.

As part of the annual budgeting process, the Board approves the commitment of capital expenditure in principle. However, individual capital projects must be approved in accordance with Board delegations following the development of a business case in line with SA Power Networks Capital Expenditure Guidelines.

ISO 9001:2015 Quality Management System certification

We frequently need to demonstrate compliance with laws and regulations. Our quality management system for network management, certified to ISO 9001:2015 Quality Management Standard, helps us manage regulatory requirements, improves the predictability of our processes and provides clear guidance to our staff.

Alignment with ISO 55000:2014 Asset Management System

In addition to our quality system already being ISO 9001 certified, we are committed to aligning our processes with that of the ISO 55000:2014 Asset Management framework through our Asset Management Transformation Program.

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2.7 Regulation

SA Power Networks is a DNSP operating in the NEM. As shown in Figure 5 below, we are governed by multiple agencies at a State and National level.

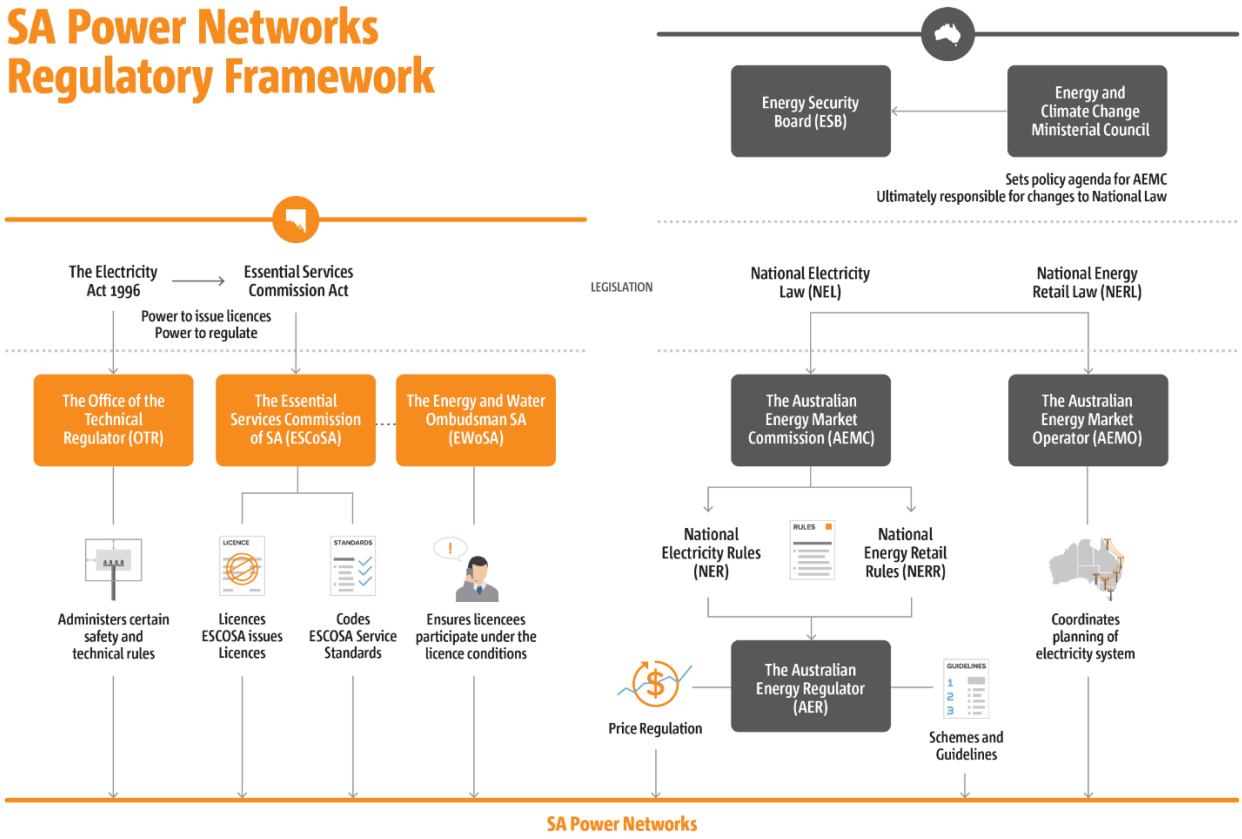

Figure 5: SA Power Networks regulatory framework

The economic regulation of SA Power Networks is undertaken by the AER. In undertaking this role, the AER is required to do so in a manner that will, or is likely to, contribute to the achievement of the National Electricity Objectives (NEO) in the National Electricity Law (NEL). The AER undertakes its regulatory functions as specifically guided by the National Electricity Rules (NER) and National Energy Retail Rules (NERR).

The jurisdictional regulator of South Australia, ESCoSA, retains responsibility for setting service standards in relation to service levels (including with respect to reliability), whilst the OTR is responsible for setting and overseeing the safety and technical regulation of the energy industry in South Australia.

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3 Understanding our Stakeholders

SA Power Networks' customers and stakeholders are widespread, diverse and evolving.

Who are our customers and stakeholders	• Our customers and stakeholders are evolving and diverse
Engagement activities	• We have ongoing engagement with our customers and stakeholders, including a dedicated engagement framework consisting of a Community Advisory Board and associated reference groups (eg Connections, Tariffs, Vegetation Management) • Our current focus is on making sure the expectations, views and priorities of our customers and stakeholders are reflected in our plans for the 2025–2030 RCP
What we've heard	Customers want us to: • Maintain safety & reliability • Deliver good service • Enable the clean energy transition • Keep the price as low as possible

3.1 Who are our customers and stakeholders?

We define our customers as any individual, business or other party who pays us directly or indirectly to use our network infrastructure to receive or provide a service as depicted in Figure 6. The expectations of customers and stakeholders vary significantly depending on individual or organisational expectations and needs.

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Figure 6: SA Power Networks customers and stakeholders

3.2 Customer and stakeholder engagement activities

We have been engaging with stakeholders and consumers on a broad range of issues and projects for a number of years working collaboratively with our Community Advisory Board (CAB). The CAB's role is to ensure that customer views shape our service delivery and are at the heart of all our decision-making. Its members are drawn from across the South Australian community, representing businesses, green energy, youth, regional communities, consumer advocacy groups, local government representatives and diverse populations. The CAB maintains high-level oversight and provides regular advice on the engagement process for our 2025-30 Regulatory Proposal.

As we prepare for our 2025–30 Regulatory proposal, we've been undertaking an extensive stakeholder engagement program. It is during this time that our customers and key stakeholders can have the most influence on our future direction. Our goal is to understand the expectations, views and priorities of our customers and stakeholders, to ensure our plans for the 2025–30 Regulatory Control Period reasonably reflect what customers value.

A high-level overview of our engagement process for the Regulatory Proposal for 2025-30 is illustrated below. This commenced with development of key themes and priorities in late 2021, after which we consulted with a wide range of customers and stakeholders in our Broad and Diverse stage, which comprised visits to six regional sites. This was followed by deep dive Focused Conversations into specific priorities identified during earlier stages, culminating in our People's Panel in early 2023. This process enabled an iterative approach to forecasting our total capital and operating expenditure, with each key stage of our engagement program directly informing each forecast iteration, and the outputs of each stage providing input into the next.

Figure 7: SA Power Networks regulatory proposal stakeholder engagement plan

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3.3 What we've heard

Throughout our engagement, four key themes continued to recur and were reinforced and refined at each stage. These were:

- **Maintain safety and reliability** – keep the lights on and minimise the risk of public harm from the failure or operation of network infrastructure.
- **Deliver good service** – be easy to deal with and help customers navigate the complex choices in responding to the new energy future.
- **Enable the clean energy transition** – since this is fundamental to mitigating climate change, and over the long-term, will result in significant reductions to customers' energy bills.
- **Keep the price as low as possible**, and play your part in improving equity – because some customers are doing it particularly tough as interest rates and cost of living increases impact. These outcomes have been considered during the development of our response and strategies, and feed into our 2025–30 Regulatory Reset Submission.

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4 Our Asset Portfolio

SA Power Networks delivers value to stakeholders through its assets. To successfully develop our asset management plans, it is important to understand the current state of our assets and of our asset management systems.

Role of the distribution network	• Fully managed service of delivering electricity that is safe, reliable, and secure • A changing role with the change in generation sources such as solar PV, and with export services now formally recognised within our regulated distribution services
Our infrastructure	• 173,000km of overhead conductors, 19,000km of underground cables, 404 zone substations, 77,000 transformers, 611,000 Stobie poles • 30% of our customers are rural and serviced by 70% of the network • Our total asset replacement cost is $65 billion
Environmental factors	• Our network intersects bushfire risk areas • Corrosion due to coastal proximity is a problem for our overhead network • Our assets are increasingly exposed to severe weather events • Our network is susceptible to trees near powerlines
Culture, the organisation and asset management	• We are one of the largest employers in South Australia • Safety is embedded in our business culture • Our industry is technically specialised and it takes time to train new staff

4.1 Role of the distribution network

Our role has traditionally been to provide a fully managed service of delivering electricity that is safe and reliable. Our assets extend from connection points shared with the transmission company (ElectraNet) to the customer's point of supply. Figure 8 illustrates our functional role in the electricity supply chain.

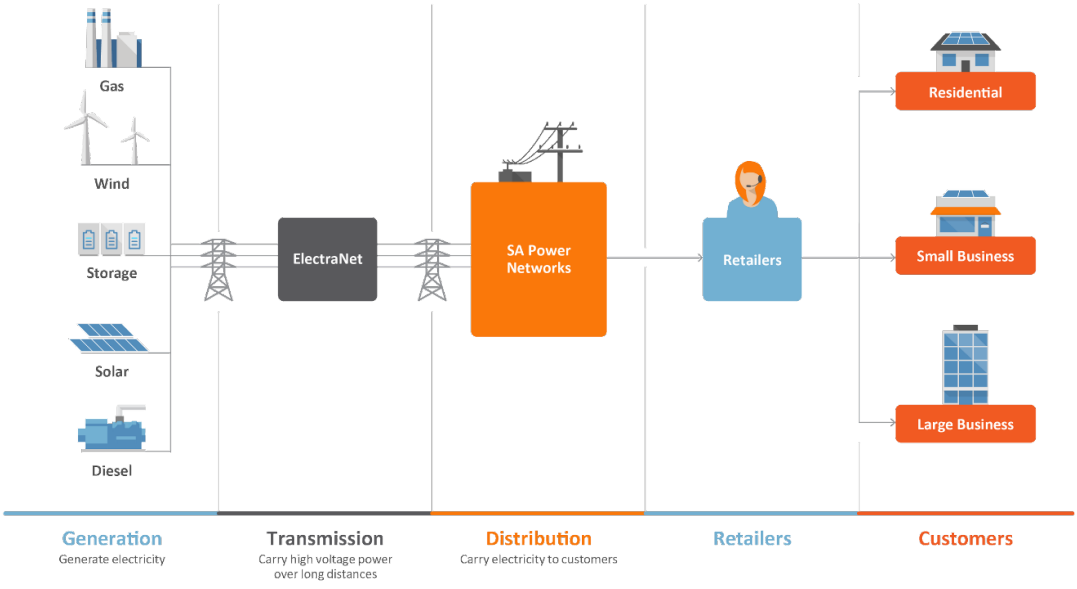

Figure 8: South Australia's electricity supply chain

However, electricity is now distributed from diverse electricity sources and thus the network has two-way flow. This transformation of the energy system presents opportunities for SA Power Networks and the community.

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SA Power Networks is playing an active role in enabling customers to get the most from their grid connected solar PV through the introduction of flexible exports. Electric vehicles also represent a new market for us to supply with energy.

Such two-way flow also presents challenges to our assets and business in maintaining regulated voltage levels, threatening to exceed thermal ratings of equipment, and placing overall system security of supply at risk by displacing traditional synchronous generation sources such as gas and coal generators.

4.2 Our infrastructure

The distribution network in South Australia is vast. It covers an area of more than 178,000km^2 along a coastline longer than 5,000km. The network extends more than 90,000km across difficult and remote terrain and operates in demanding conditions. It includes approximately 400 zone substations, 77,000 transformers, 611,000 Stobie poles, 173,000km of overhead conductors and 19,000km of underground cables. Figure 9 shows the extent of our service area.

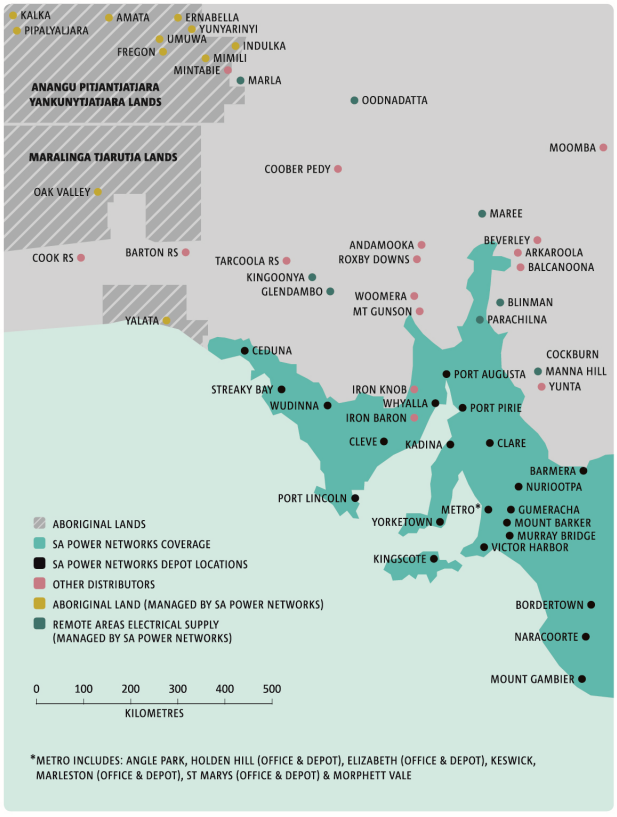

Figure 9: SA Power Networks service area

The distribution network is made up of the sub-transmission system, substations, the high voltage distribution network and the low voltage network. The sub-transmission network supplies and connects zone substations, operating at 66,000 volts and 33,000 volts. In rural and remote areas, long single-phase lines connect remote customers. About a third of our network comprises these long 'single wire earth return' lines operating at 19,000 volts. In higher density rural and urban locations, the three-phase high voltage distribution network operates at 11,000 volts. The standard low voltage customer supply is 230 volts at 50Hz.

Our major electricity distribution assets are summarised in Table 1. We supply electricity to customers on isolated farms in rural areas through to industry precincts, regional and metropolitan residential homes, businesses and city centres.

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Table 1: SA Power Networks electricity distribution assets summary

Asset classification	Quantity	Replacement value ($m)[6]
Underground cables (circuit km)	19,065	25,084
Poles	611.316	7,628
Overhead conductors (conductor km)	173,114	10,584
Transformers	76,857	2,365
SCADA network control and protection systems	6,367	3,649
Switchgear	8,227	1,269
Service lines	840,369	531
Pole Top Structure	miscellaneous	13,931
Other: DNSP defined	miscellaneous	48
Total		65,091

Pole top structure

Distribution transformers

Substation transformer

Underground cable

Figure 10: Selected examples of SA Power Networks infrastructure assets

[6] Calculated as historic replacement cost x units in service

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4.3 Environmental factors

Bushfire risk areas and corrosion zones

Figure 11 illustrates the three bushfire risk areas in South Australia. The South Australian distribution network intersects with several protected natural reserves, conservation parks and forestry plantations. Operating the distribution network in forested areas poses significant bushfire risks.

In addition, SA Power Networks' overhead electricity distribution network is predominantly located along the coast, where exposure to a saline environment is high and leads to high levels of corrosion. Figure 12 shows the levels and location of the atmospheric corrosion zones in South Australia. A large part of the distribution network (see Figure 9), is in severe and very severe corrosion zones.

To effectively manage our asset portfolio, SA Power Networks specifies and considers the bushfire risk area category and the corrosion zone for each asset in our asset management database.

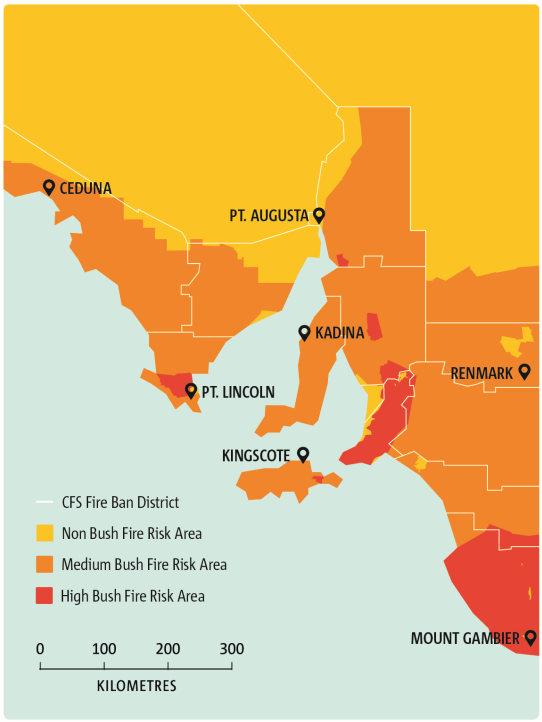

Figure 11: Bushfire risk area, South Australia

Figure 12: Atmospheric corrosion zone, South Australia

Hot and dry climate

Adelaide and much of South Australia has a dry climate featuring greater extremes of summer temperature than most other Australian capitals. Extended periods of heatwave conditions can occur in summer. During these heatwave periods, summer daytime temperatures can exceed 40 degrees Celsius for several days in a row; overnight minimums can remain above 30 degrees Celsius for some of those days.

South Australia thus has one of the peakiest electricity demands in the world driven by the demand for cooling during our hot summers. On the few extremely hot days of a South Australian summer, typically around six to nine days each year, air conditioning loads cause South Australia's electricity demand to double relative to average demand levels. For many customers, air conditioning plays an important role in maintaining reasonable levels of comfort, and can be critical for their health. Customers expect us to

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ensure sufficient capacity exists in our network (with the support of non-network solutions), to meet these peak demands that occur for less than 2% of the year.

Severe weather events

Our distribution network is vulnerable to weather and climatic changes including coastal flooding, extreme heat, drought, wind speed and bushfires.

The climate in South Australia is changing and will continue to change. The CSIRO report, Climate Change in Australia[7], shows a plausible range of climate system responses to given emission scenarios and the range of natural variability for a given climate. The report indicates higher temperatures, hotter and more frequent hot days, less rainfall in winter and spring, increased intensity of heavy rainfall events, longer drought duration, slower winter mean wind speed, increased solar radiation and reduced relative humidity in winter and spring, increased evaporation rates, and reduced soil moisture and runoff.

These changes have implications for the electricity service we provide to our customers, especially electricity demand, supply and reliability. Severe weather events are the major cause of prolonged interruptions to power supply in South Australia. The challenge of maintaining overall reliability of the network under changing climatic conditions will remain high.

[7]Source: CSIRO, Climate Change in Australia Projections Cluster Report - Southern and South-Western Flatlands, 2015

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5 Opportunities & Challenges

The electricity industry in which we operate is evolving at a rapid pace. Internal and external issues challenge our electricity service delivery now and into the future, and we have a range of options to address them.

Ageing infrastructure	• Large proportion of assets built during 1950s and 1960s • Low historic investment in renewal expenditure (0.25% of asset replacement value per annum) • Increase in risk on network due to degrading condition of assets
Increasing & dynamic energy flows	• Increasing demand due to electric vehicles and transition to electricity for energy more broadly • More complex pattern of energy flows with increasing CER connection
Varied Reliability	• In general our customers have seen improving reliability over the long term, but more recently reliability has been declining • Some regions/customers are experiencing declining or relatively poor performance • We have failed to meet reliability targets in the CBD
Climate change increasing risks	• The risk of bushfire from our assets is increasing • The potential for extreme weather events to impact our network is increasing
Increasing volume of investment	• Increasing volumes of investment challenge our existing processes and systems
Workforce & Sourcing Considerations	• Recognised national shortage of core skill types to deliver the Network Program, • Service provider market and capability within South Australia.

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5.1 Ageing infrastructure

SA Power Networks has one of the oldest electricity distribution networks in Australia with a large proportion of our network constructed in the 1950s and 1960s. Much of this network will reach the end of its life in the coming decades.

While the network was relatively young, the level of sophistication to manage the assets was low and proactive replacement of many asset types was minimal.

As the network deteriorates, without a better understanding, we risk electricity assets failing in-service resulting in power outages, safety incidents or bushfires. This risk will be made worse in coming decades by climate change.

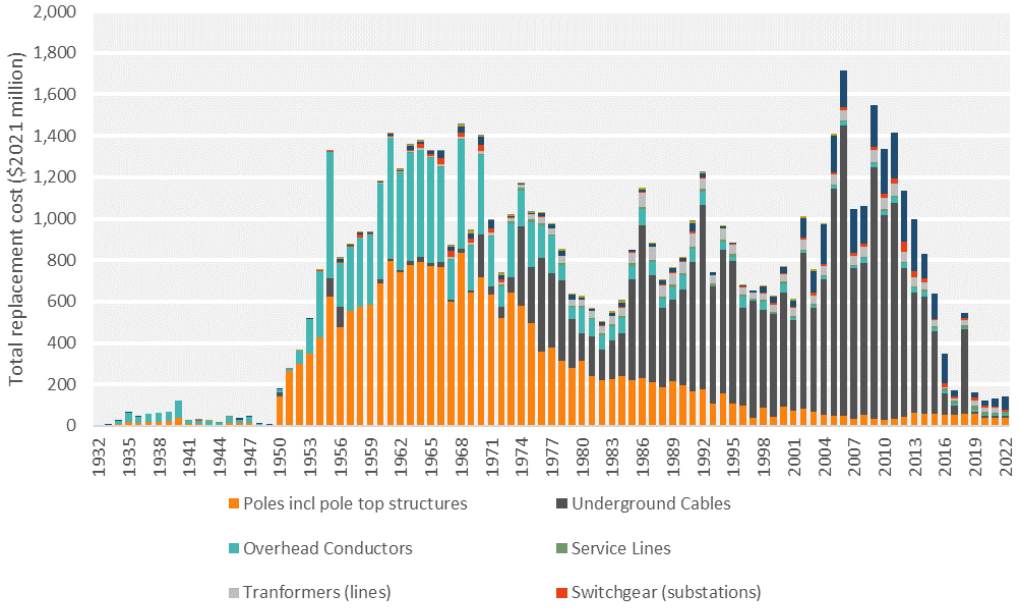

Figure 13: Asset replacement cost by age

Given the long lives of the assets that make up the network, SA Power Networks has replaced relatively little of the network constructed to date. While a low replacement rate of long-lived assets is appropriate when the assets are relatively new, this is not sustainable in the long-term. Without an increase in replacement rates, failure of in-service network assets will increase, leading to a gradual deterioration of service levels for customers and endangering the safety of the community.

While the assets were relatively young the level of sophistication required for our asset replacement planning was rudimentary. In recent years we have made a step change in our understanding of our asset condition and risk (including in a monetised way, by quantifying the dollar impact on customers), however further advancements will likely be required to ensure we can manage the safety and reliability of our ageing fleet at lowest cost.

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5.2 Increasing demand and a more dynamic energy system

In the coming decade the demand on our network will gradually increase as new customers continue to connect to our network and our existing customers move more of their energy needs to electricity. The Australian Energy Market Operator (AEMO) notes in its latest forecast for electricity demand that while we can expect strong growth in rooftop solar PV systems, demand will increase through the take up of electric vehicles and the shift from gas to electricity.

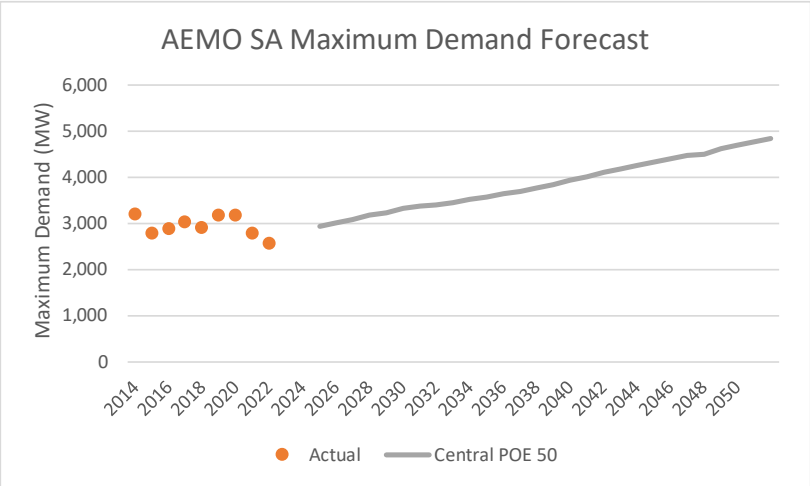

Figure 14: Peak electricity demand forecasts for South Australia

While peak demand growth is not new (the network experienced significant growth in the 1990s and 2000s driven by the adoption of reverse cycle air conditioning), the nature of the electricity flows on the network will be dramatically different. There are currently 330,000 homes and businesses in South Australia that have rooftop solar, with a combined capacity of 2.2GW, making rooftop solar by far the biggest generator in the state. During spring and summer there are times when more than 90% of the entire electricity needs of the state are supplied by rooftop solar alone. In October 2021 the net load on our distribution network fell below zero for the first time and we now regularly experience reverse power flows across large areas of the network during sunny conditions. No other large-scale electricity network in the world is operating in this way.

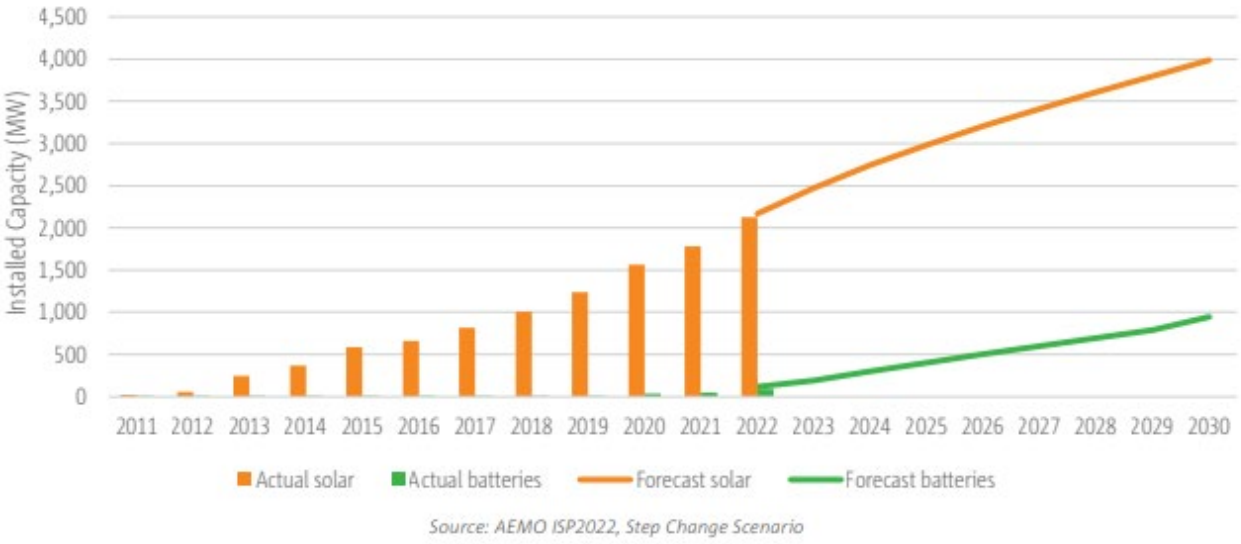

Figure 15: AEMO step change scenario solar and battery storage capacity forecast

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Batteries, large and small, are also now an integral part of South Australia's electricity system. In addition to very large-scale batteries, like the 150MW Hornsdale Power Reserve (the world's first 'big battery'), which connect to ElectraNet's transmission network, we see growing numbers of mid-sized grid-connected batteries connecting to our distribution network. This includes the community batteries planned to be rolled out in South Australia as part of the Commonwealth Government's Community Batteries for Household Solar scheme.

There are also now more than 40,000 small-scale batteries in homes and businesses in South Australia, more than any other state. More than a third of these are enrolled in Virtual Power Plant schemes which allow them to be centrally controlled and operated, enabling customers to earn money by using their batteries to trade in the wholesale energy market and to help stabilise the power system.

While batteries help soak up surplus daytime solar and reduce evening peak demand, the ability of batteries and virtual power plants to switch between exporting and importing large amounts of energy in a very dynamic manner creates unique challenges for the distribution network.

The coming growth in demand will be a more complex challenge than the growth in previous decades driven by a relatively predictable steady growth in summer peak demand. In the coming decade the electrical flow on the network will peak in different locations at different times of the year. Given the capacity of the network also changes through the year this more dynamic flow and changing capacity will require additional sophistication in our approach to demand forecasting and capacity planning.

5.3 The reliability our customers experience varies across South Australia

With recent increases in network expenditure we have managed to meet the reliability targets in most regions set out in the South Australian Electricity Distribution Code (EDC) published by the jurisdictional regulator, the Essential Services Commission of South Australia (ESCoSA). However, the reliability of our network in the Adelaide CBD is worsening.

Also, while we have generally been meeting regulated targets (other than the CBD) – and *on average* our customers are experiencing less outages – customers in some regions suffer significantly more outages than the state average.

Rural and remote communities supplied by long, radial networks particularly feel the effects of long duration outages. Critical infrastructure in these areas rely on a consistent power supply to deliver essential services such as water, health care and telecommunications.

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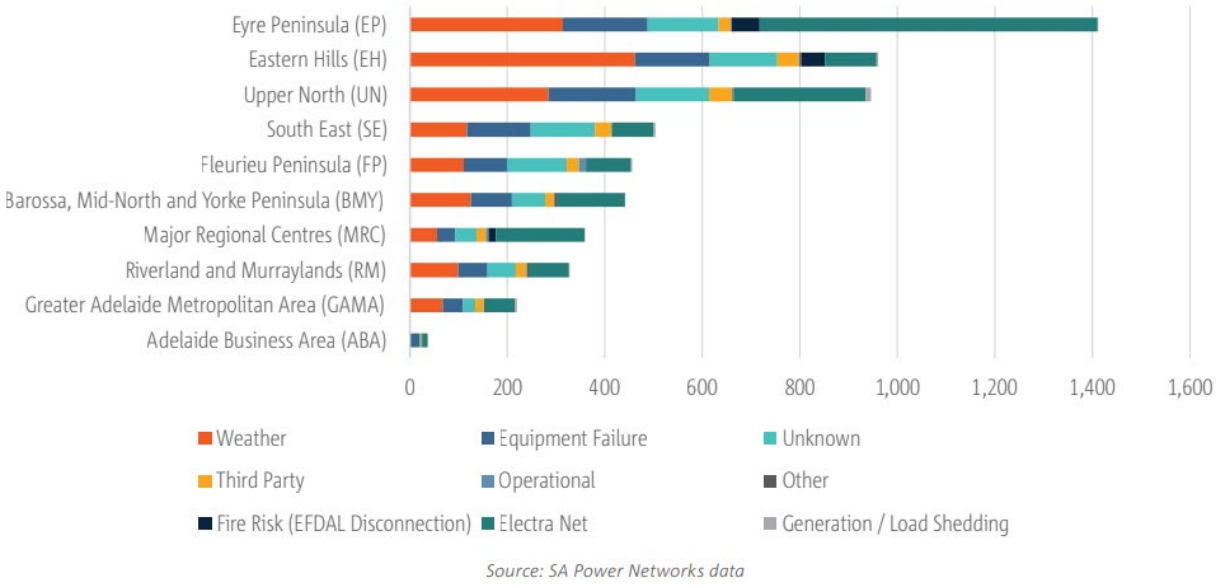


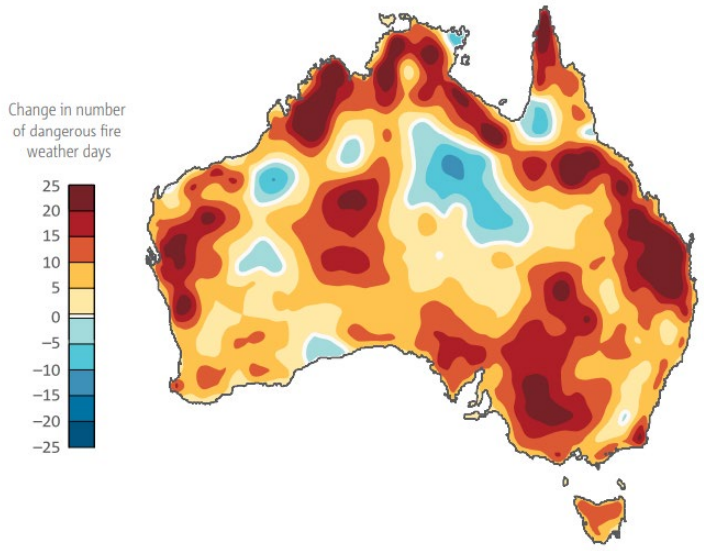
Source: SA Power Networks data

Figure 16: Supply interruptions causes by region

It is important that we consider the experience of all our customers - not only averages - as we develop our asset plans to ensure certain customers and communities are not left behind.

5.4 The risk of bushfire is increasing

Although we have robust business-as-usual practices to manage the bushfire risk each season (including pre-bushfire season powerline patrols, inspections and vegetation management), faults on our network can still result in fires. During the bushfire season, any one of these fires has the potential to result in a major bushfire that can result in significant losses to the South Australian community. Climate change will likely contribute to more frequent and severe high bushfire risk conditions increasing the risk to the community.



2022 State of the Climate, The Bureau of Meteorology and CSIRO, © 2022 Commonwealth of Australia

Figure 17: Change in number of days with FFDI exceeding 90th percentile between two periods - July 1950 to June 1986 and July 1986 to June 2022

Our understanding of bushfire risk has improved dramatically through modelling by the CSIRO based on historical weather, however we will need to consider the impact of climate change on this (and other) risks going forward.

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5.5 The volume of work on our network is increasing

In addressing these challenges, the investment in our network is expected to continue increasing – with additional investment in both asset replacement and augmentation of the network. Processes, systems and tools that were appropriate for delivering smaller volumes of large-scale projects will need to adapt to larger volumes of work to ensure we can plan and deliver our work as efficiently as possible.

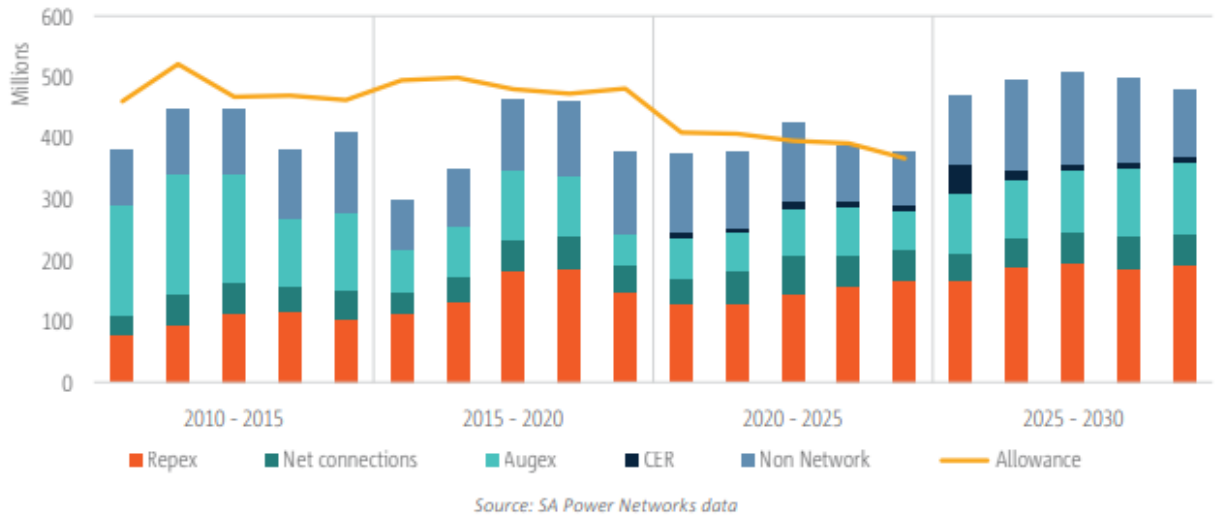

Figure 18: SA Power Networks expenditure

5.6 Workforce & Sourcing Considerations

Our approach to Workforce Planning and Strategic sourcing to address the challenges associated with increasing investment in our network is to undertake quantitative modelling to enable a sustainable, low risk, approach to resourcing the network program (being the total sum of our work in relation to network augmentation, network asset replacement, connections, CER integration).

The primary constraint identified in the resourcing plan is the ability to resource Trade Skilled Workers because of the lead time of three years until apprentices become productive. All other resource types are expected to be met with adequate organisation planning, as they have a reduced lead time. To address the recognised national shortage of core skill types, we have adopted a balanced approach to resourcing utilising our apprenticeship program, international recruitment, and continuation of our engagement of key external delivery partners.

Our key delivery partners have shown their commitment to contractual agreements and have worked with us to ensure that the needs of customers and the network are met. In addition, we are further developing these relationships with both key delivery partners and interstate service providers to further mature the resources available in the market and to support our long-term needs.

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6 Asset Management Objectives

Given our asset management context and the key strategic issues we face, SA Power Networks has developed six key asset management objectives.

Safety	• Keep the public, our staff and contractors safe
Engagement	• Develop levels of service that are supported by comprehensive customer and key stakeholder engagement
Service	• Achieve agreed current and future levels of service while complying with legislative requirements
Efficiency	• Deliver sustainable network investments and performance that are cost efficient and consistent with prudent risk management approaches
Regulatory support	• Maintain an asset management system that satisfies the criteria and evidentiary needs of our regulatory stakeholders
Stakeholder confidence	• Promote clarity and transparency to build stakeholder confidence

6.1 Safety

Safety is our number one priority. As an organisation that operates infrastructure that has the potential to injure or cause death to members of the public, our staff or our contractors, we must stay focused on managing safety. This includes understanding and managing the bushfire risk posed by our assets.

6.2 Engagement

Customer expectations are a critical input into our levels of service. We continually engage with our customers to help us understand their expectations through operational and targeted touch points. SA Power Networks values and respects the opinions and concerns of our stakeholders and actively gears its asset management system to deliver energy services that our customers value as outlined in section 3.2.

6.3 Service delivery

Our service delivery is the result that asset management achieves. It is the levels of service our customers experience. Our service targets have been defined through consultation with customer and stakeholders.

The categories we consider for service delivery are:

- customer service experience;
- reliability and power quality;
- environment;
- aesthetics;
- multi-flow grid; and
- communication and information.

6.4 Efficiency

We aim to manage life-cycle costs and optimise asset management outcomes for the long term. Effective asset management strategies require that both physical and non-physical assets are holistically managed and operated.

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6.5 Regulatory support

To ensure adequate expenditure allowances, we need to demonstrate the effectiveness of our management system and decisions to both state and national regulatory bodies.

In addition, it is only through a consistent and long-term vision of the network that we will be able to get support for changes to legislation as our role changes.

6.6 Stakeholder confidence

We aim to build stakeholder confidence through understanding our customers and consistently delivering on our commitments. This requires us to build consistent processes that deliver predictable outcomes. We also aim to be transparent in our decision making and act with integrity and social responsibility.

6.7 Success measures

The measures and targets by which we ascertain success are listed in Table 2.

Table 2: Success measures and targets

Measure	Target	By when
Safe		
Number of fatal risk incidents per year attributable to network assets and/or asset management activities	0 pa	Ongoing
Electric shocks attributable to our assets	TBC	
Fire starts attributable to our assets	TBC	
Engagement		
Stakeholders engaged	Stakeholders identified, engagement activities established and plans shared	Ongoing
Levels of service incorporate stakeholder requirements	Levels of service established in consultation with stakeholders	Ongoing
Efficient		
Relative performance efficiency rank compared to other Australian electricity distributors	Upper quartile	Ongoing
Regulatory support		
Regulatory proposal forecasts	Funding requirements for 2025–2030 clearly understood	By Jan 2024
Acceptable regulatory outcome	In line with funding required to effectively manage assets (as per regulatory proposal)	Before start of 2025–30 regulatory period
Stakeholder confidence		
TBC	TBC	TBC

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7 Past performance

In developing our asset management plans it is important that we consider the historic performance of our assets in delivering against our objectives.

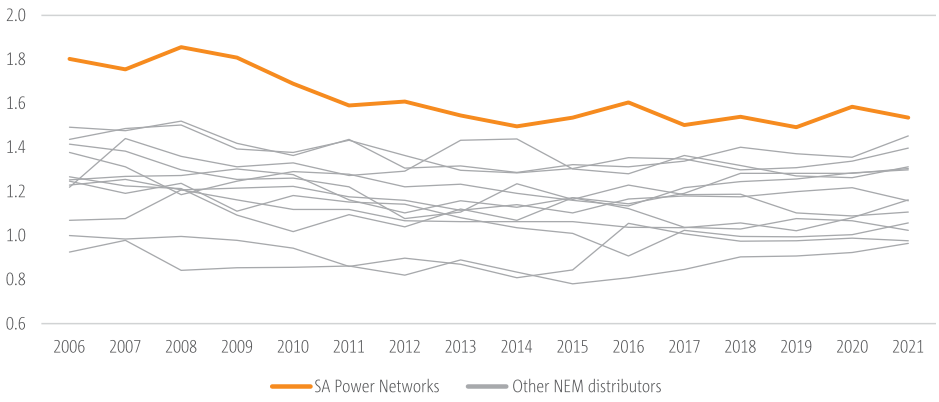
Efficiency	• We benchmark well against our peers • Most efficient distributor in Australia on a state-wide basis
Safety	• We have a strong focus on safety • Our safety performance has been maintained.
Reliability	• We generally meet our reliability targets • We have failed to meet our target in the CBD and for Rural Long feeders
Quality of supply	• We have actively reduced voltage complaints in recent years
Customer satisfaction	• Customer satisfaction is generally good

7.1 Economic efficiency

The AER undertakes annual benchmarking to compare the relative productivity of networks in the NEM.

We remain consistently among the most efficient distribution networks in the NEM, under the range of measures published by the AER, in relation to total, capital and operating productivity. For example, we rank as the most efficient NEM electricity distribution network on the measure of Multilateral Total Factor Productivity, which accounts for all capital and operating inputs and outputs, displayed in Figure 19.

This is the product of our ongoing focus on managing our assets as efficiently as possible to deliver the services that our customers expect and value. We retain strong relative performance notwithstanding the significant challenges of managing a network with the oldest asset fleet in the NEM and being at the forefront of the renewable energy transformation.



Source: Adapted from AER, Annual benchmarking report – Electricity Distribution Network Service Providers, November 2022, p.iv.

Figure 19: Electricity distribution multilateral total factor productivity indices by distributor, 2006-2021[8]

[8] Source: adapted from AER, Annual benchmarking report – electricity distribution network service providers, November 2022, p.i.v

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7.2 Safety

Safety is the number one priority for SA Power Networks given the network infrastructure has the potential to injure or kill members of the public, our staff or our contractors. Safety levels of service provide an indication of how safely the network is operated and maintained to minimise safety risks to staff, contractors, customers and the community in general.

Overall, SA Power Networks performance on measures for injuries to staff, contractors and the public arising from power assets has remained good due to the comprehensive safety systems and processes. While the rate of equipment related fire starts and equipment related switching incidents has remained stable this has corresponded with an increasing rate of asset renewals. It is anticipated that increased expenditure will be required to maintain these trends in response to the continued ageing and deterioration of the distribution network assets.

Safety of our employees is measured using lost time injury (LTI) frequency, medical treatment injury (MTI) frequency and Restricted Work Case (RWC) frequency.

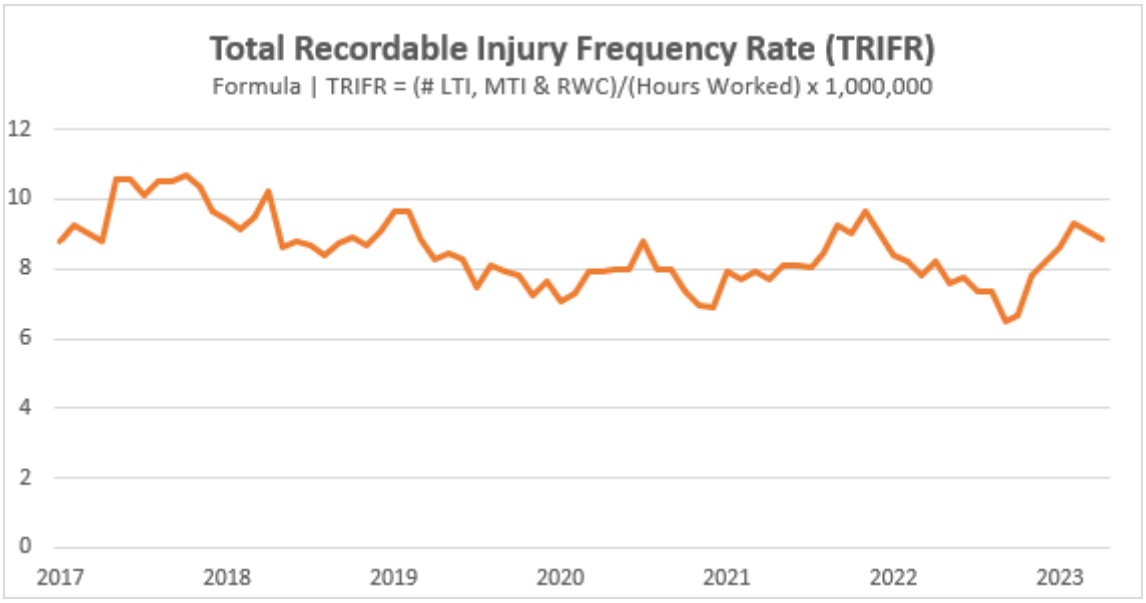

Figure 20: Total recordable injury frequency rate (2017–2023)

Safety of the community is measured using electric shocks and fire starts. The number of reports of our low voltage (LV) distribution network assets causing shocks, as displayed in Figure 21 has been relatively stable over the long term, noting that in recent years we have increased our proactive renewal expenditure for service lines which are the assets that contribute to increases in electric shocks, and introduced systems to leverage smart meter data to detect faults before resulting in a shock.

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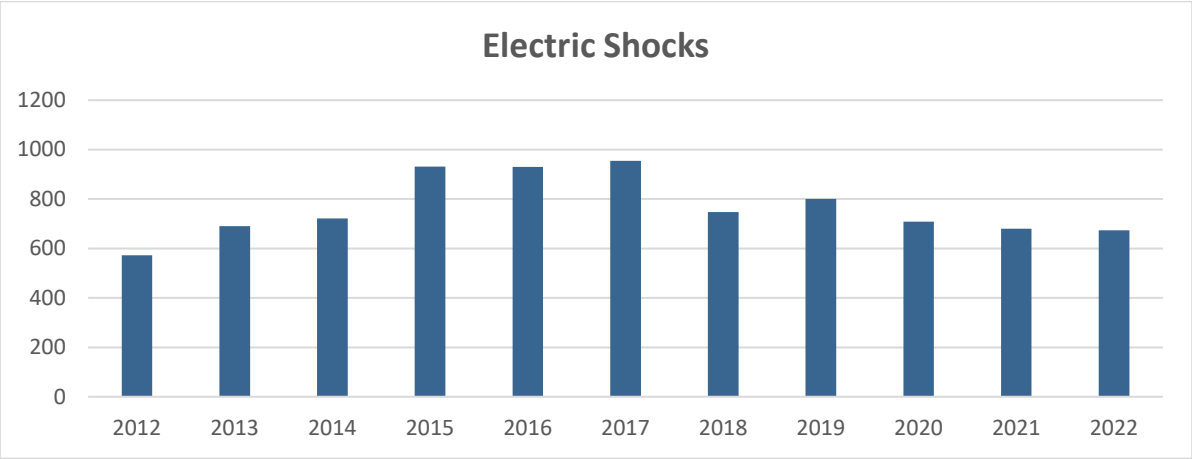

Figure 21 - Electric shock reports

Figure 22 shows the fire starts vary from year to year with no obvious long term trend. We manage bushfire risk through operational controls, increasing replacement expenditure, increasing sophistication in targeting of asset replacement based on risk and our vegetation management and ongoing investment in our Bushfire Risk Mitigation Program.

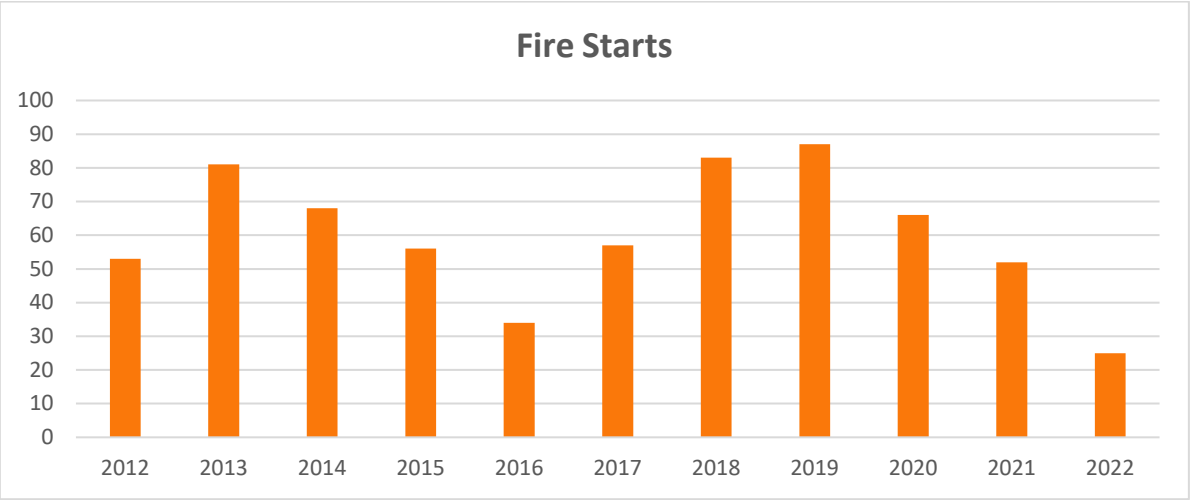

Figure 22 - Network fire starts

7.3 Reliability

We generally meet our reliability targets. Our historic performance for outage duration and outage frequency, excluding major event days is shown in Figure 23 below. It shows we have maintained both Unplanned System Average Interruption Duration Index (USAIDI) and Unplanned System Average Interruption Frequency Index (USAIFI) over the longer term (with a more recent decline in performance since 2019/20).

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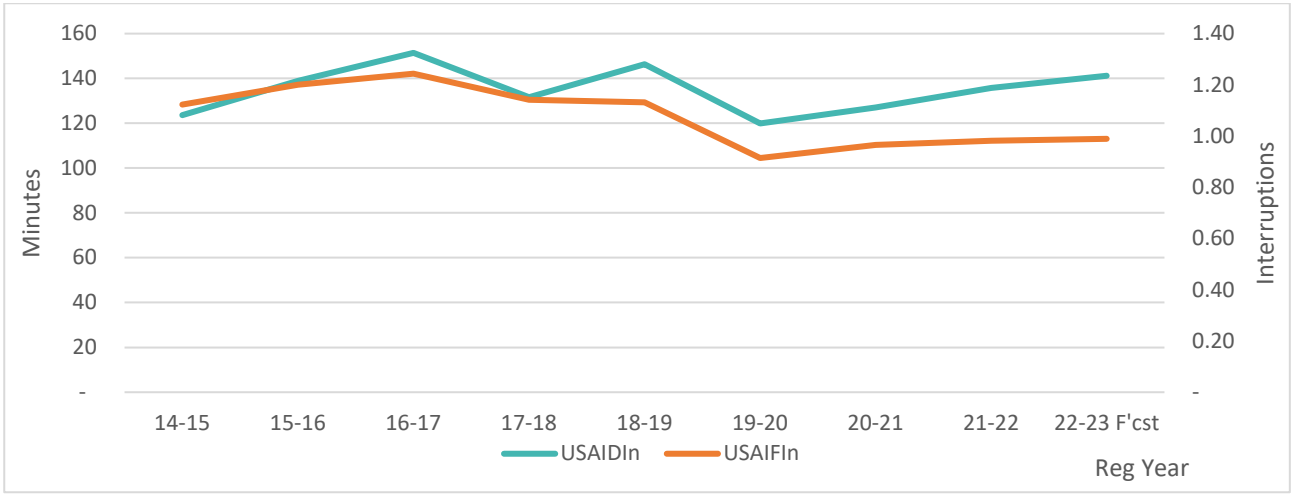

Figure 23: Historic USAIDI and USAIFI performance

We have achieved this partly through our distributed feeder automation (DFA) program which automatically isolates faulted sections of the network – reducing the number of customers interrupted during an outage. Figure 24 below shows that without DFA our reliability (both USAIDI & USAIFI) would have deteriorated over the last 5 years.

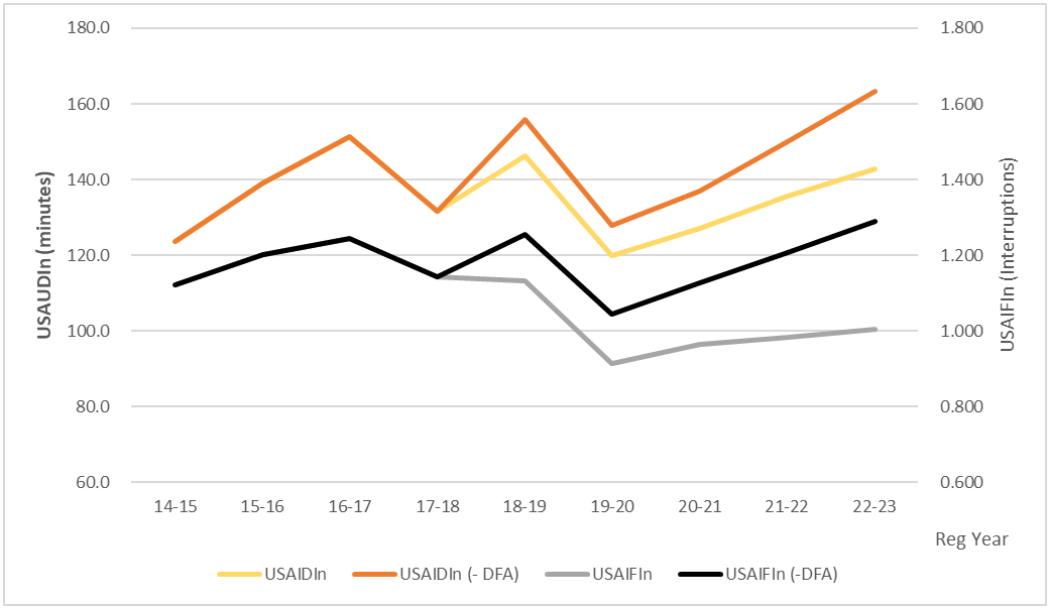

Figure 24: SA Power Networks USAIDI and USAIFI with and without DFA

7.4 Quality of supply

In the years from 2015 to 2020 complaints about solar PV-related high voltage in the local network significantly increased (Figure 25). When the local network experiences high voltage, solar PV inverters turn off and prevent systems from exporting energy, thus reducing the income generated from these systems for their owners. In 2020 SA Power Networks commenced a project to implement enhanced voltage management capabilities at zone substations to actively manage voltage and increase the network hosting capacity for distributed energy resources. The number of enquiries has clearly declined from 2020 as we implemented enhanced voltage management capabilities at our zone substations.

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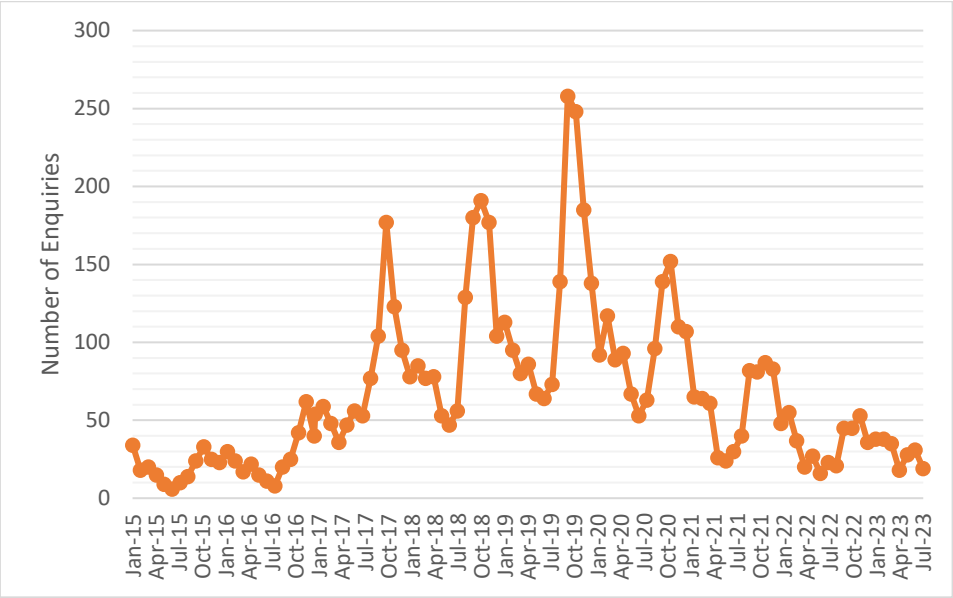

Figure 25: Solar PV related high voltage customer enquiries[9]

7.5 Customer satisfaction

Figure 26 shows that the combined satisfaction score, as measured by Customer Service Benchmarking Australia for SA Power Networks, has improved since this method of benchmarking was established in 2018, but has not met our target of 7.8. The overall satisfaction scores are derived from four measured categories being, General Enquiries, New Connections, Planned Interactions and Unplanned Interaction.

Figure 26: Average overall customer satisfaction score (excl. Q1 2018 and 2018 general enquiries)

[9] Source: SA Power Networks

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8 Our response and strategies

The SA Power Networks asset management system brings together the expectations of our stakeholders and the current capabilities of the organisation and its assets. Our strategies are designed to deliver energy services that customers value.

In response to our environment and corporate objectives we aim to employ good asset management practices that deliver our business objectives for the benefit of our customers and stakeholders. We aim to meet our regulatory obligations using a value-based approach and foster a continuous improvement culture.

Our Asset Management is informed by our recently developed Asset Management 2035 Vision aligned with the corporate Strategic Directions 2035 outlined in section 2.

First, we **focus** on what our **customers and stakeholders** value. The **outcomes** we seek to deliver through our assets reflect the needs of our customers and stakeholders. We combine this with **evidence based decision making** to inform our response and develop **optimal works planning and delivery**.

We achieve this through **an aligned organisation** and by **continually innovating and adapting** how we do things by empowering our people, investing in our asset management system, and piloting and trialling new technologies and concepts.

Figure 27: SA Power Networks asset management 2035 vision

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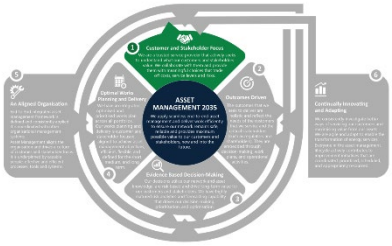
8.1 Customer & Stakeholder Focus



We are a trusted service provider that actively seeks to understand what our customers & stakeholders value. We collaborate with them and provide them with meaningful choices that trade off costs, service levels & risks.

Background

Our asset management policy dictates that strategies, objectives and plans are defined to provide the level of service that our customers and the community seek and are prepared to pay for. It is also expressed as the goal of the ISO 55000 Asset Management System standard that we are aligning to.

Our customers and stakeholders are many and varied, and we must recognise this as we seek to understand what they value.

What this means in practice

As described in Section 3, the key messages we have heard from our stakeholders as we develop our strategies are:

- Maintain safety and reliability
- Deliver good service
- Enable the clean energy transition
- Keep the price as low as possible, and play your part in improving equity

These outcomes have been considered during the development of our response and strategies, and feed into our 2025–30 Regulatory Proposal. These key messages are directly reflected in the outcomes we seek to deliver through our asset management.

In addition to our engagement for our 2025-30 Regulatory Proposal, we also actively engage with government bodies, special interest groups and industry bodies.

Every year we prepare a Distribution Annual Planning Report and an SRMTMP to keep our national (AER) and state based (ESCoSA and OTR) regulators informed on what we do. In addition, we have frequent issue-specific interaction with our regulators.

ESCoSA is responsible for engaging with customers and stakeholders when setting our minimum levels of service expectations. We actively work with ESCoSA and share with them our understanding of what our customers value. This is to improve the alignment between our regulatory requirements and the levels of service our customers want.

We also actively engage with the Local Government Association of South Australia on issues such as public lighting and vegetation (tree) management. We have working relationships in State Government with Primary Industries and Regions South Australia, Department of the Premier and Cabinet, Renewal SA, and Department for Infrastructure and Transport, and the Australian Government Department of Defence.

We actively engage with and seek advice from the Urban Development Institute of Australia, Property Council of Australia, Housing Industry Association, and National Electrical and Communications Association. We have strong industry partnerships with other network companies through our involvement with Energy Networks Australia and the International Wildfire Risk Mitigation Consortium.

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Improvement initiatives

Asset Management Transformation Program

We are defining an Asset Management Improvement Plan which outlines a multiyear program of change to our processes, data and systems to enable us to better balance cost and asset risk in delivering the services that customers value.

Improvement initiatives within the program are under development and will be described in the AMTP roadmap.

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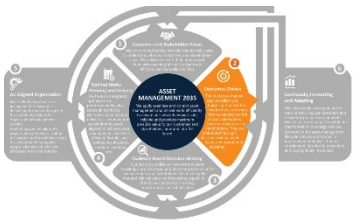
8.2 Outcomes Driven



The outcomes that we seek to deliver are holistic and reflect the needs of the customers that we service & the critical stakeholders (such as regulators and shareholders). They are embedded through decision-making, work plans, and operational activities.

Background

Our asset management decisions are based on the outcomes they deliver. We have defined frameworks that allow a systematic approach linking decision making and plans to outcomes for customer & stakeholders.

What this means in practice

Value Framework[10]

The purpose of the value framework is to implement a common set of customer and stakeholder value dimensions and underlying monetised values for the risks and benefits of all proposed business expenditure. Utilising a common set of values enhances the decision-making process by improving transparency and alignment with the business' overall goals and objectives. This ultimately empowers the business to assess and prioritise expenditure based on its potential to contribute to the customer business and outcomes.

The Value Framework aligns with industry best practice and measures defined by the AER considering consequence areas:

- Reliability
- Public and worker safety
- Bushfire safety
- Environment
- Financial
- Customer value of exports

The Value Framework underpins our expenditure forecasting and is used operationally to prioritise asset replacement tasks. The Value Framework is closely aligned with the Risk Management Framework.

Risk Management Framework[11]

Our Risk Management Framework outlines our framework for the management of risk across the business. It is closely aligned to the requirements of AS/NZS ISO 31000:2009 Risk Management – Principles and Guidelines.

This document is designed to outline the risk management activities of SA Power Networks as they relate to the principles and guidelines described in AS/NZS ISO 31000:2009.

SA Power Networks Risk Management Framework is designed to assist the organisation meet key business objectives such as:

[10] For more information see Value Framework
[11] For more information see Risk Management Framework

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- to maintain and improve stakeholder confidence in our ability to deliver on our commitments
- to understand and prioritise risks allowing for informed decision making and appropriate action to support continued growth, productivity and competitiveness
- to ensure that compliance and good governance are a by-product of existing management practice rather than an additional activity.

Improvement initiatives

Asset Management Transformation Program

We are defining an Asset Management Improvement Plan which outlines a multiyear program of change to our processes, data and systems to enable us to better balance cost and asset risk in delivering the services that customers value.

Improvement initiatives within the program are under development and will be described in the AMTP roadmap.

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8.3 Evidence Based Decision Making

Our decisions utilise our network & asset knowledge, are risk based and drive long-term value for our customers & stakeholders. We have highly matured risk analytics and forecasting capability that drives our decision-making, prioritisation, and optimisation.

Background

We need to understand the assets we are managing to make effective asset management decisions. This means understanding where they are, what their capacity is, what condition they are in, how they are being used now and into the future, and the impact they are having on service and risk.

What this means in practice

Condition assessment and Risk valuation

We monitor the condition of our assets through methods like online condition monitoring and periodic inspections. We determine inspection cycles by the criticality of an asset, the bushfire risk area in which the asset is located and the level of corrosion it is exposed to. Targeted programs are also employed when an emerging risk is identified.

When a significant or unexpected failure does occur, we undertake a detailed equipment failure investigation, which contributes to our knowledge of asset failure modes. We continue to close the loop on failures, linking asset failures back to observed condition during cyclic inspections. This is improving our understanding of asset risk and informing our policies, strategies and practices.

We employ risk cost models to understand the risk to service outcomes our assets present to determine the timing of our asset replacements or refurbishments. Where possible, risks are quantified using the Value Framework.

Bushfire Risk Quantification

We use quantified bushfire risk modelling from the CSIRO to underpin our decision making. The Bushfire Risk Model calculates the risk resulting from bushfires our network could start across an area that encompasses all our network feeders traversing High and Medium Bushfire Risk Areas (HBFRA and MBFRA), covering 1,111 feeders and approximately 48,000 route km of overhead HV line.

The overall risk calculation covers a very large range of unique bushfire events, which cover the different locations the SA Power Networks network could start a fire and the different fire danger conditions and weather patterns specific to each of those locations.

In total, the risk calculation encompasses approximately 122,000 unique ignition locations across the covered regions, and on average approximately 40 different weather patterns and fire danger rating combinations for each of these locations. This amounts to a resolution of approximately 5 million unique bushfire events that define the calculation of the total risk from bushfires that the SA Power Networks network can start across these bushfire risk areas.

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Demand Forecasts and Capacity assessment

Each year after summer we review our High Voltage network demand forecasts by considering load recordings that summer, recent network changes and any new committed large loads or generation. Our forecasts consider the specific weather patterns we experienced that summer, economic factors, distributed energy take up and spatial factors. These forecasts are then compared with network capacity to identify any constraints. The results from our demand forecasting are published publicly in our Distribution Annual Planning Report each year.

In addition to our High Voltage forecasts we have established an LV Planning Engine. The LV Planning Engine enables us to forecast the future net load flow (forward or reverse) for any LV transformer in any 30-minute interval from 2025 to 2050 based on postcode-level forecasts of growth in solar, battery storage, electric vehicles, etc. derived from AEMO's ISP scenarios. The Engine allows us to determine the optimal series of network investments to address forecast export capacity.

Improvement initiatives

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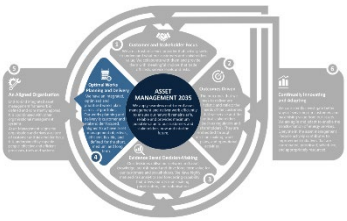
8.4 Optimal Works Planning & Delivery



We have an integrated, optimised and prioritised works plan across all portfolios. Our works planning and delivery is customer & stakeholder focused, aligned to achieve asset management objectives, efficient, flexible, and defined for the short, medium, and long term.

Background

Our work plan needs to balance our investment across all portfolios to deliver the most possible value within the constraints of our budget and resources.

What this means in practice

To achieve this balance, we invest in systems and processes that help us understand the impact of our maintenance, asset refurbishment and replacement, customer connection and capacity programs on network risk and service levels.

We use a life cycle asset management approach to maximise the useful life and minimise the costs of acquisition, use, maintenance and disposal of network assets. Figure 28 shows the typical asset life-cycle process.

Asset planning

The first decision we make in the asset life cycle is whether we need to create the asset in the first place.

The three primary drivers for new assets are:

- capacity upgrades driven by forecasted increases in customer load and generation (indirect customer demand);
- new and altering customer connections in response to customer requests for connection (direct customer demand); and
- replacement of existing assets that are inadequate, have failed or are posing significant risk.

For larger projects we complete a detailed cost benefit analysis. Larger capacity and replacement projects are subject to a regulatory investment test, which includes calling for proposals for non-network solutions to address constraints where feasible.

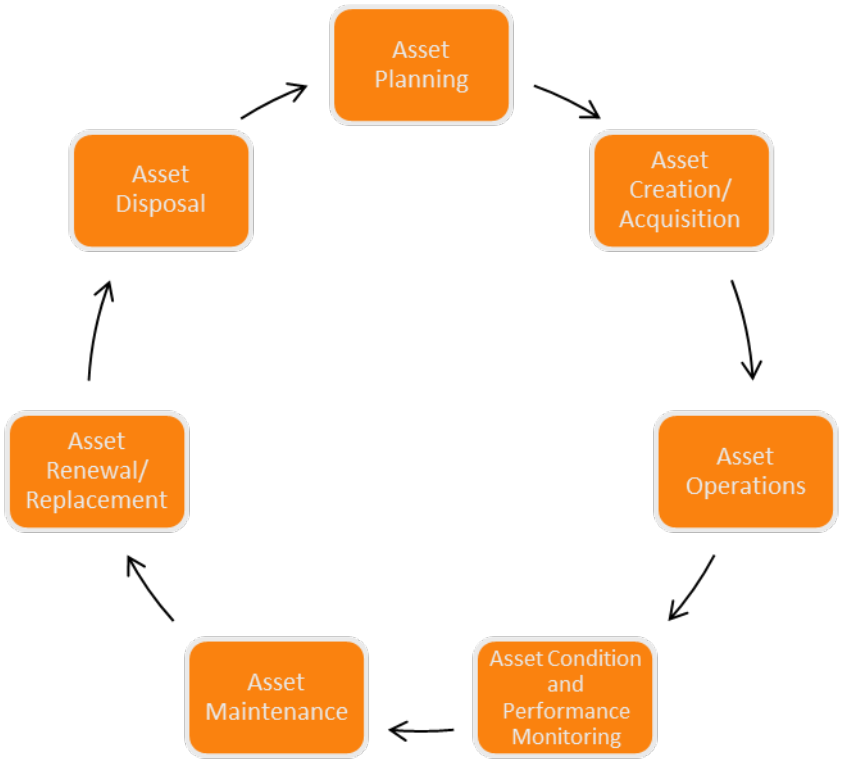


Figure 28 Typical asset life-cycle stages

Building on our network risk forecasting methodologies we determine an 'actionable' work value for small to medium size jobs to

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help us make day-to-day decisions. Work value is the measure of the benefit of undertaking work on the asset. It is the combination of how much risk we reduce and other benefits from undertaking the work. This work value is used to ensure effective investment decisions on smaller projects where a detailed cost benefit analysis is not warranted.

Safety is considered at every phase in the plant life cycle, from design to disposal. However, the earliest stages of the design process (during conceptual and planning phases) are the best places to design out hazards, incorporate risk control measures and design in efficiencies. This means thinking in advance about potential hazards and possible design solutions as the plant is manufactured, transported, installed, commissioned, used, maintained, repaired, de-commissioned, dismantled, disposed of or recycled.

Asset creation and renewal/replacement

In the lead up to creating an asset in response to an identified need in the asset planning phase, we consider what the right asset is to install.

Where possible and prudent to do so, we repair or refurbish assets to extend their service lives. In addition to 'patching' in service assets we redeploy refurbished transformers, switching cubicles and circuit breakers. Our active refurbishment programs have allowed us to extend the life of our assets and reduce the investment required to maintain risk and service levels.

Where we do decide to install a new asset, we consider the future requirements for that asset. For instance, new switchgear is installed with remote monitoring capabilities to help us get visibility of energy flows on our network. We also consider non-network solutions where prudent to do so.

Asset operation

Once assets exist, we use them to safely transport electricity throughout the network to and from our customers. A key factor is the mitigation of bushfire risk. We have a systematic focus on prevention of fire starts from the network operations leading up to the start of the Country Fire Service declared fire danger season and safe operation of the network during the fire danger season. Operational activities to mitigate the risk of bushfire are outlined in the SA Power Networks Bushfire Risk Management Manual. Each year before the fire danger period, SA Power Networks implements preventive measures and prepares contingency plans to reduce the risk of bushfire start.

Additional typical operational activities undertaken on the network include:

- real time operation of the network through remote switching and monitoring of the network status and system load using the SCADA system;
- effective switching to allow work on assets with minimal disruption while ensuring the safety of staff, contractors and the public; and
- monitoring and clearance of vegetation growing near assets.

Condition and performance monitoring

Comprehensive asset inspection and condition monitoring programs are undertaken across line and substation assets to identify signs of asset deterioration. The assessment techniques used include visual inspections, thermography, partial discharge tests and other diagnostic techniques to determine the condition of the assets.

The inspection and condition monitoring programs happen on a cyclic basis in line with the corrosion zone an asset is in (ie how quickly it is likely to deteriorate), the bushfire risk zone an asset is in (ie how big the

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consequence of a failure is likely to be) and/or the criticality of the assets (ie how many customers are supplied by the asset).

The frequency of inspection cycles across the network continues to be optimised.

We also actively monitor network reliability and performance to identify — and thus address — emerging trends.

Disposal

When an above-ground asset reaches the end of its life, it is removed with components salvaged for reuse where possible and the remainder disposed for scrap value or to landfill. Below-ground assets are typically left in the ground unless they can easily be removed (eg cables in conduits) or if there are environmental considerations that require the decommissioned asset to be removed.

Improvement initiatives

Asset Management Transformation Program

We are defining an Asset Management Improvement Plan which outlines a multiyear program of change to our processes, data and systems to enable us to better balance cost and asset risk in delivering the services that customers value.

Improvement initiatives within the program are under development and will be described in the AMTP roadmap.

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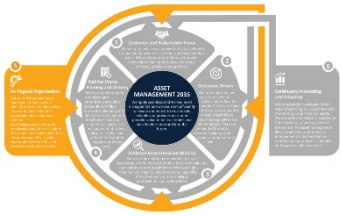
8.5 An Aligned Organisation



End-to-End integrated asset management framework is defined and consistently applied. It is coordinated with other organisational management systems.

Asset Management aligns the organisation and drives a culture of customer & stakeholder focus. It is underpinned by capable people, effective and efficient processes, tools & systems.

Background

To deliver effective asset management, we have evolved and continued to develop an Asset Management System (AMS).

What this means in practice

The AMS ensures the many aspects of asset management are addressed, risks are identified and managed, asset management activities are integrated with other business planning functions and review and improvement are organised and ongoing. Our AMS includes but is not limited to:

- strategic asset management documentation including this Strategic Asset Management Plan and supporting detailed strategies, asset plans, manuals, processes and procedures with line of sight to the Corporate Strategic Plan;
- comprehensive, centralised management of asset information and standards;
- specific strategies for managing all classes of assets and all operating environment issues;
- a risk management process;
- systemised relationship management to ensure asset management activity integrates fully with other departments;
- effective management of life-cycle delivery mechanisms; and
- work process documentation including provision for review and improvement.

To align the organisation and oversee our Asset Management activities we have an Asset Management Steering Committee (the AMSC) including four key Executive General Managers.

SA Power Networks has established an Asset Management Transformation Program to support the Asset Management activities of the business to align with industry best practice.

Improvement initiatives

Asset Management Transformation Program

We are defining an Asset Management Improvement Plan which outlines a multiyear program of change to our processes, data and systems to enable us to better balance cost and asset risk in delivering the services that customers value.

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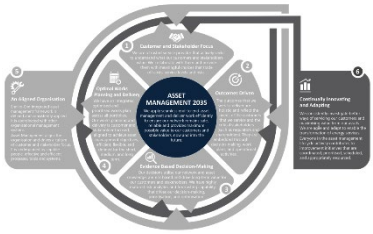
8.6 Continually Innovating & Adapting



We consistently investigate better ways of servicing our customers and maximising value from our assets. We are agile and adapt to enable the transformation of energy services. Everyone in the asset management lifecycle actively contributes to improvement initiatives that are coordinated, prioritised, scheduled, and appropriately resourced.

Background

We have been improving our asset management systems through a long-term strategic program, Assets and Work.

What this means in practice

The Assets & Work program delivers on a roadmap first established in 2014 developed in consultation with the global asset management specialist firm, Vesta aligning with ISO5500:2014. The first stage of the A&W program was approved by the AER in the 2015-20 Determination. Development during this period focused on foundational elements including asset data as well as an initial move to a value versus cost approach to network investment. The second stage of the A&W program was approved by the AER in the 2020-25 Determination. This stage has focused on improving our approach to economic valuation of network investment and ensuring network expenditure aligns with this approach.

Investment in our asset management systems via the Assets and Work (A&W) program has underpinned our ability to continue to deliver service outcomes to customers despite a growing number of assets reaching the end of their economic life. This has largely been achieved through a better understanding of the risk our assets pose to service outcomes and where best to invest our network replacement expenditure.

Recognising the need to refresh the roadmap first developed in 2014, SA Power Networks is undertaking a comprehensive assessment of its asset management practices and systems and refreshing its long-term roadmap. This roadmap will consider our capability maturity with respect to ISO55000 and will be delivered through our Asset Management Transformation Program The program effectively continues the Assets & Work program, delivering on a revised roadmap and ensuring that all business activities support effective asset management.

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9 Summary of asset management programs

Table 3 lists the capital programs, for asset management from 2023 to 2030. *Pending update.*

9.1 Capital programs

Table 3: Capital program 2023–2030

Program	Forecast expenditure (2023–30, $m)	Description
Asset renewal - Distribution **Asset renewal - Substations** **Asset renewal - Telco**		• Replacement or refurbishment (life extension) of assets. • Largest expenditure category due to ageing asset base. • Expenditure largely based on risk cost approach.
Customer connections		• Connection works between the customer and the distribution network, extension of the network to the customer's location and any network augmentation required to ensure sufficient capacity. • Forecast is net of customer contributions toward connections.
Capacity upgrade		• Network upgrades to cater for new or growing demand. • Based on forecast generation/load and capacity of network to meet. • No customer contribution is derived for this expenditure.
Safety		• Targeted capital works programs to ensure that the electrical distribution network is operated in a safe manner for customers, SA Power Networks employees and contractors • Includes capital elements of bushfire risk management and targeted programs to replace existing assets or install new assets where other controls are not adequately mitigating safety risk
Reliability and resilience		• Driven by the need to meet regulated supply reliability and customer service standards and meet customer service expectations. • Reliability expenditure is generally based on strategic planning and historic values focused on maintaining regulated service standards
Network control		• Covers activities required by the organisation to operate the network, eg outage management system; the budget category covers specific major projects

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Program	Forecast expenditure (2023–30, $m)	Description
Power Line Environment Committee projects		• Mandated program under the *Electricity Act 1996* and regulations to underground overhead mains, generally on main roads, as determined and agreed with the Power Line Environment Committee • All projects have a third of their costs covered by the relevant local council
Environmental		• Targeted environmental management activities at sites with high environmental risk factors, such as oil containment • Aimed at meeting our requirements under the *Environment Protection Act 1993* and other environmental Acts

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