

Network Matters Management Approach

This document details how the SA Power Networks Group manages material electricity network matters, including how we identify and assess risks and opportunities, respond to issues, and evaluate progress on our actions.

Our material network matters are:

1. Emerging technologies and integration
2. Grid resilience and reliability

This document should be read in conjunction with our 2022 Sustainability Report and Sustainability Data and Disclosure Databook.

Our reporting follows the guidance of the Taskforce for Climate-related Financial Disclosure (TCFD) framework, the Global Reporting Initiative (GRI) Standards and general industry standards. Supporting information that forms part of our sustainability disclosures is available on our website.

About our electricity network

SA Power Networks' core business is electricity distribution. Our network spans 178,000km², and incorporates 650,000 Stobie poles, 89,000km of powerlines and underground cables, more than 400 zone substations, and 73,000 street transformers. We provide and maintain around 220,000 streetlights for over 70 Council, Aboriginal and regional areas across South Australia.

We provide a safe and reliable network, which involves us undertaking construction and maintenance and improvement works, trimming vegetation under our powerlines, and conducting helicopter, drone and ground inspections of our assets. This helps to protect our customers, communities and network from bushfires, outages, and storm impacts.

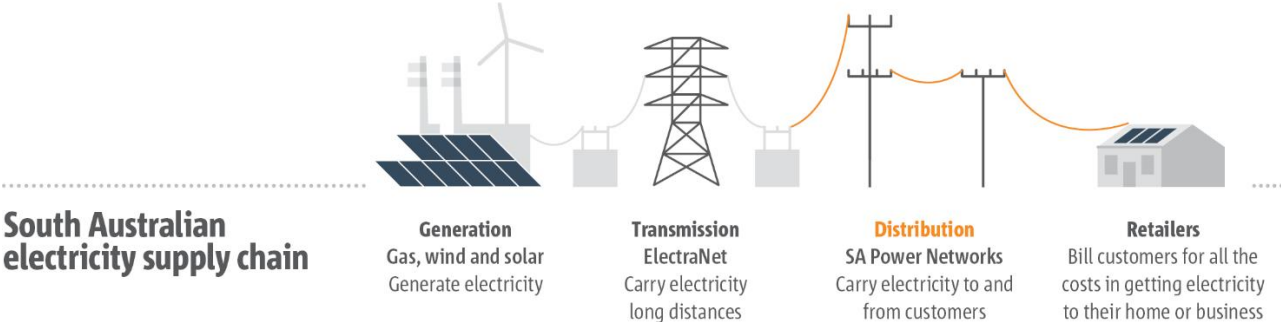
Our network also plays a vital role as South Australia transitions to a distributed and decarbonised energy system. A network that once served only to supply energy generated by large, centralised fossil-fuelled generators, now hosts more than half of the State's generation capacity, with much of it owned by customers. Increasingly, batteries connected to the distribution network are providing system security services once provided solely by grid-scale generators. Over the longer term, our network will enable broader decarbonisation through electrification of transport and potentially other end-use applications currently powered by hydrocarbons.

This shift to widespread and decentralised energy resources directly connected into the electricity distribution network, has already resulted in an expansion of the services our network provides. There are further opportunities to increase the value that the network offers and leverage the significant investment our community has made in it.

Along with this shift, and the opportunities it provides, are a range of challenges, including managing the integration of new and emerging technologies into our grid, maintaining system security and reliability, and hardening our infrastructure against the impacts of climate change.

Our vision is to demonstrate that South Australia can solve the 'energy trilemma'. The 'energy trilemma' is seen as a key challenge to the industry – how do we balance sustainability, reliability and affordability? We believe we can maintain reliability, while fully decarbonising and potentially halving household energy bills through increasing renewables-based electrification. **Our approach to energy affordability and equity can be found in our 2022 Sustainability Report and Social Matters Management Approach Statement.**

Sole distributor in South Australia	Supply South Australia's 1.7 million population	2,400 employees in more than 30 sites across the state	Peak demand 3,145MW	Network coverage over 178,000km²	Oldest network assets in the NEM
	Supplying 900,000 homes and businesses	600 apprenticeships since 2003	Electricity distributed 9,636GWh	Route length around 89,000km	



1. Emerging technologies and integration

1.1 Overview

This section of our management statement outlines how the SA Power Networks Group approaches the identification and management of new and emerging technologies in the energy sector and their integration into our grid operations, systems and processes.

Emerging technologies include distributed and consumer energy resources (CER) such as (residential and commercial) solar and wind generation, storage batteries, Virtual Power Plants (VPPs) and electric vehicles (EVs). Integration of CER presents planning, design, engineering, system stability and security challenges.

We are also acutely aware that the benefits and challenges of the rapid energy transition have the potential to affect customers in different ways. We have made a commitment to ensure our activities and services are developed and delivered in a just and fair manner and to think ahead to identify and address new forms of exclusion and inequality.

1.2 Management approach

1.2.1 Strategy

The SA Power Networks Group's *Strategic Direction 2035* sets out our vision to lead the transformation of energy services for a sustainable future. It reflects a significant shift toward a more aspirational leadership role for SA Power Networks as an influential South Australian organisation, and Enerven's capacity for tailored and innovative solutions for its customers, with both contributing to the state's dynamic energy future. The *Strategic Direction* setting process provided the vehicle for the business to align on key issues and opportunities relating to the challenging and unprecedented pace of change we face as an industry and community, to articulate our aspirations and chart our course for the future.

A number of key strategies and delivery plans outline how we will achieve the aspirations of the *Strategic Direction*, including our Network Strategy and Delivery Plan, and [Distributed Energy Transition Roadmap 2020–2025](#). The Transition Roadmap was developed in consultation with customer representatives and industry, and outlines some of the initiatives we have underway in the next five years that will help us to enable this transition, including our plans to double the amount of solar that can connect to the SA electricity distribution network by 2025.

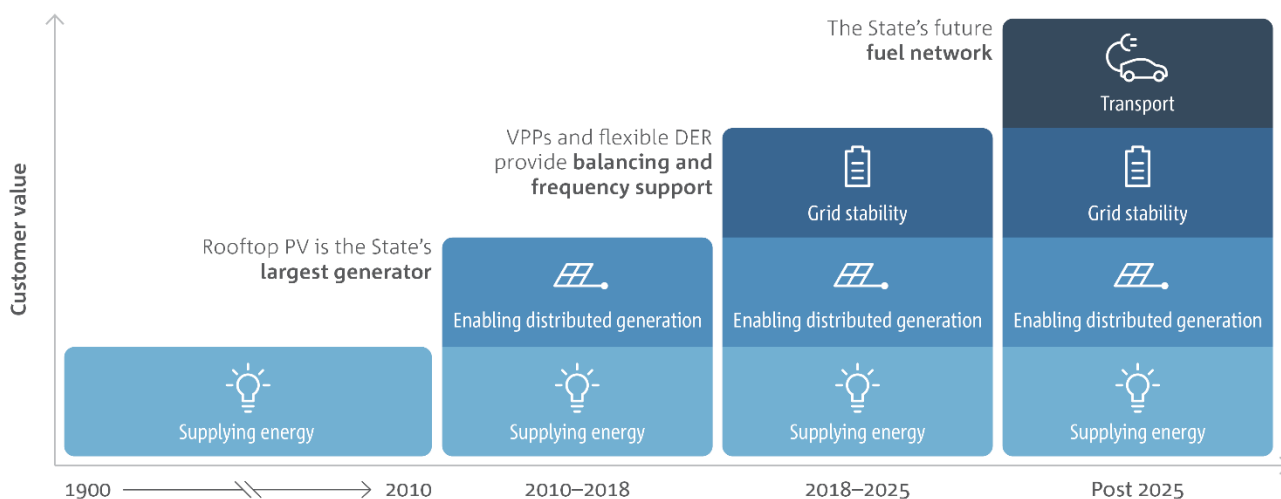
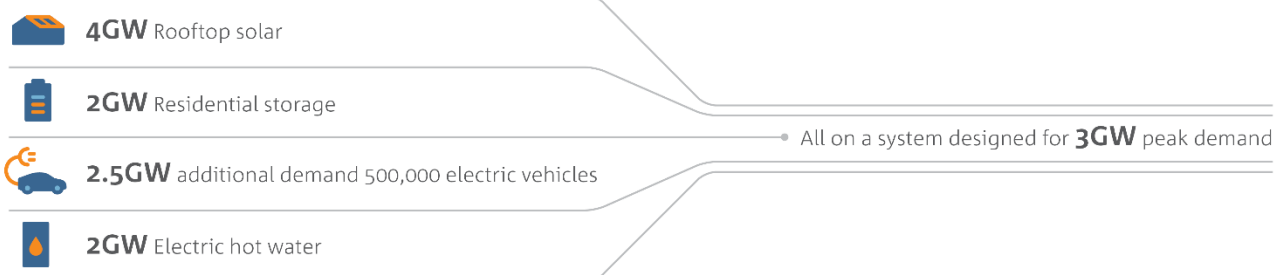
1.2.2 Transforming energy in South Australia

Understanding and planning for the rapid transition of the energy sector

Over the past decade, the South Australian electricity system has undergone a dramatic transition from being predominantly coal and gas powered to being powered largely by renewable energy. Already we have the highest penetration of distributed solar of any gigawatt-scale energy system in the world and we're working on doubling our solar capacity in the next five years. In the longer term, the growing availability of renewable-generated energy combined with storage, will drive down wholesale energy prices benefitting all customers.

As the economy continues to decarbonise, we anticipate a significant amount of 'electrification' to occur – where applications previously powered by hydrocarbons (eg natural gas, petrol, diesel) will switch to clean, efficient, low cost electricity, for example electric vehicles. The electricity network currently delivers ~25% of state end-use energy. As the State decarbonises, the distribution network could ultimately supply 80%+ of the State's energy needs. Our challenge is to efficiently adapt the existing network to support all these new applications – releasing significant value for customers. The period 2025–30 will be critical in managing the continued uptake of solar and batteries, and an acceleration in the take-up of electric vehicles.

By 2035 we could have up to



There has already been a high level of co-operation between the Government of South Australia, the Australian Energy Market Operator (AEMO), ElectraNet and SA Power Networks in implementing the energy transition so far. In many cases, the most effective methods of managing issues related to the energy transition are implemented in the distribution network. Our job is to make sure the network and our services evolve to make this future possible.

In 2022 we worked with a specialist consultancy to better understand the implications of various pathways to net-zero on the energy sector broadly, and our customers and network specifically. The scenarios used to develop the modelling are based on those that AEMO used in developing their integrated system plan, reflecting lower or higher levels of DER/customer energy resource (CER) take-up, electrification and the role that hydrogen might play in the future energy system.

Overall, the modelling predicts an exciting future in which energy will be clean, reliable and increasingly affordable. However, the challenge is that customers will need to invest (for example, in buying an electric vehicle) to see these benefits, which could be particularly challenging for those customers suffering vulnerability.

1.2.3 Integrating distributed and consumer energy resources (CER)

Leveraging latent capacity and flexibility

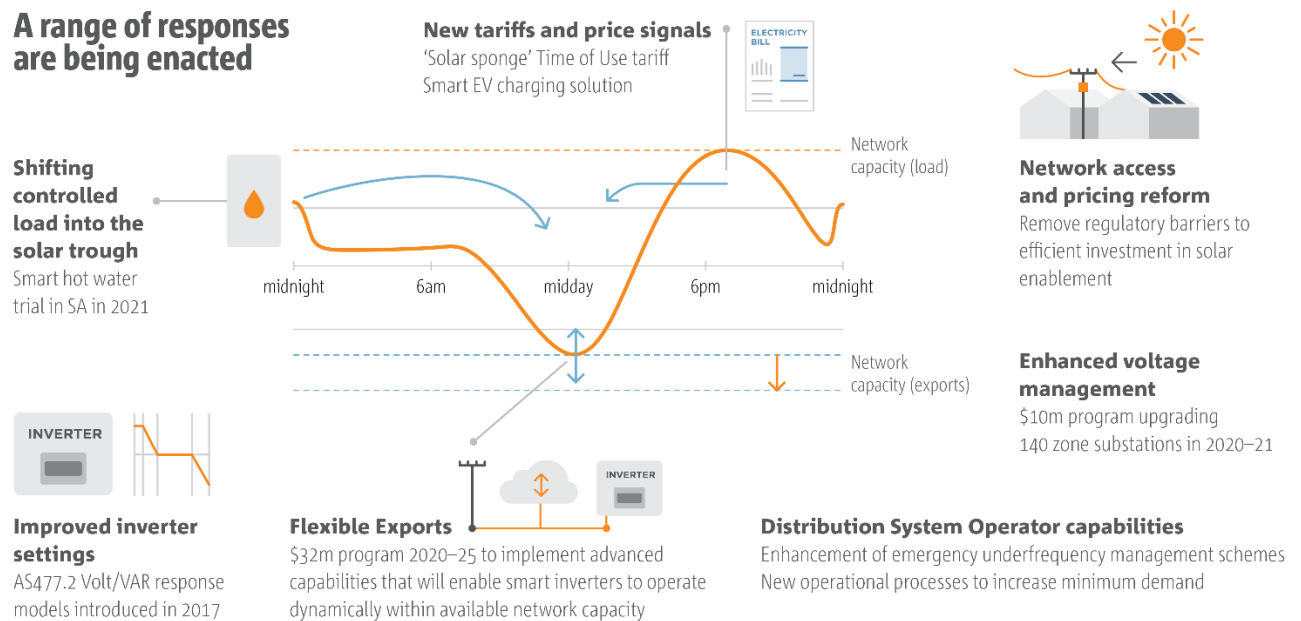
During the 1980s and 1990s, significant investment was made in the distribution network to meet air conditioning demand, which means we have untapped potential in our network – most of the time it is only running at about 30% capacity. By tapping into that unused capacity, we can avoid the need for expensive network investment.

Our job is less about ensuring we move energy from distant or distributed generators, but rather ensuring we have enough network capacity to support peak demand and generation (or using flexibility to avoid building out capacity). Hence our solutions are about 'stretch and fill'. Stretching the network's capacity

through smart network management and leveraging the network's spare capacity – filling it with flexible customer energy resources.

We have achieved stretch through investing in dynamic voltage management capabilities, whereas the fill part of the strategy leverages the flexibility of customer energy resources such as PV, storage, hot water, and EV to ensure we can enable consumer energy resources within the existing capacity of the network. This includes innovative tariffs to encourage customers to use network capacity more efficiently, and we are also developing a new connection option that communicates with customer smart inverters and VPPs to provide flexible export limits to customers rather than fixed limits.

A range of responses are being enacted



Additionally, we are improving our network planning and forecasting processes to accommodate future high-DER scenarios such as springtime reverse power flows and an expected 350,000 newly added electric vehicles charging on the network. To enable data analysis from the hundreds of thousands of smart distributed or customer energy resources connections we are building systems to optimise the operation of the network and unlock more value from network and customer assets.

Electric vehicles

A key piece in the net zero puzzle is the electrification of the transport sector. Although uptake of EVs has historically been slow in Australia, the Electric Vehicle Council expects that by 2030, there will be around a million EVs on the road, and by 2035 around 30% of vehicles in Australia will be electric. In addition to beginning to transition our own large fleet of vehicles, we have developed a range of initiatives under our Network Strategy to ensure our network is 'EV Ready' as the uptake of EVs and chargers will have huge impacts on the energy system.

We are working to make the network 'EV Friendly' – we've updated our tariffs so EV owners can charge EVs overnight on the same low rate as off-peak hot water, and the 'solar sponge' tariffs provide an additional 'super off-peak' period in the middle of the day. We have also made changes to our tariffs for large commercial customers that will reduce the cost to large EV 'supercharger' stations and we're working with commercial EV charging networks to help them to find the best places to connect to the grid.

Innovation and collaboration

SA Power Networks' Network Innovation Centre (known as 'the NIC') provides us with a facility to trial and test new technologies that could impact on our business and customers in the immediate and mid-term future. The NIC showcases a wide range of displays to share some insights into where the future of the

electricity network might be heading, and the role that customers, networks and other key stakeholders may play in that future.

The NIC has both network side and customer side technologies on display including a section of distribution network that can be viewed close-up as well as a ‘smart house’ which integrates solar PV, battery storage, an electric vehicle and a home energy management system with a range of traditional appliances. Our aim is to understand, trial and test new technologies then develop strategies to adapt and capture new opportunities.

South Australia’s world-leading take-up of CER (particularly rooftop solar panels) and variable renewables has required us to solve issues that have not yet been addressed anywhere else in the world. This necessity to innovate has also led to groundbreaking and enduring collaborations and partnerships.



Flexible exports

Establishing a real time interface to customers’ inverters to enable dynamic export limits – increasing customers ability to maximise value from their solar systems, as well as providing an emergency backstop for SA’s security of supply.

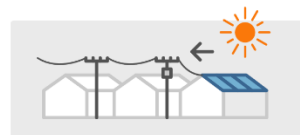
Collaborators: ARENA, DEIP, SMA, Fronius, Solar Edge, SwitchDin, Ausnet Services, SA Government, AEMO



Advanced VPP integration project

Demonstrating a new model of how VPPs can participate in the NEM while ensuring they do not breach network or system technical constraints. Awarded 2020 Energy Networks Australia Innovation Award.

Collaborators: Tesla, ARENA, CSIRO



Access & pricing rule change

Changes to the National Electricity Rules to recognise the ‘Export Service’ provided by networks, allow investment to support energy exports, provide incentives to improve performance, and allow customers to be charged for the service.

Collaborators: Total Environment Centre, Australian Council of Social Services, AER, AEMC, UTS



Enhanced voltage management

Implementing new technology, processes and systems to more than double the solar PV hosting capacity of the network while providing an emergency backstop to AEMO to maintain SA system security. Awarded 2021 Premier’s Innovation and Collaboration Award in Energy.

Collaborators: AEMO, ElectraNet, SA Government

We believe that our (and other networks’) collaboration with the Australian Energy Market Operator (AEMO) will release significant value through providing an ‘open access’ network platform to facilitate new energy services and connection of DER/CER.

1.3 Evaluation and improvement

To ensure we keep up with the rapid pace of change, we have systems in place to scan and gather local and global information, trends and technology development. Our people attend and speak at conferences and actively collaborate with colleagues interstate and overseas on projects.

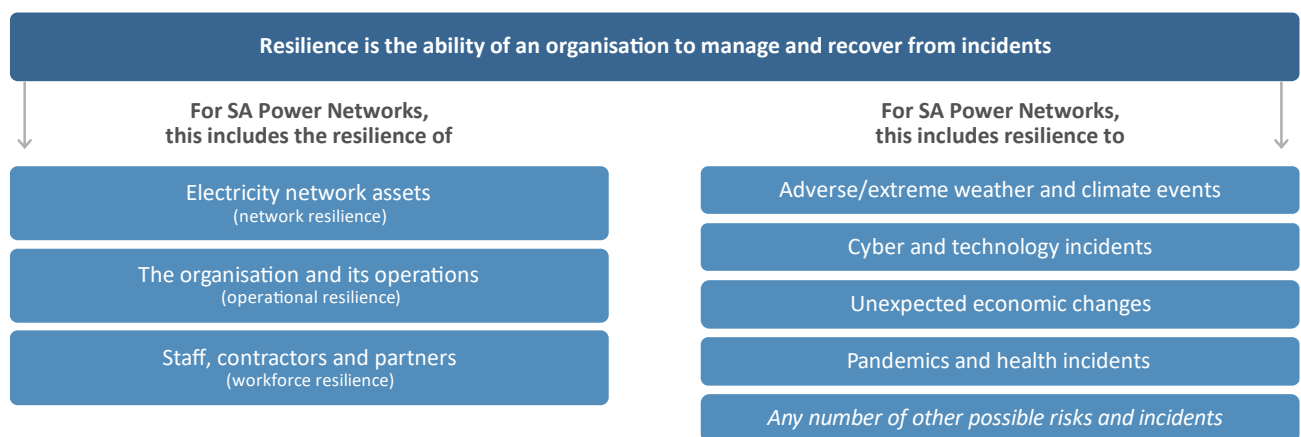
Progress on delivering the projects and programs detailed in our Network Strategy and Delivery Plan is reported regularly to the Executive Leadership Team and to the Board on a six-monthly basis. A range of strategic and operational metrics and KPIs are monitored by the organisation in relation to the implementation of the Network Strategy and Delivery Plan and network reliability. A number of relevant measures and case studies are provided in our annual Sustainability Report and Sustainability Data and Disclosure Databook.

2. Grid resilience and reliability

2.1 Overview

This section outlines how the SA Power Networks Group approaches maintaining and improving electricity grid reliability and resilience, with a focus on managing the impacts of climate change, and aging assets.

For an electricity grid, reliability refers to the average network performance (or how effectively the network delivers power to its customers) and relates to minimising frequency and outage time under normal conditions (excluding major storms) and planned outages. Resilience in its broadest sense is the ability to withstand, manage and recover from incidents. The SA Power Networks Group needs to be resilient to respond to a range of issues and incidents, encompassing matters such as cyber security, economic changes, severe weather and climate impacts, and changing consumer preferences. We have a holistic approach to organisational resilience that assists in managing both foreseen and unforeseen risks.



We have an overarching Organisational Resilience Policy and Framework, aimed at assisting the organisation to develop the capability to deal with both foreseen and unforeseen risks, respond to any disruptive event, recover and improve resilience over the longer term.

2.2 Management approach

2.2.1 Strategy, performance and challenges

SA Power Network's has a suite of strategies aimed at managing the distribution network to maintain (or improve) the reliability of supply to customers. These strategies address the four key drivers of reliability performance:

- ensuring there is capacity in the network to meet changes in customer demand;
- managing the condition of the physical assets that comprise the network;
- adapting to external trends that impact on network reliability; and
- adapting to changes in the State's energy generation mix.

Our strategy for managing the distribution network's capacity to meet demand is described within the SA Power Network's *Distribution Annual Planning Report*. Our demand forecasting methodology and network planning approach ensures we have sufficient reserve capacity in the network to supply peak demand, and to provide an ability to restore supply to customers even after a major interruption. The planning criteria used to develop our capacity plan are designed to meet the quality of supply (QoS) requirements of the Electricity Act reflected through the Electricity Distribution Code to maintain historic levels of network performance, security and reliability.

SA Power Networks' *Strategic Asset Management Plan* and *Power Asset Management Plan* describes our

strategy for managing the physical assets that comprise the distribution network, outlining our approach to refurbishment and replacement.

SA Power Networks' *Reliability & Resilience Management Strategy* (RRMS) describes our current strategy for managing the distribution network to comply with our distribution license conditions and details how we will identify areas of poor performance (eg via customer enquiries or complaints) and manage negative reliability trends (eg declining performance due to an increase in severe weather events).

SA Power Networks considers the transitional impact of changes to the State's energy generation mix and the shifting preferences of our customers within our strategy and network planning processes, as highlighted in our refreshed Network Strategy, *Strategic Directions 2035* document and Sustainability Strategy. Our [Distributed Energy Transition Roadmap 2020–2025](#) outlines some of the initiatives we have underway in the next five years that will help us to enable the energy transition and maintain network stability.

Reliability

Maintaining reliability can be challenging. We operate an ageing network that supplies a vast geographical area of 178,000 square kilometres, in some particularly remote and hostile environments and conditions. Despite these conditions and having the oldest fleet of assets in the NEM, our underlying network reliability for customers has been maintained over a significant period of time.

Two widely applied measures of distribution network reliability are the system average interruption frequency index (SAIFI), and the system average interruption duration index (SAIDI). SAIFI measures the frequency or number of interruptions to supply experienced by the average customer each year, while SAIDI measures the total duration or minutes off supply experienced by the average customer.

We have consistently met the ESCoSA's jurisdictional reliability standards as well as outperforming targets under the AER's Service Target Performance Incentive Scheme. Reliability is just one component of how we monitor our performance. We have been measuring customer satisfaction with our services and the interactions we have with customers. These indicate steady performance at the top end of industry performance, and result, in part, from significant recent improvements in automating the provision of outage information to customers.

Resilience

Engagement with our customers tells us that:

- Customers expect the minimum number of outages for the shortest time possible.
- Customers and stakeholders expect that we will work with other providers to build resilience for both our network and communities.
- Customers and stakeholders expect that we will put in place network solutions to build resilience.

We know that power outages can be extremely disruptive to communities and businesses, particularly when they are widespread, enduring, or affect remote communities. As part of our commitment to delivering a reliable, resilient and safe electricity service, we work with our stakeholders and the community to ensure our investments align to our customers' priorities.

Resilience was identified as a topic of interest in our "Broad and diverse" stage of engagement, with customers wanting increased resilience to extreme weather events and natural disasters, and improved equity between metropolitan and regional communities. Customers were concerned about the impact of outages on community resilience. Resilience can mean different things to different people, and there is a strong link between resilience and regional reliability.

In 2022 we developed a network resilience discussion paper with the aim to seek customer feedback on our proposed approach to improving network resilience in the face of extreme weather events. As part of this process, we developed a definition of resilience, based on the Australian Energy Regulator's (AER) definition:



“...It is the network’s ability to continue to adequately provide network services and recover those services when subjected to disruptive events”

“...The ability of **SA Power Networks** to continue to **safely** provide network services and recover those services, **and mitigate community impacts of network service outages** when subjected to disruptive **weather** events”

Aging Assets

The majority of our network infrastructure assets were initially installed in the 1950s, 1960s and 1970s. Our average asset age is now around 37 years old, with many assets in excess of 80 years old. Although some assets (eg poles) may last up to 100 years, others (eg protection relays) are unlikely to last more than 15 years. On average, we expect asset lives in the order of 50 years.

Increasing numbers of assets are now approaching end of life and SA Power Networks is currently undertaking major work to understand the condition and risk profile for a range of assets with differing working life expectations. This will be used to develop a sophisticated understanding of our assets and risk and to develop an uplift in replacement programs that intelligently manages risk over time and in a way that is cost efficient for customers and ensures safety for the community.

Climate change and the grid resilience challenge

Climate change impacts – such as rising temperatures, increased frequency and severity of bushfires and extreme winds – on Australia’s future energy system will become increasingly significant. Information about how we identify and manage climate related risks and opportunities, including their impact on reliability and resilience can be found in our Environmental Matters Management Approach Statement.

2.2.2 Operations

Planning and upgrading (‘augmenting’) the capacity of our network

SA Power Networks has developed its planning criteria to meet and maintain the reliability and security of supply requirements of the NER and EDC. Where the forecast demand breaches the planning criteria, a constraint is established and a suitable solution is sought whether this involves implementation of a major network augmentation such as an extension or upgrade of our assets, a deferral solution or a suitable contingency plan taking all risks and their associated consequences into consideration. As a matter of course, SA Power Networks considers various non-network solutions when attempting to determine its preferred solution to address an identified constraint on its network.

SA Power Networks plans to implement solutions for those assets forecast to be overloaded under normal conditions, prior to the overload occurring. However, the solution for contingency events considers both the likelihood and consequence of such an event as well as the amount and type of customer load at risk. The load at risk level chosen usually allows verification of exceedance of the contingency capacity prior to project commitment.

Managing the physical assets in our network

In order to ensure satisfactory present and future performance of SA Power Networks electricity infrastructure and provide assurance that legislative, regulatory and business requirements have been met a framework of asset management plans and procedures has been developed. The asset management of electricity infrastructure is carried out in accordance with the Corporate Policy for Asset Management and associated Network Directives authorised by General Manager Network Management.

These asset management plans detail the way in which we manage our physical assets and are founded on:

- the provision of the levels of service that our customers and the community seek and are prepared to pay for;
- the most cost-effective delivery; and
- meeting Regulatory obligations and corporate strategic objectives.

Assessing the performance of our network and responding to trends

We have a dedicated Reliability Operations team that monitors and analyses power outages on our network. This team acts to reduce the risk of future outages and works to continually manage our network's reliability. We carry out an ongoing Reliability Management Program, which focuses on managing reliability performance in areas where our customers experience frequent outages. This work includes projects aimed at:

- preventing outages occurring
- reducing the number of customers whom experience the outage
- reducing outage durations.

In addition to managing the capacity of the network and condition of our physical network assets, there are a range of improvements ('augmentation') to manage our network's reliability ('hardening' the network), including the installation of:

- lightning resilient insulators
- animal guards where wildlife comes into contact with our equipment
- line covering on bare wires under problem vegetation (trees, bushes, etc)
- feeder automation
- switches to minimise the number of customers who experience an outage
- Line Fault Indicators to better identify the location of faults.

Managing the impact of severe weather events

To reduce the impact of increasingly extreme and frequent weather events on service continuity, we are proposing to invest in network resilience and reliability in our upcoming 2025-30 regulatory period. During the recent customer and stakeholder engagement process designed to assist with the development of the SA Power Networks Regulatory Proposal for 2020 to 2025, electricity customers discussed electricity reliability in South Australia, and agreed the following:

- Network reliability and resilience is a very high priority for customers, particularly regional and rural customers, especially those in the Adelaide Hills and on the Eyre Peninsula
- Reliability standards should not be lowered

The participants in the "Reliability and bushfire safety" Focused Conversation have recommended that SA Power Networks invest in an approach that, through a combination of Replacement and Augmentation expenditure, achieves:

- Maintains regional reliability at current levels with improvements for worst served regions.
- Improves Adelaide CBD reliability to achieve compliance with ESCoSA target.
- Improves rural long restoration times to achieve compliance with ESCoSA target.
- Improves service to worst served customers
- Maintains the current level of bushfire risk (excluding any influence of climate change).

New Value initiatives (in order of preference) also recommended were:

- Bushfire Replacement Expenditure.
- Regional Reliability Improvement
- Worst Served Customers Reliability Improvement
- Public Safety Power Shutoff Reduction.

The participants in the “Network resilience” Focused Conversation have recommended that SA Power Networks invest in an approach that includes the purchase and installation of 3 – 5 new mobile generators to be stationed across the State and the funding of energy resilience projects. Stakeholders felt that this approach addressed community concerns about regional equity and provided a good balance between SA Power Networks’ significant role in building community resilience and the need to partner with other stakeholders. While some stakeholders supported additional investment above new value, others felt that SA Power Networks needed to collaborate and work with others, as well as experiment and learn from other utilities as to what works in building community resilience.

Maintaining stability and resilience

We are actively adapting our grid design and operations to better withstand and recover from significant events, issues and changes. We have clearly identified our most significant hazards – major disruptive events or chronic risks such as extreme weather events, cyber-attacks, or losses in power supply from fluctuations in intermittent energy sources outside of normal operating parameters – and developed the approaches and technology to manage them. For example, South Australia is rapidly incorporating and utilizing the latent power, storage and supply strengthening services of battery systems and synchronous condensers.

To facilitate the energy transition, we have begun developing (and will need to refine and implement) new Distribution System Operator (DSO) capabilities, managing an enormous capacity of DER/CER on the network to ensure network safety and reliability, as well as system security. We work closely with the South Australian government, AEMO, Essential Services Commission of South Australia (ESCoSA), and the state’s transmission network operator, Electranet, to improve technical capabilities to help support the state’s energy system during severe faults, extreme weather events or other abnormal conditions that could destabilise the system, and to play our part in ensuring the whole energy system is optimised during the energy transition.

Crisis management

We have detailed and mature approaches to managing – preparing for, responding to, and restoring power – any crisis events associated with business operations, including extreme weather events, particularly with regard to bushfire risk and severe storms.

A Crisis Management Team (with representation from executive) can be stood up to respond to crises in real time, and we have a dedicated local customer relations team and Customer Relationship Management System, operating a 24/7 faults and emergencies line. During outage or crisis events we also boost our social media and SMS communications.

2.3 Evaluation and improvement

We continually review and report on our progress against network performance, severe weather and bushfire preparations and response to the Executive Leadership Team, Board and in our annual ESG reporting.

Minimum network reliability standards apply to SA Power Networks for the distribution of electricity to customers in South Australia:

- Average duration and frequency of unplanned interruptions
- Proportion of customers who experience very long interruptions.

SA Power Networks must use its best endeavours to achieve a series of performance standards. We continue to identify, trial, introduce and review new reliability management products and procedures, and apply best practices to maintain a reliable electricity supply. Condition monitoring practices and strategic asset maintenance and replacement also underpin network reliability.

To ensure SA Power Networks invests allocated reliability management funds in the most efficient,

effective and prudent manner, to meet reliability performance standards and outcomes for our customers, we have previously engaged an independent statistician to analyse reliability performance data. This independent analysis confirmed that:

- there was a high level of assurance that we are addressing the right feeders / causes
- vegetation, unknown and lightning are the major causes of interruptions
- the average rate of interruptions was lower after reliability solutions were implemented (the level of reduction depending on the solution class)
- reliability solutions are highly effective when considering the impact at specific locations
- reliability solutions are sometimes not as effective when factoring all faults at all locations (as they can be impacted by faults at other random locations)

The RRMS is reviewed and updated (as required), following an annual reliability performance review. This includes a review of actual performance against reliability targets and historical network reliability performance trends and other emerging issues.