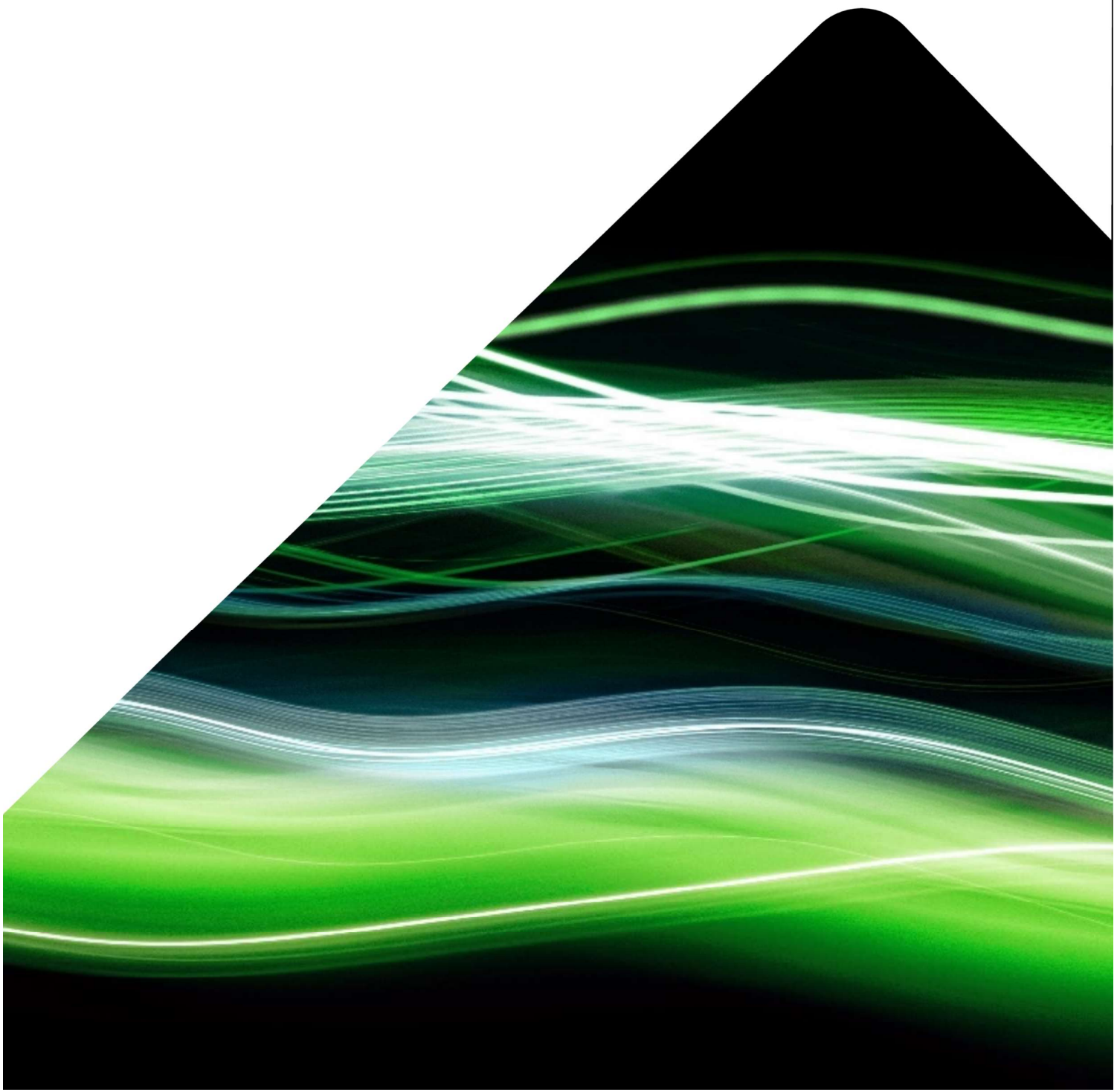
Transgrid

People. Power. Possibilities.

Network Asset Strategy

2021/22



Summary					
2021 Network Asset Strategy					
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Contents

1. Forward

Asset Management Vision and Policy

The vision for the Asset Management System is to be recognised nationally and internationally as leading practise by using data driven asset lifecycle decisions to provide a safe, reliable and efficient network. This will ensure we serve the needs of our stakeholders, customers and electricity end-use consumers, while optimising long-term sustainability for our security holders.

"Delivering value to the community by providing a safe and reliable network and efficiently developing this to meet the future energy needs of our customers." Asset Management Policy

Our vision is supported by our Asset Management Policy that aims to ensure the:

- Provision of safe and reliable power.
- Efficient management of the regulated assets and growth of the non-regulated business.
- Development, maintenance, and continuous improvement of our asset management system.

This Network Asset Strategy plays a central role in ensuring we implement our asset management principles and realise our vision and Policy. Transgrid commits to applying an effective asset management system over the entire asset life cycle to manage cost, risk and asset performance efficiently for the benefit of consumers and stakeholders.

Asset management decisions and strategies across each stage of the lifecycle will deliver value add, and will be quantitatively derived to support optimal performance of our assets.

Asset Management Mission

Our Lifecycle Asset Management mission is to efficiently operate and manage our network for the benefit of stakeholders and consumers and ensure a sustainable investment for security holders.

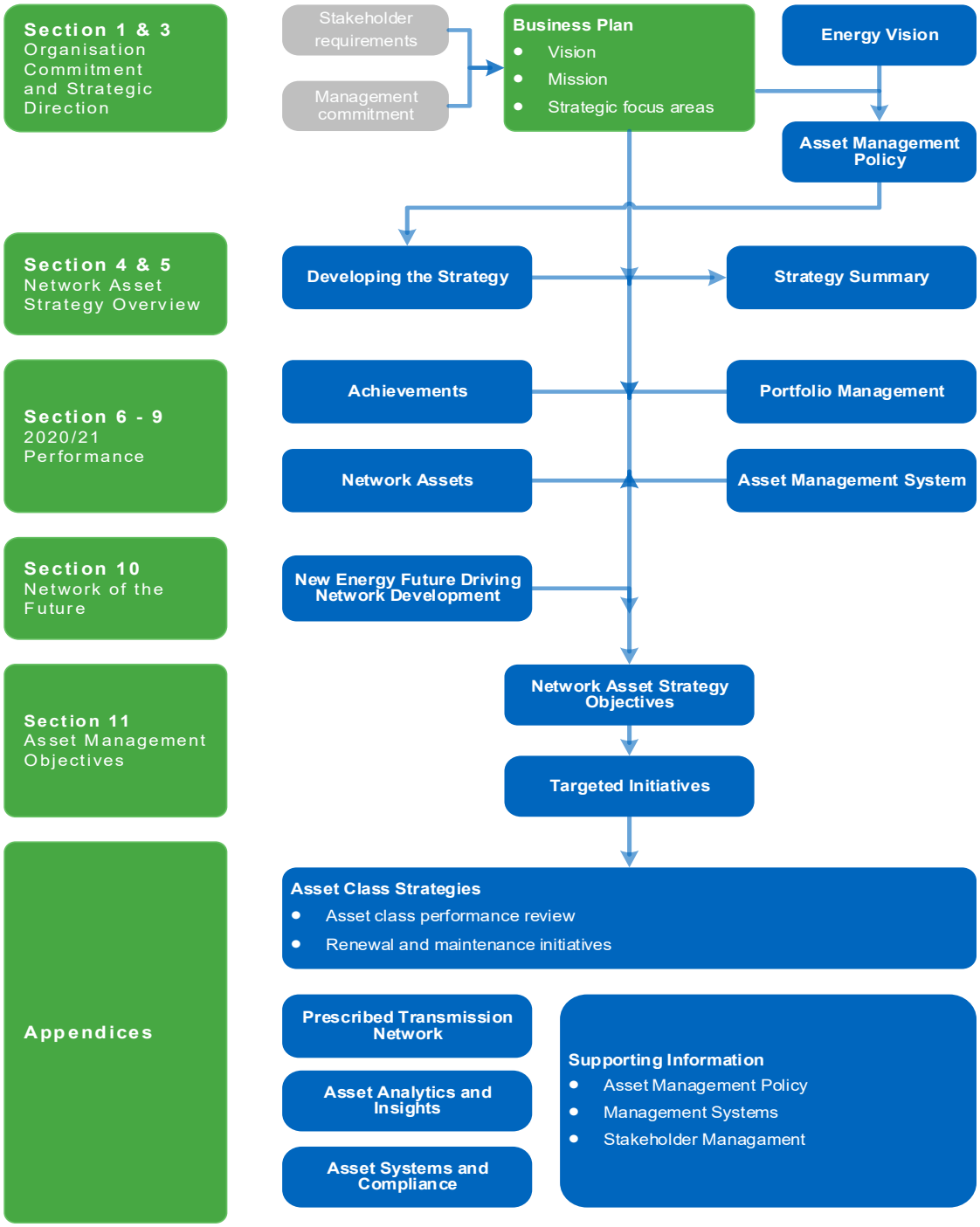
"We will be customer-centric, with strong and positive engagement with our key stakeholder groups: security-holders, staff, and other parties in the electricity generation and distribution industry, contractors, and consumers. We will continue to realise operating efficiencies across our network to the benefit of stakeholders and consumers and to ensure a sustainable business for the security-holders.

We will utilise all available tools, embrace and exploit cutting-edge technology, build on the Transgrid Asset Management system, align with Transgrid's Risk Appetite and build on our people's market-leading technical expertise."

2. Document Summary

Figure 1 shows the sections contained with the Network Asset Strategy and illustrates how our business plan and Energy Vision, sets the direction for our Asset Management Policy and the components of our Network Strategy.

Figure 1 - Network Asset Strategy Overview



Below is a description of the sections illustrated in Figure 1.

Section		Description
1	**Forward**	Shows that senior management are committed to our Asset Management Vision, Policy and Mission.
3	**Alignment with our Business Plan**	Describes how asset management system objectives align with the strategic direction from our business plan.
4	**Alignment with our Energy Vision**	Provides an overview of our Energy Vision, the key themes that underpin it and provides the alignment into the asset management system.
5	**Developing the Strategy**	Provides an overview of the aims of the Asset Management Policy and the challenges in achieving the Network Asset Strategy objectives.
6	**Strategy Summary**	Lists our strategic pillars, Network Asset Strategy objectives, opportunities and challenges in realising the objectives and desired outcomes.
7	**2020/21 Performance Review**	Lists our 2020/21 achievements, and provides a performance review of asset portfolio management, asset performance and Asset Management System performance.
8	**New Energy Future Driving Network Development**	Describes drivers to the future development of our transmission network
9	**Network Strategy objectives**	Details the Network Asset Strategy objectives, describing challenges, improvement opportunities, targeted actions, expected outcomes and key performance indicators
10	**Initiatives**	Lists our asset management system objectives and the identified short, medium and long term actions to be implemented to achieve our objectives.
Appendix A	**Asset Base Overview**	Provides counts and lengths of our prescribed transmission assets split by asset class.
Appendix B	**Asset Class Strategies**	Provides an overview of Digital Infrastructure, Substations, Transmission Lines, Underground Cables, Easements and Asset Analytics and Insights Asset Classes. • Detailing 2020/21 achievements, challenges and initiatives to address emerging issues
Appendix C	**Asset Systems and Compliance**	Provides an overview of Asset Systems and Compliance activities including 2020/21 achievements, challenges and initiatives.
Appendix D	**Supporting Information**	• Shows the Asset Management Policy • Describes our Asset Management System and Electricity Network Safety Management System • Provides an overview of our Stakeholder Management approach, listing stakeholder groups, their needs and expectations.

3. Alignment with our Business Plan

The central function of the Asset Management System (AMS) is to ensure the network assets support the direction set by our 2022-2026 Business Plan as outlined below. This Plan is founded on three strategic pillars, shown in Figure 1. Our Network Asset Strategy is designed to support and deliver against these strategic themes.

Leading the transition to a clean energy future

In 2021, Transgrid launched its Corporate Strategy including its vision and purpose.

Our Strategy outlines how Transgrid is responding to changes in our operating environment, including

- Consumers remaining at the forefront of the energy debate, with a focus on industry-wide efficiencies to improve end-user outcomes.
- The energy system evolving to a renewables-based power system. Major transmission projects are needed to support the future grid and new generation needs to connect into the grid.
- Disruptive technologies and market changes creating opportunities for new energy services, new business models and improving the way we operate.
- The regulatory and political environment changing rapidly as the energy sector transforms.

Transgrid is in a unique position to **Lead the energy transition**, building on our purpose of **Making a better power system for Australians.**

Underpinning this is are three strategic pillars for Transgrid.

1. **Advocate for the energy system of the future.** Deploy our engineering, regulatory and policy expertise to advocate for a sustainable energy future.
2. **Deliver safe, reliable and low cost power.** Maintain high standards of system reliability as the system transitions, for the benefits of consumers, while in turn ensuring safety is paramount for our workforce and the public.
3. **Invest in new infrastructure and services to support the transition.** Pursue new transmission projects, including interconnectors and renewable energy zones and capitalise on new growth opportunities that align with our competitive advantage

The relationship between our Corporate Strategy and our Asset Management Objectives are shown in the following diagram.

Figure 2 - Network Asset Strategy alignment to 2021-2025 Business Plan

4. Alignment with our Energy Vision

Australia's energy system is undergoing a once in a-lifetime transformation. Our Energy Vision provides evidence-based, data-driven insights into what that transformation could look like over the next 30 years.

The Transgrid Energy Vision identified the following key themes for the Australian economy and the energy system:

Decarbonised economy

- Net zero emissions achieved economy-wide well before 2050.
- Strong energy efficiency, 100% renewable energy, electrification of transport, industry and buildings, fuel switching and carbon offsetting are key pillars to decarbonise our economy

Transformed economy

- Harnessing Australia's renewable energy potential to become a global clean energy leader.
- Creating jobs and upskilling workers for new industries.

Resilient and affordable energy system

- A resilient energy system in the face of climate change.
- A secure and reliable energy system.
- Affordable electricity.
- To produce sufficient quantities of clean energy, a large number of renewable energy generation and storage projects must be located in regional Australia, with transmission infrastructure connecting generation to population and demand centres.

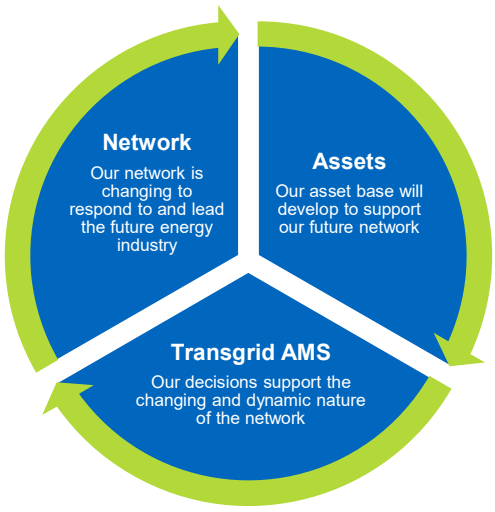
Our Asset Management System (AMS) has been developed to ensure network assets support our Energy Vision, to meet the future challenges from climate change, the changing generation mix and technology changes.

5. Developing the Strategy

The Network Asset Strategy is developed to realise Transgrid's strategic direction and Asset Management Policy, optimising current performance and developing our asset base to support the evolving energy supply system. A number of challenges impact Transgrid's ability to achieve the strategic themes. These challenges were considered in the development of the Network Asset Strategy and will be navigated during its execution to support the achievement of Transgrid's strategic direction.

Sound asset management principles and practices are key to optimising current performance and best positioning Transgrid for the energy transformation. The Network Asset Strategy drives defined and valuable outcomes across the business.

Figure 3 – Assets support our current and future network



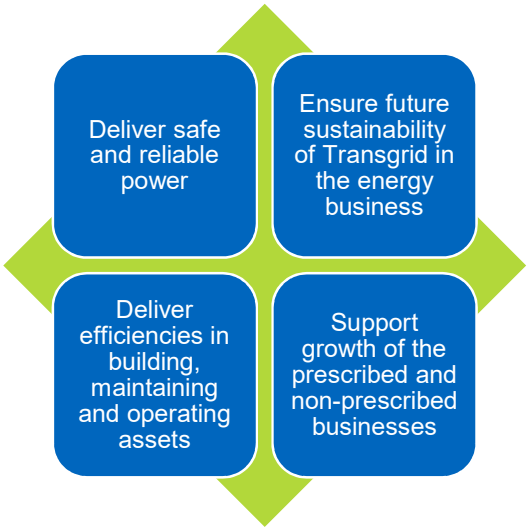
To support our strategic direction, Transgrid's Asset Management System (AMS) will optimise cost, risk, and performance, whilst developing our asset base to support our future network. Figure 3 shows the interrelationship of the network, its assets and the AMS. The Network Asset Strategy sets out how the AMS will be developed to support this strategic direction.

Transgrid's Asset Management Policy aligns with the strategic direction set by the Business Plan. This Network Asset Strategy sets out how we will realise our Policy. The goals/aims of the Policy are summarised in Figure 4. The Asset Management Policy is included in the appendices.

Strategy objectives support Transgrid's strategic direction

The Network Asset Strategy identifies a range of targeted objectives, aligned to the Business Plan and consistent with our Asset Management Policy, to deliver valuable outcomes in the short to medium term and advantageously position Transgrid for the medium to long term as the energy industry transforms. Figure 2 presents the Network Asset Strategy objectives that have been identified to assist Transgrid realise its strategic objectives.

Figure 4 – Asset Management Policy Goals



Objectives identified to drive value in key areas

The Network Asset Strategy objectives were identified to target effort where most value could be realised across the business. An overview of the alignment of Transgrid's strategic direction and Asset Management Policy to the Network Asset Strategy objectives, and the valuable outcomes expected to flow from achieving those objectives, is set out in Section 6.

The Network Asset Strategy approach is summarised in Figure 5.

Figure 5 – Approach to achieving Network Asset Strategy outcomes

Challenges in achieving the objectives

Transgrid operates in a complex environment, with operational constraints, varied and often competing stakeholder needs, increasing regulatory pressure, and societal scrutiny within an industry that is transforming to a new energy future.

These challenges impact the business' ability to achieve Transgrid's strategic direction and the Network Asset Strategy objectives. These challenges were considered in the development of the Network Asset Strategy and will be navigated during its execution to support the achievement of Transgrid's strategic direction.

We recognise it is essential to deliver best practice asset and stakeholder engagement to effectively manage and mitigate these challenges and satisfy stakeholders' needs in the management of assets. See the appendices for an overview of Transgrid's Asset Management and Safety Systems Framework and stakeholder management practices.

The analysis of the challenges and proposed actions to support the Network Strategy objectives is developed in section 9.

Defined actions to address the challenges and ensure the Strategy objectives and outcomes are achievable

Seven work streams have been identified to achieve the Strategy's objectives and outcomes, and develop the business' understanding and adoption of the AMS to better position Transgrid to succeed now and into the future.

The work streams comprise SMART, realistic and achievable actions. These actions have been developed to work within or address the challenges Transgrid is experiencing, to address risks and target improvement opportunities.

The range of actions against each objective will be implemented over three horizons. The overview of these work streams and component actions across the three horizons is summarised in the initiatives sheet presented in section 10.

6. Strategy Summary

The following table summarises the eight Network Asset Objectives detailed in Section 9, the associated opportunities and challenges, targeted value outcomes and performance measures on which we measure our success.

Strategic Pillars	Network Asset Strategy Objectives	Opportunities and challenges in realising the objectives	Valued outcomes	Performance measures
Advocate for the energy system of the future	Support new technologies and innovations that improve or grow our business	• Identifying new and alternative technologies that support the growth and maintain network stability. • Identifying opportunities to obtain further value from potential new areas of growth to the network.	• Optimised REPEX and AUGEX to provide consumer value whilst managing risk. • Achieving lowest OPEX solutions that benefit the consumer. • Managing network safety risk ALARP at the lowest cost. • Maintaining social licence by demonstrable risk management to consumer expectations. • Sustainable security holder returns through an efficient business. • Improved performance for regulatory performance incentive schemes. • Benefit to stakeholders through decisions based on quality asset information. • Reduced compliance effort through harmonisation of management systems. • Value to consumers through access to low cost renewable energy. • Value to security holders by maintaining a sustainable transmission network. • Additional revenue by investment in technologies that support the energy transition. • Regulatory respect for TransGrid as a leading influencer of positive reform. • Being cost competitive in bids for contestable services. • Improved investment returns by managing cost and risk for non-prescribed assets.	*Maintain 5 year average for High Potential Incidents*
	Develop standing as industry leader for positive regulatory reform	• Support the Regulatory team with asset related information that supports future energy development. • Provide advice to the policy team on how the regulatory environment affects asset management of the transmission network.		
Deliver safe, reliable, and low cost power	Manage assets efficiently to deliver security holder and consumer value.	• Demonstrating the efficient expenditure of capital and operating funds to the AER, consumers and security holders. • Achieving asset objectives that improve the performance of regulatory incentive schemes to benefit consumers		*Achieve 99.99975 system reliability*
	Manage Network Safety Risk	• Efficiently managing network safety requirements across multiple jurisdictions. • Meeting the expectations of consumers to provide electricity transmission at the lowest cost.		*Continual improvement of processes and systems*
	Maintain Network Reliability	• Meeting reliability standards and requirements as energy system complexity increases • Analysing and where necessary developing new technologies, strategies and systems to operate the network reliably with increasing renewable generation penetration		*Achieve +/- 5% performance in Program of Works Budgets*
	Ensure asset information is available to inform business-wide decisions	• Improving the ability to make informed decisions through integrated asset management information systems. • Ensuring consistent, reliable, and available information by adhering to data governance principles.. • Identifying the requirement for capacity to support the energy transition that benefits consumers and stakeholders.		*No major non-conformance in regulatory audits.*
Invest in infrastructure and services to support the transition	Support sustainable growth of the asset base by developing the right infrastructure	• Developing skills in new technologies required to support the energy transition. • Providing support to the ISP through communicating the value of network upgrades that add consumer value. • Ensuring the resilience of the network to changes in climate and resultant increase in severe weather events.		*Long term sustainability and resilience of the network*
	Support growth as the service provider of choice to the non-regulated market	• Ensuring processes supporting Lumea provide efficient response to dynamic business requirements. • Leveraging processes to efficiently managed non-prescribed assets and add value to TransGrid's offerings.		

7. 2020/21 Performance Review

7.1. Achievements

Transgrid has delivered a number of successful initiatives in 2020/21 that have realised significant value for consumers and security holders.

- The asset risk index has been fully developed and embedded within the capital investment prioritisation process enabling consistent, data driven decisions to drive optimised risk outcomes.
- Maintained a high level of reliability consistent with previous years.
- The 2019/20 bushfire season was the worst on record in NSW. Transgrid has identified all associated condition issues and is halfway through addressing them with a 2 – year corrective maintenance program.
- An independent Bushfire Strategic Review found no major concerns and provided some recommendations to improve Transgrid's preparedness.
- All insurances were renewed with significantly less increases to premiums compared to the industry with some TNSPs and DNSPs finding it difficult to even retain their policies.
- ISO 55001 certification was retained with only one minor nonconformity raised and all previous nonconformities closed out.
- Transgrid is progressing our Digital Core project – a major upgrade to our Enterprise Asset and Workforce Management Systems and Finance systems to bring these system up to the best of breed modern equivalent.
- Easement management strategy enhanced and delivering value through continued reduction of asset risk while reducing costs in easement management.
- Delivering operating cost savings while balancing network risk implications through risk based budget analysis.
- Significant contribution (>50%) to capital efficiency through innovation activities, this was contributed largely from the secondary systems renewal investment strategy.
- Maintained no non-conformances on our network safety management system audits.
- Effectively dealt with an increasing volume of connection enquiries.
- Completed significant work to support the energy transition and the AEMO Integrated System Plan (ISP).
- Undertaken significant community consultation, route development and environmental assessment work to support major project development.
- Maintained key operational systems and performance in an increasingly complex operating environment.

7.2. Portfolio Management

AUGEX Portfolio Review

Transgrid's Asset Management System (AMS) has delivered improved capital management and operational cost efficiencies and improved network risk management. Moving forward the AMS will focus on prudent network investment, efficient operating and maintenance programs, optimising efficiency scheme returns and development of defensible revenue reset proposals.

Over the 2018-23 regulatory period we:

- progressed the following key projects to ensure we continue to meet our customers expectation for a reliable, secure power supply and comply with all applicable regulatory obligations:
  - Powering Sydney's Future (PSF), which was necessary to ensure the continued safe and reliable power supply to the people working and living in Sydney's CBD and the surrounding suburbs to meet future demand growth, at a cost of $232.0 million
  - built a new 330/132 kV substation at Stockdill to ensure continued compliance with ACT government reliability requirements, at a cost of $40.1 million
  - a number of investments required to meet our network regulatory obligations and other compliance requirements, in light of load increases driven by economic growth, as well as the impact of changes in the generation mix. The most substantive of these projects have been at Macarthur and Orange, and
  - undertaken connection works relating to new loads, totalling $14.5 million.
- supported the policy transition to a low carbon future, through our investments in major transmission projects which underpin the Australian Energy Market Operator's (AEMO) Integrated System Plan (ISP) optimal development path, which is a whole-of-system plan to deliver the lowest cost energy solution for customers consistent with an electrified, low carbon future. We are on-track to deliver three of the projects on the optimal development path by the end of the current period:
  - Queensland to New South Wales (NSW) Interconnector (QNI) minor upgrade
  - Victoria to NSW Interconnector minor upgrade (VNI)
  - Project EnergyConnect (PEC)

  These projects have been identified by AEMO as critical to deliver the lowest cost energy solution for customers consistent with an electrified, low carbon future.
- Invested in new technology and infrastructure to support the continued delivery of a safe, reliable and secure power system and deliver value for customers. These included the first grid-scale battery in NSW (at Sydney West), the adoption of Smart Wires power flow control devices to increase network capacity and reduce congestion and the roll-out of dynamic line ratings to improve our real-time utilisation of the network.

REPEX Portfolio Review

Over the 2018-23 regulatory period we:

- Progressed asset replacement and refurbishment projects in alignment with our 2018-23 proposal, prioritising delivery in accordance with the benefit it delivers to our customers and to maintain compliance with our obligations. Key programs progressed include those relating to:
  - transmission lines (representing 39.1% of Repex - where we invested $104.3 million in refurbishing steel tower transmission lines, including removing asbestos paint, as well as $120.7 million replacing deteriorated wood poles with poles made from concrete or steel. As part of these programs, significant investment in insulators ($51.6M) and overhead conductors ($24.6M) was completed.
  - substations (representing 26.0% of Repex) - where we invested $145.9 million replacing substation switchbay equipment , and a further $54.4 million replacing or refurbishing transformers and reactors.
  - digital infrastructure (representing 34.9% of Repex), including:
    - > $91.4 million replacing substation protection systems
    - > $51.4 million replacing control systems
    - > $39.6 million on network property and security systems
    - > $36.7 million for metering and communication systems (including OPGW)
    - > $30.5 million on SCADA systems replacement
    - > $18.9 million on supporting AC/DC systems
- continued to deliver a safe network as a mission critical priority and have seen a decreasing number of fire starts, decreasing levels of trespass events and very low levels of public injury incidents
- maintained our network safety, reliability and security utilising our robust asset management system to optimise our investments
- experienced and responded to extreme climate driven weather events impacting our network (bushfires, storms and floods), causing unprecedented levels of asset damage, while minimising disruptions to the community
- strengthened the cyber and physical security aspects of our network in response to increasing government concern regarding the security of critical infrastructure
- remained agile to change by investing in emerging asset issues as they arose, reprioritising our investment portfolio to do so, to ensure we continue to maximise the benefit we deliver to customers throughout the regulatory period, and
- implemented innovative strategies, such as our digital substation, to ensure we leverage the latest technologies and continue to deliver value in the best long term interest of our customers.

Transgrid has managed to maintain strong reliability and safety performance of an asset base increasing in average age with minimal direct maintenance cost increases

Network Operating Program of Works

Transgrid's asset maintenance program is regularly under review for efficiency gains. The maintenance plans for all asset classes are updated every year to allow for productivity improvements, learnings from the field and ongoing risk assessments.

Non-routine maintenance processes have been further enhanced to ensure all network issues and incidents are reviewed and prioritised by the Asset Monitoring Centre and Asset Managers.

Network Service Efficiency

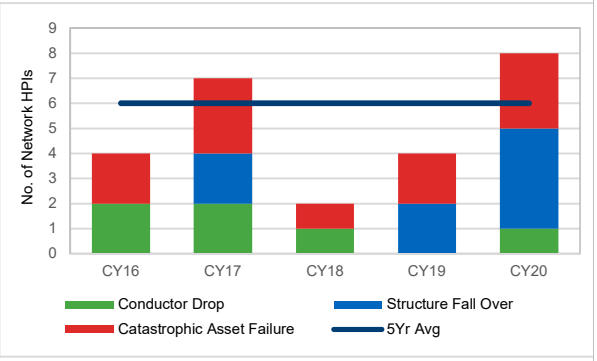
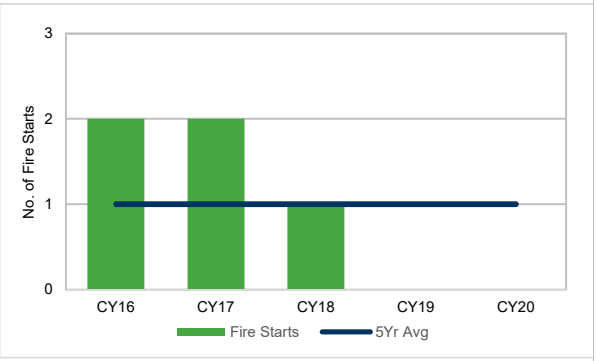
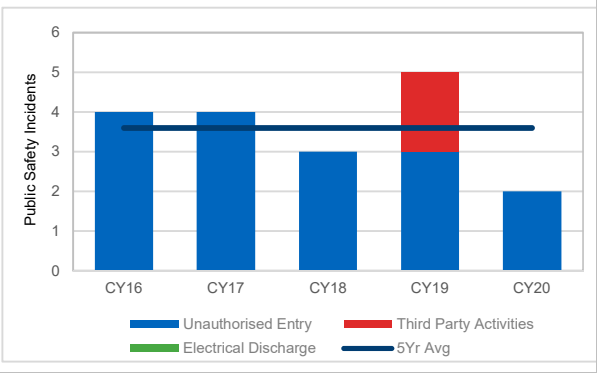
A substantial shift in the electricity generation mix across NSW and neighbouring states over recent years, in conjunction with unpredictable bidding behaviour from generators, poses a significant challenge to Transgrid's ability to plan efficient outages to provide necessary access to capital and maintenance projects.

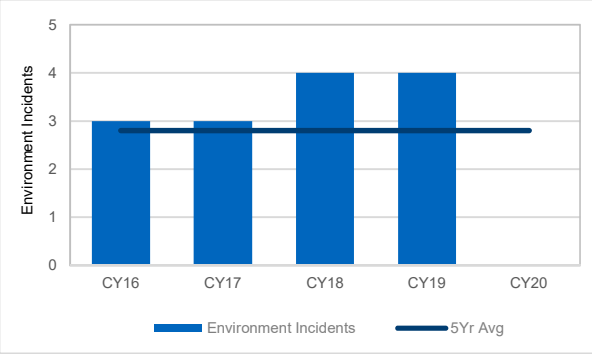
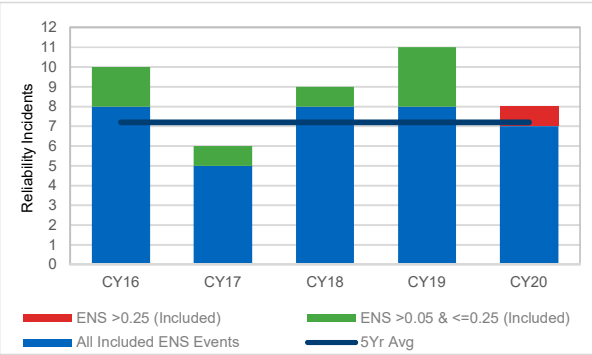
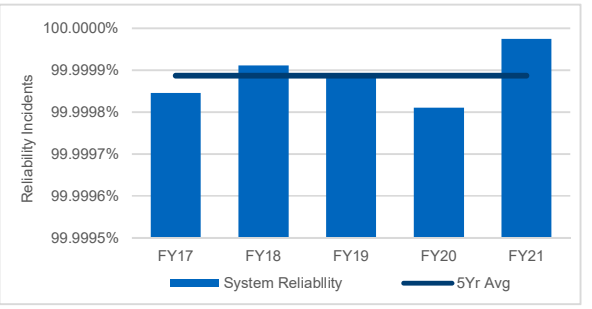
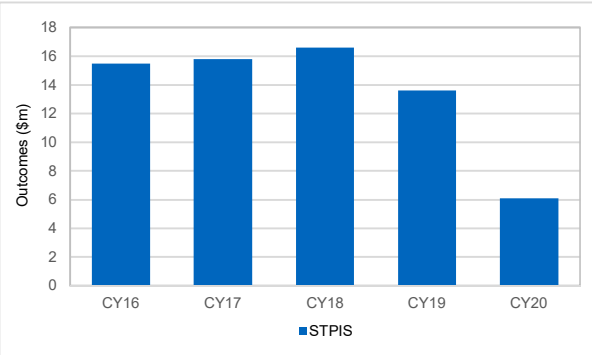
We are enhancing outage modelling to ensure service efficiency is maintained. This will incorporate emerging trends, drivers and changing market conditions contributing to network constraints and ensure efficient outage planning.

7.3. Network Assets

Transgrid monitors the performance of its assets and associated risks through monitoring a set of high potential incidents and associated performance indicators. The following tables provide a snapshot of our performance over the prior periods.

Review of the performance indictors shows a majority of positive trends for items that are delivered under the Asset Management System. This provides confidence that the AMS is delivering on its objectives.

Performance indicators	Performance outcomes
High Potential Incidents • Conductor drop • Catastrophic failure • Structure fall over Target: Maintain 5 year average	
High Potential Incidents • Fire starts Target: Maintain 5 year average	
Public Safety incidents • Unauthorised Entry • Third Party Activity • Electricity Discharge Target: Maintain 5 year average	

Performance indicators	Performance outcomes
Environment incidents Target: Maintain 5 year average	
Loss of supply events Target: Maintain 5 year average	
Maintain system reliability Target: 99.9997%	
Short Term Performance Incentive Scheme STPIS measures • Service Component • Market Component • Network Capability Component Target: Achieve annual forecast	
Network related lost time injuries[1] Target: Zero	There have been zero network related lost time injuries over the period.

[1] A network related lost time injury is one where the injury was cause by a loss of directly related network stored or transmitted energy including that held in attached infrastructure.

7.4. Asset Management System

Transgrid has achieved continuous improvement of its Asset Management System in 2020/21. For 2021/22 and beyond, Transgrid will focus on realising additional value by continuing its journey to go 'beyond compliance' through implementation of the Network Asset Strategy.

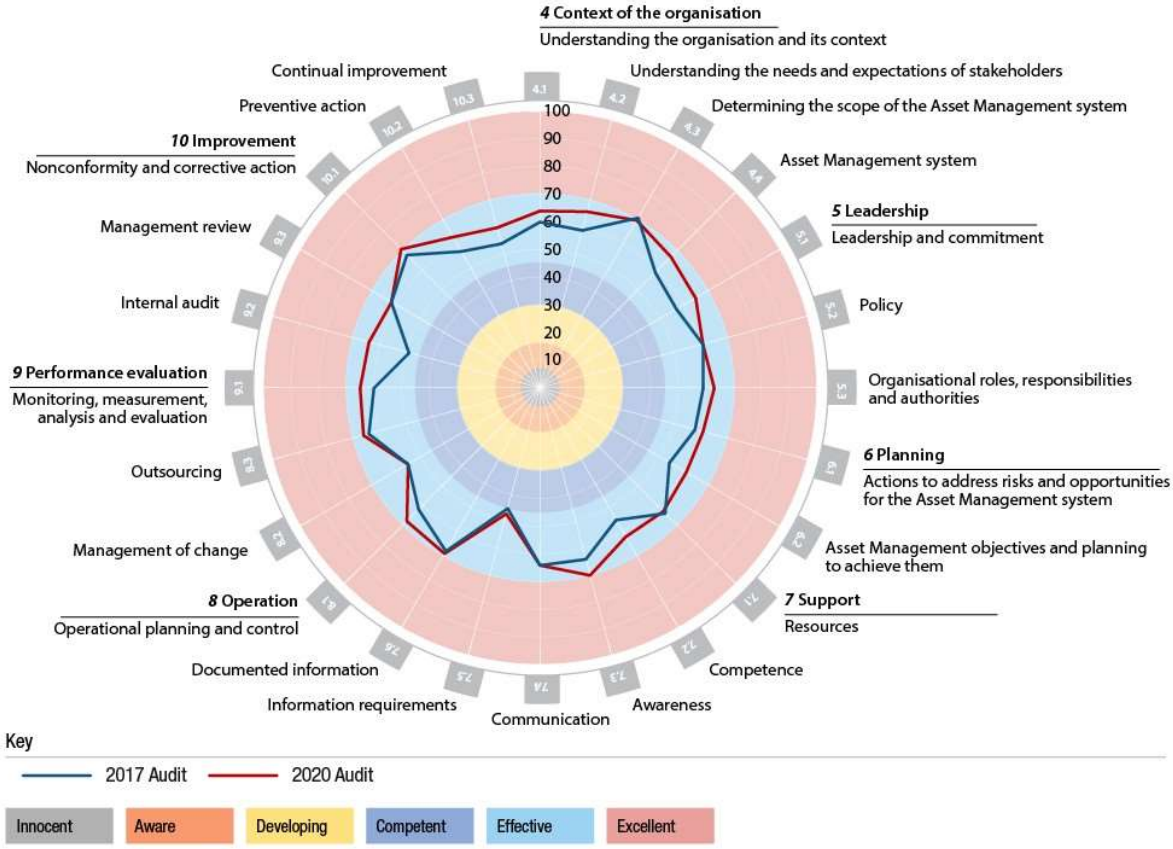
An independent assessment of the Asset Management System carried out by WSP concluded that:

> *"…Transgrid is one of the most mature asset management organisations we have assessed. The foundational principals of a balance between costs, risks and performance have been embraced by the organisation".*

Performance indicators (FY21)	Performance outcomes
Program of Works	
Asset Management Program of Work (AMPoW) budget • Target: Perform within -5/+10% of the approved budget	Target Met
Network Capital budget • Target: Perform within +/-5% of the approved budget	Target Met
Compliance Management	
Electricity Network Safety Management System non compliances	No major or minor non-compliances
Zero reliability standard non-compliances	Zero non compliances
Zero NER non-compliances	Zero non compliances
ISO 55001 certification	In late 2020 we maintained certification with existing minor non-conformities removed although one new one was identified. This is on track for closure in 2021 surveillance audit.
Reach excellent maturity level in the risk, strategy and asset information Asset Management System elements of ISO550001	Achieved an assessment of "Outstanding" in this area in the ISO 55001 recertification. Transgrid's overall performance in its last certification audit is shown in Figure 6.
Network Safety Management	
No red reports in key result indicators provided to Board audit and Risk Committee regarding Bushfire and Reliability	Zero red reports.
Control effectiveness metrics fully developed and communicated to stakeholders	Developed a high level plan and carried out a preliminary assessment to identify critical control measures.
Climate change review recommendations incorporated into asset management strategies and plans	Work in progress
Asset Management initiatives.	
Key issues identified for network to support the energy transition	Work in progress.
Development of enhanced cost and asset performance reporting for the non-prescribed portfolio	Work in progress

Continuous improvement and innovation registers systematically identify, evaluate and where viable implement new or alternative technologies or processes	Work in progress
Documented evaluation and risk assessment of credible innovations and new technologies	Smart Wires are being installed in three locations to help ease a capacity constraint.
Incorporation of new network connected technologies into the Asset Management System (e.g. batteries and synchronous condensers.)	Completion of first large scale battery installation
Completion of Audit Plan and close out of actions	Weekly reporting and monitoring of actions associated with the AMS instigated

Figure 6 – Asset management maturity (from 2020 recertification audit)



8. New Energy Future Driving Network Development

Our transmission network links major generation and load centres within NSW, interconnects with other States, and in doing so drives Australia's largest economy and enables the National Electricity Market (NEM). The Network Asset Strategy considers this transition in the development of its objectives.

Transmission Annual Planning Report (TAPR)

Our Transmission Annual Planning Report sees our network providing the backbone of the future energy system for Australia's NEM.

The TAPR involves joint planning with each of the distribution network service providers in New South Wales, Queensland, Victoria, and South Australia and the Australian Energy Market Operator (AEMO). The objective of joint planning is to work together to develop the power system in the most efficient way for the benefit of customers.

Recent economic uncertainties

The Australian economy suffered a steep downturn in the first half of 2020, with a cumulative decline in GDP during the period between March and June pushing GDP for financial year 2019/20 into a -0.2 per cent recession. This is expected to return to trend and this will drive some locational demand growth in the AUGEX forecast.

It is likely that non-residential energy consumption will be impacted due to closure of a number of commercial and business establishments due to the impact of the July 2021 lockdown in NSW due to the ongoing COVID-19 outbreak. It is expected that this reduction will be partially offset by increases in residential consumption.

Forecast energy consumption

Figure 7 shows the composition of historic energy and the medium growth forecast. A significant proportion of the decline in energy consumption in the initial years of the forecast period is accounted for by the non-residential sector as a result of disruption to small industrial/commercial loads due to COVID-19. A large amount of potential load increase has been, and is forecast to be, offset by accelerated energy efficiency and small-scale rooftop PV take up.

Meanwhile, the impact of battery charging on annual energy is projected to remain modest over the forecast horizon. Under the medium scenario, there is minimal effect of COVID-19 on major industrial loads and these are expected to increase at a modest pace due to additional mining and data centre loads.

Forecast peak demand

Figure 8 shows the composition of historic summer MD and the medium growth forecast. A significant amount of potential load increase in the grid has been, and will continue to be, offset by accelerated energy efficiency and small-scale rooftop PV take up. In the later forecast years, batteries discharging around the time of the network peak also act to depress the grid maximum demand.

Figure 7 - Composition of NSW region annual energy consumption (actual and medium forecast)

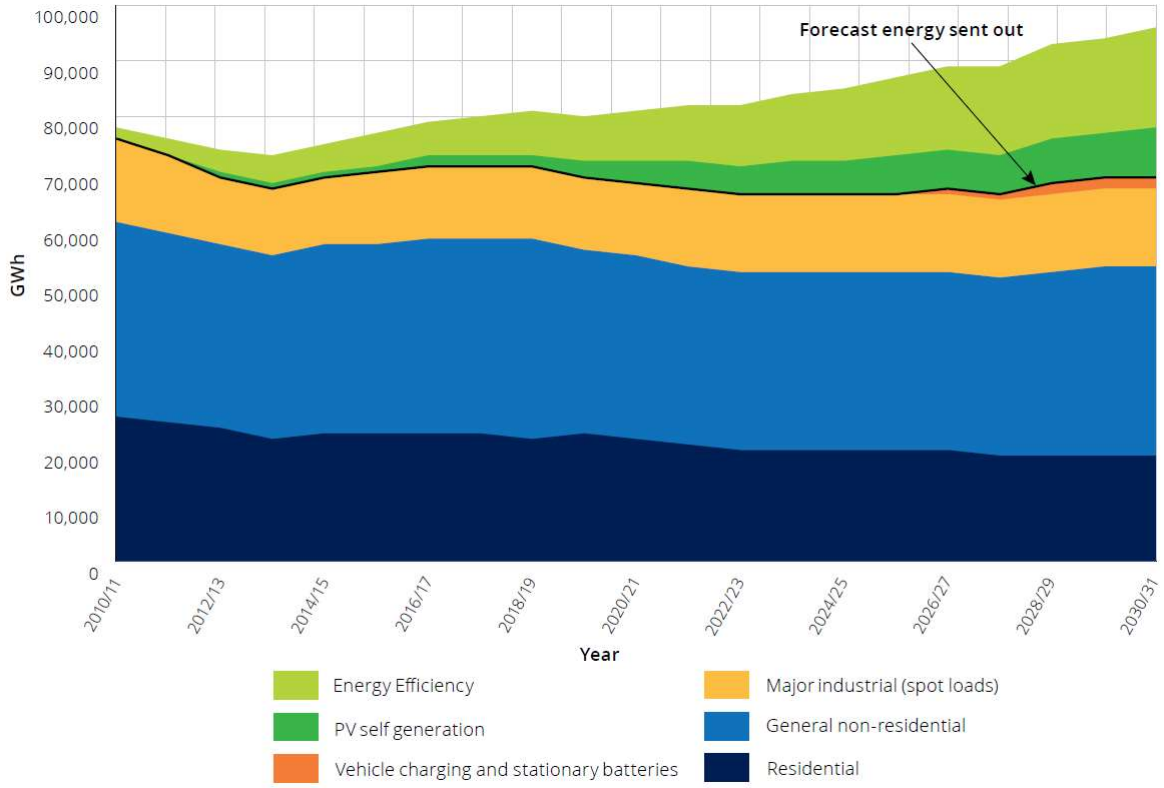


Figure 8 - NSW region summer as-generated maximum demand (MW) medium forecast

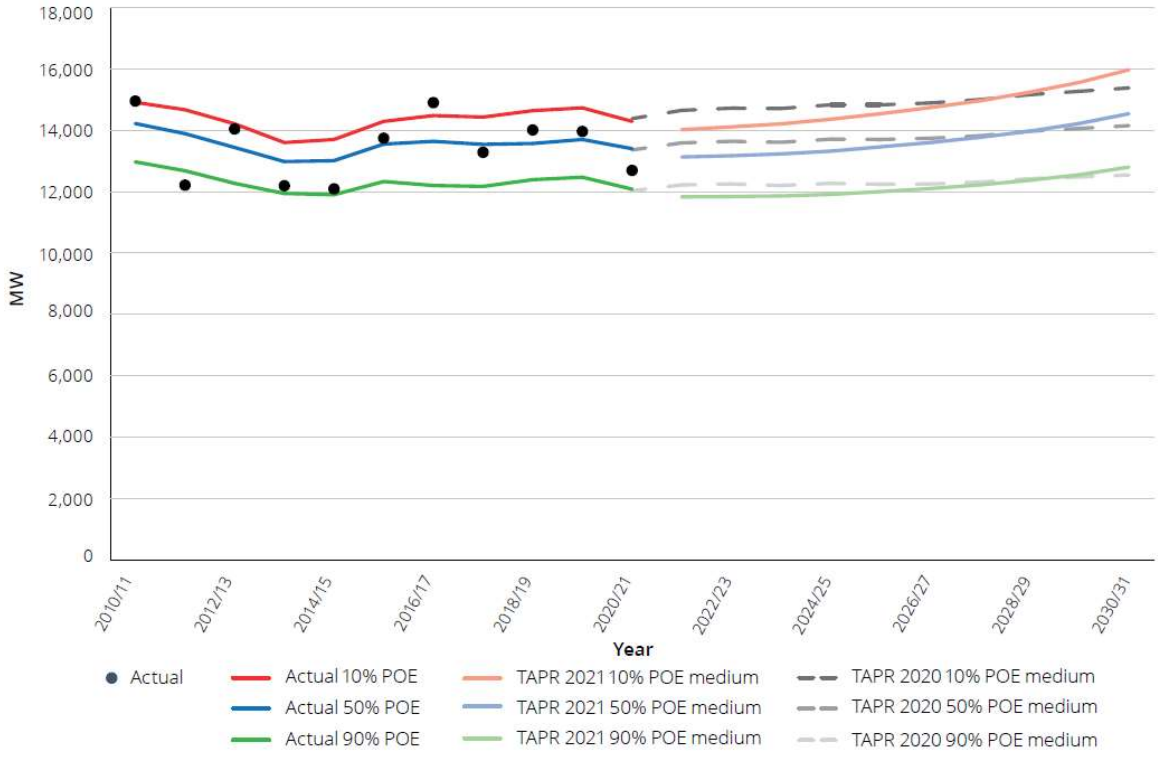
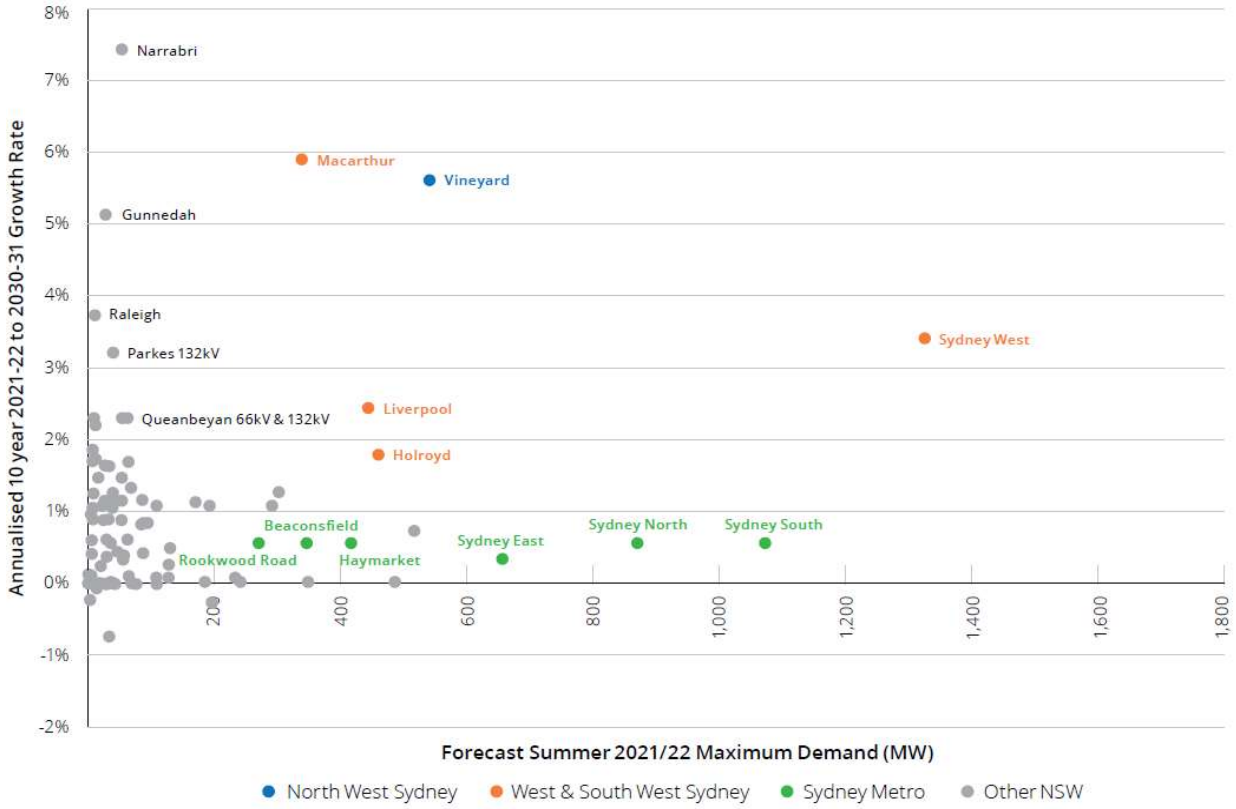


Figure 9 - BSP summer forecast growth rates



Bulk supply point forecast

Figure 9 shows the forecast growth rates for Bulk Supply Points (BSPs) serving the respective DNSPs in summer, with annualised growth rates. This data was provided by the relevant distributor (i.e. DNSPs) and directly connected customers to Transgrid in early 2021.

The BSPs with the highest growth rates are those serving the following areas:

- *West and South-West Sydney* - This area is predominantly within the South West Sector Land Release and Broader Western Sydney Employment Area, and the new Western Sydney Airport at Badgerys Creek where a large number of residential lot releases are planned.
- *North-West Sydney* - The development and operation of North West Rail infrastructure and associated activity in medium/high density residential, commercial & industrial areas will drive load growth in this area.
- *Sydney Inner Metropolitan area* - This area continues to grow at a higher rate than the overall NSW region average. The NSW Government is delivering and planning a range of projects (electricity loads) in this area including transport infrastructure and a number of precinct or urban developments.

Power system security

There is a projected shortfall in generation to meet peak demand as coal-fired generation retire. The shortfall can be met by new generation, greater interconnection, storage and demand management.

Specifically, we expect shortfalls in system strength and system inertia following the retirements of Liddell, Vales Point and Eraring Power Stations or if coal-fired power stations move to flexible operation.

Plans

We have identified major network developments to address emerging constraints and support the connection of new, low-cost renewable generation.

In the short-term, Transgrid is progressing upgrades to Queensland NSW Interconnector (QNI) and the Victoria to NSW Interconnector (VNI) to improve the capacity for existing generation to meet peak demand.

In the medium-term, Transgrid is progressing regulatory approval for EnergyConnect and HumeLink to provide capacity for existing and new generation to meet peak demand. Transgrid is also working with the NSW Government planning the Central-West Orana and the New England Renewable Energy Zones to integrate new generation into the power system.

Network Support Opportunities

The NSW transmission network is becoming more congested in weak areas as more spot loads and variable renewables connect. For more details refer to section 3 of the Transmission Annual Planning Report.

9. Network Strategy Objectives

Sound asset management principles and practice are key to optimising performance and best positioning Transgrid for the energy transformation. The Network Asset Strategy identifies the objectives that will deliver valued outcomes to optimise Transgrid's cost, risk and performance.

Advocate for the energy system of the future

Develop standing as industry leader for positive regulatory reform

Situation and Challenge

The success or failure of policy changes will in part rely on the interactions with the realities of the existing network and the challenges created by greater complexity and dynamics of the future energy market.

Challenge:

- Presenting the current and future technical challenges in operating a transmission system to non-industry players and regulators is complex and difficult to clearly articulate.
- STPIS, RIN and other regulatory schemes are expected to be reviewed periodically. Decisions made here are critical for the correct signals to be applied to the management of the assets.

Improvement Opportunity

- Continue to engage with the AER and consumer groups (principally the Transgrid Advisory Council) on the future network capital needs of the business.
- Provide modelling and advice to the Public Policy team on how changes to the external regulatory environment might positively intersect with the transmission network
- STPIS scheme market component increasingly does not reflect the movement in the NEM and proliferation of constraints
- Future changes to ring fencing arrangements may require changes to the AMS and or ENSMS / ESMS accountabilities.

Action

- Look to continually improve engagement on the RIT-T and regulatory processes
- Identify what is required out of the energy system to benefit Transgrid and the consumers (developing greater maturity enables Transgrid to speak from a position of strength in running a network well).
- Engage through the Regulations team on any proposed updates to the STPIS, RIN and other regulatory schemes
- Monitor and comment into the engagement on potential ring fencing changes to ensure the AMS and network safety management systems are still effectively meeting all regulatory obligations

Value Outcomes

- Value to Transgrid though optimised network asset or non-network solutions to benefit consumers
- Regulatory respect for Transgrid as a leading influencer of positive reform to the regulatory environment
- Improved asset management capability to add value through new and alternative technologies connected to the network

Performance Indicators

- Capability in regulatory policy included in relevant performance development plans
- Continuous improvement and innovation registers systematically identify, evaluate and where viable implement new or alternative technologies or processes
- Incorporation of new network connected technologies into the Asset Management System (e.g. batteries and synchronous condensers.)

Advocate for the energy system of the future

Support new technologies and innovations that improve or grow our business

Situation and Challenge

Critical to the Transgrid business plan is the identification of new opportunities beyond the traditional network asset business. Significant initiatives within the business are underway to assess these innovations and technologies. These may require a different set of capabilities and skills which may have some overlap with existing AM capability where connected to the network.

Challenge:

- New technologies directly connected to the transmission network will need to be integrated into the existing AMS.
- Transgrid may require asset management services for new types of assets independent of the network where these cannot be effectively outsourced.
- Leveraging the existing skills and capability to seek innovations based on a new business development mindset.

Improvement Opportunity

- Identify new or alternative technologies that support the growth of services outside of Transgrid's traditional transmission network base.
- Identify opportunities to obtain further value from the existing transmission network.
- Improve continuous improvement frameworks and processes to integrate the long-term corporate need into the asset management strategies to ensure visibility and action where value is identified.

Action

- Review and develop the Future High Voltage Technology Review and Strategy to identify new and innovative technologies that will add value to Transgrid's AMS
- Engaging with other electricity and infrastructure service providers, both public and private, globally.
- Engaging with relevant industry groups, higher education facilities, and research groups such as CSIRO.
- Evaluation of innovative delivery solutions through concepts such as modularisation.
- Identify opportunities in the existing network to utilise existing capacity to improve revenue generation.
- Improve processes within the AMS for identifying, assessing, and delivering continuous improvement associated with Transgrid's broader strategic innovation direction.

Value Outcomes

- Value to Transgrid though optimised network asset solutions
- Advocating reform to ensure we have an effective and efficient regulatory framework to operate in
- Improved asset management capability to add value through new and alternative technologies connected to the network
- Improved opportunity to support new innovations and technologies

Performance Indicators

- Continuous improvement and innovation registers systematically identify, evaluate and where viable implement new or alternative technologies or processes
- Incorporation of new network connected technologies into the Asset Management System (e.g. batteries and synchronous condensers.)
- Development of Future HV Technology Strategy

Deliver Safe, Reliable, and Low Cost Power

Manage assets efficiently to deliver security holder and consumer value.

Situation and Challenge

Transgrid must meet the expectations of its social licence through ensuring affordable services to consumers and direct connect customers. This commitment is outlined through:

- Transgrid's commitment to energy affordability for consumers through the Energy Charter.
- Delivering asset management strategies that support the key strategic theme of Efficiency in the Transgrid business plan.
- The commitment to value in the Asset Management Policy as signed by the CEO.

Challenge:

- To transmit electricity at an efficient balance of funding and cost to consumers and customers in an environment of overall rising electricity prices.
- The need to demonstrate to the AER and consumer groups that value is being delivered and efficiencies are constantly being achieved.
- Transgrid operates network electricity assets in multiple jurisdictions creating a challenge in managing multiple safety management systems efficiently.
- To optimise the interplay of the regulatory efficiency schemes to obtain the most balanced outcomes.

Improvement Opportunity

- Identify gaps in information availability and close these using quantified data-analytics to assist in achieving the right balance between network safety, reliability, and cost to the consumers, direct customers and generators.
- Improve process for balancing capital and operating expenditure and managing outages to ensure maximum efficiency
- Potential exists for flexible standard designs to meet specific project needs as required
- Improve alignment of various configuration management processes within data standards, project delivery handover requirements, operations procedures and management of change procedures.
- Alignment of AM equipment and design standards team interfaces with delivery needs improvement to ensure efficiency
- Minimise duplication of effort required to meet the requirements of multiple regulators to ensure safety standards are met at lowest possible cost.

Action

- Review design and equipment standards (including easements) for changes that result in lifecycle benefits
- Optimise outage planning, asset performance and operation to best meet consumer outcomes.
- Enhance processes to ensure that capital and/or operating programs and activities are coordinated to reduce expenditure where one program may influence the other.
- Continue delivery of the capital efficiency program to achieve further savings for stakeholders and consumers
- Review all asset configuration processes to ensure all are aligned in an end-to-end process.
- Review current asset management capability and identify gaps with respect to energy system and policy capability where development is required to support business growth.
- Identify competencies and skills required to deliver this capability and include in the development plans of identified Transgrid positions.

Value Outcomes

- Maintain our social licence through providing transmission at an acceptable price to the consumer
- Improved cost competitiveness in developing bids for contestable services
- Optimise returns from the performance incentive schemes where there is a benefit to consumers and the business
- Quality information that underpins making the best decisions for consumers and security holder

Performance Indicators

- Meet Asset Management Program of work budget targets
- Meet agreed capital works budget targets
- Meet planned budget for unregulated infrastructure portfolio
- Completion of Design Standard reviews and quantify benefits

Deliver Safe, Reliable, and Low Cost Power

Ensure asset information is available to inform business-wide decisions

Situation and Challenge

The decisions associated with managing the assets requires linkage of asset data to informed decisions. This is achieved through the transformation of data to knowledge via information models.

Transgrid has defined Asset Information as an asset class within its AMS. The Asset Information Strategy and Plan supports the Network Asset Strategy to deliver this outcome.

Challenge:

- Assuring that asset information is aligned to the defined data quality dimensions is essential to having confidence that asset based decisions balance cost, risk and performance.
- Currently information at Transgrid is managed though a number of information sources and systems with varying levels of connectivity.
- Developing and maintaining systems that seamlessly interact with each other to provide the required asset management information.
- Ensuring that the data collected via the works programs meets data governance requirements.
- Ensuring the delivery of the EAM and WFM systems meet business objectives.

Improvement Opportunity

- Improve and rationalise Enterprise Asset Management (EAM) information systems into a set of effectively integrated systems that seamlessly provide capture, transform, and visualise information for all Asset Management related stakeholders to enable value added decisions.
- Improve data governance to ensure data meets the required standards of accuracy, relevance, accessibility, completeness, timeliness and consistency. This ensures accurate and repeatable information is available.
- Get better information out of both business and operational systems through better use of techniques such as software engineering, machine learning, data science, etc. to gain extra efficiencies in the AMPoW.
- Improve alignment of asset management information systems covering asset data, work management, competence, finance and risk systems to provide an integrated single view to reduce waste caused by conflicting information.
- Management of non-structured asset data (manuals, factory and site testing reports etc.).
- Improve archival processes around documentation considering compliance with legislative requirements across various states.

Action

- Identify gaps in Asset (EAM) and Workforce Management systems created by a lack of information and close these gaps in collaboration with information systems Digital Core Transformation.
- Continue to develop planned approach to increase data availability / accuracy and feed into the Asset Analytics and Insights tool. Includes continued development to get access to all appropriate, beneficial SCADA data in the AMC.
- Revise data standards and procedures around Transgrid's defined data governance dimensions to ensure information meets user requirements.
- Development of information dashboards that provide relevant information to stakeholders to ensure asset management performance is accessible.
- Further develop data quality reports to monitor and identify poor, out of tolerance, missing data etc. to enable correction of data and data sets that are falling below quality requirements.
- Clarify and review archival requirements for documents including compliance with legislative requirements considering variations between states.

Value Outcomes

- Maintain our social licence through providing transmission at an acceptable price to the consumer
- Improved cost competitiveness in developing bids for contestable services
- Optimise returns from the performance incentive schemes where there is a benefit to consumers and the business
- Quality information that underpins making the best decisions for consumers and security holder

Performance Indicators

- Meet Asset Management Program of work budget targets
- Meet agreed capital works budget targets
- Meeting STIPS performance targets

Deliver Safe, Reliable, and Low Cost Power

Manage network safety risk

Situation and Challenge

Transgrid is committed to managing its assets to the highest safety standards for its people, the community and the environment. These standards are articulated through:

- Transgrid's Risk Appetite Statement that sets out our Board commitment to managing all safety risks (including bushfire) to As Low as Reasonably Practicable (ALARP).
- The community expectations that network safety risks should be eliminated where possible, or reduced ALARP as prescribed through the Network Safety regulations.
- The Asset Management Policy which provides our CEO commitment to managing network safety in all aspects of the asset life cycle through the use of cost effective risk controls.

Challenge:

- Consumers expect the appropriate level of safety to be delivered at lowest cost.
- Transgrid's business plan requires continual improvement in capital delivery and efficiencies in the asset related operating expenditure.
- Emerging requirements for state registration of people carrying out engineering services.
- Increasing incidence of physical security breach.

Improvement Opportunity

- Align network safety risk acceptance with the Transgrid risk appetite and/or quantified requirements set by regulatory bodies to realise cost efficiencies.
- Improve ability to validate capital requests to regulators by improving the criteria used to assess network safety risk and criticality.
- Improve assurance of competency of people undertaking technical activities with safety implications.
- Improve assurance that risk controls remain effective over time.
- Public Safety performance has seen increased tower climbing and unauthorised entry activity over the last two years.
- Design and data extraction for public safety lead and preventative metrics.
- Coverage of life cycle by AMS / ENSMS Audit procedures to be widened.

Action

- Improve risk based maintenance and operations analysis using integrated tools to ensure the right tasks occur at the right time and cost without compromising safety risk or asset performance.
- Implement a technical authority framework supported by competency assessment processes.
- Maintain a structured induction process for people undertaking asset management roles.
- Implement Critical Control Management for key areas of the business.
- Review public safety and security including industry consultation and public safety KPI development.
- Mapping and further development of Asset Management metrics and the Performance Framework to improve consistency and effectiveness.
- Update Control Assurance Review process to ensure full life cycle coverage
- Update Bushfire and Public Safety models to optimise risk based decisions.

Value Outcomes

- Maintain our social licence through providing transmission of safe reliable electricity at acceptable price
- Reduced compliance effort through consolidated safety management systems
- Demonstrating network safety risk is reduced ALARP at the lowest cost
- Optimised REPEX expenditure to provide consumer value whilst managing risk
- Efficient management systems supported by risk based processes

Performance Indicators

- Maintain Network Safety LTIs at zero
- Maintain 5 yr. average of high potential (loss of control) incidents
- Zero major non-compliances for all Network Management Systems
- No red reports in Strategic Risk reporting in the areas of Bushfire, Public Safety and Reliability.
- Control effectiveness metrics fully developed and communicated to stakeholders
- Meet reliability planning standard p/a
- Completion and appropriate follow up of second line audit program

Deliver Safe, Reliable, and Low Cost Power

Maintain network reliability

Situation and Challenge

Transgrid strives to provide reliability to a level that meets customer's needs. For its prescribed services this level is defined through:

- Transgrid's Risk Appetite Statement that sets out our Board commitment to managing reliability risk ALARP.
- Community expectations on the level of reliability. These are defined through the Transmission Reliability Standard.

For non-prescribed services this level is defined through customer agreements to deliver infrastructure services with an agreed level of performance (as applicable).

Challenge:

- AEMO's expectation that the power system will have short periods entirely powered by renewable energy by 2025.
- Understanding and reacting to risks presented by climate change.
- Increasing complexity of the power system as numbers of generators, generation types, battery connections and special protection schemes increase
- Delivering the level of reliability that meets directly connected customer requirements at the most efficient cost.
- Achieving the balance between reliability for prescribed services and the cost of achieving this as seen by consumers.

Improvement Opportunity

- Identify areas where quantifiable risk increases occur from climate change and harden network.
- Further cross-functional analysis of the potential impacts of increasing renewable generation penetration.
- Improve quantification of reliability risk to optimise cost versus reliability performance and deliver transmission services at the lowest cost to the consumer.
- Improve the consistency and adoption of the use of ICAM root cause analysis for safety incidents and AMC process for non-safety incidents.
- Further review operating practices and tools to deal with increased network complexity and Special Protection Schemes (SPS).

Action

- Update risk based maintenance analysis within the reliability modelling tools in line with the risk methodology update to ensure the right tasks occur at the right time with effective capital and operating expenditure outcomes.
- Analysing and where necessary developing new technologies, strategies and systems to operate the network reliably with increasing renewable generation penetration.
- Improve asset assurance and acceptance processes to manage risks of supply from alternatives sources.
- Review the process of high potential incident investigations to ensure consistent adoption and quality outcomes.
- Improve standardisation of SPS etc.
- Identify impacts of climate change on the network to ensure future assets are resilient to greater bushfire frequency, changing climatic conditions or other environmental factors.

Value Outcomes

- Maintain our social licence through providing transmission of safe reliable electricity at acceptable price
- Reduced compliance effort through consolidated safety management systems
- Demonstrating network safety risk is reduced ALARP at the lowest cost
- Optimised REPEX expenditure to provide consumer value whilst managing risk

Performance Indicators

- Maintain Network Safety LTIs at zero
- Maintain 5 yr. average of high potential (loss of control) incidents
- Zero major non-compliances for all Network Management Systems
- No red reports in Strategic Risk reporting in the areas of Bushfire, Public Safety and Reliability.
- Control effectiveness metrics fully developed and communicated to stakeholders
- Meet reliability planning standard p/a
- Completion and appropriate follow up of second line audit program

Invest in infrastructure and services to support the transition

Support sustainable growth of the asset base by developing the right infrastructure

Situation and Challenge

Transgrid has developed its network based on a traditional power system model of electricity being generated at large base load power stations and Transgrid providing the transmission services to deliver this directly to industry or distribution network service providers (DNSPs). Development of the network has occurred by:

- Identification of network augmentation requirements due to population and load growth.
- Identification of network asset replacement requirements due the risks imposed by aging assets.

Challenge:

- The shifting regulatory framework has created more flexibility and delivery models through the Designated Network Asset (DNA) classification which introduces additional interfaces, complexity and new operational risks to manage.
- An aging asset base with many assets built during time of high network growth now approaching their nominal life resulting in increasing failure risk and a flow on requirement for increasing capital expenditure to maintain a safe/reliable network.
- The expected approval of major projects that Transgrid would deliver as part of the AEMO Integrated System Plan 2021 that exceed Transgrid's current capacity.
- Increased expectations from the community around engagement on new major infrastructure projects.

Improvement Opportunity

- Improve requirement definition, processes and stakeholder interfaces to support the Independent User Shared Asset (IUSA) and DNA processes.
- Improve skills and knowledge (capability) in new network technologies that allows identification of credible alternative options to be included in renewal evaluation.
- Identify opportunities to expand transmission capacity to the Renewable Energy Zones that allow renewable generators to have reliable, high capacity connections to the electricity transmission network.
- Identify opportunities to provide network stability in the network to improve reliability to consumers and industrial end users.
- Improve project delivery capability to handle large scale capital projects that are a magnitude greater than current activities.
- Manage an increasing number of environmental and development approvals and enquiries.
- Long term strategic direction on equipment requirements, new technologies and trends not well articulated.
- Ensure resources have the capability and knowledge to identify and implement the most effective processes and technology.

Action

- Complete gap analysis and process review for IUSA and DNA project development processes
- Develop capability and knowledge in alternative technologies and evaluate if they will aid in providing stability and reliability to the electricity network.
- Support the Regulation team in developing a network capital plan for the next Revenue Reset through defensible risk and value based processes that benefit consumers.
- Further development of the delivery strategy and implementation for major projects above Transgrid's current capability.
- Review and further improve the approach to community consultation when delivering new infrastructure.
- Review current asset management capability and identify gaps with respect to energy system and policy capability where development is required to support business growth.
- Identify competencies and skills required to deliver this capability and include in the development plans of identified Transgrid positions.

Value Outcomes

- Increased value to consumers through access to low cost renewable energy
- Maintain network reliability though providing a resilient electricity transmission network
- Improved value to security holders by maintaining a sustainable transmission network
- Additional revenue from investment in new and alternative non network technologies

Performance Indicators

- Climate change review recommendations incorporated into asset management strategies and plans
- Value identified for preferred network to support the energy transition
- Regulatory approval for all proposed projects supporting the energy transition
- Embedding the delivery strategy for major projects

10. Initiatives

The following table lists the seven work streams identified to achieve the Strategy's objectives and targeted outcomes. The work streams comprise 38 individual actions for implementation over three horizons.

7 WORK STREAMS With individual actions over 3 horizons	HORIZON 1 – SHORT TERM Improve & identify *Develop understanding of the future network* *Optimise current performance, risk and cost* AMS capability baseline set	HORIZON 2 – MEDIUM TERM The network incorporates new technologies and configuration to meet changing generation *Asset decisions integrate with the needs of the network* AMS maturity consistent across the business	HORIZON 3 – LONGER TERM Future network configured and deployed *Assets optimised to support network, operational and customer needs* Industry leading AMS
Asset Management Capability and Awareness	• Identify competencies and skills required and include in development plans of TransGrid roles • Implement a technical authority framework supported by competency assessment processes • Enhance the structured induction process for people undertaking asset management roles	• Identify capabilities for future network	• Address gaps in Asset Management energy system and policy capability to support business growth and consumer value
Efficiency	• Continue delivery of the capital efficiency program to achieve continual improvement • Further develop the capital delivery strategy to facilitate the implementation of major projects • Review of Asset handover and acceptance processes	• Identify information/operational technology solutions to improve efficiency of capital and operating works program delivery activities • Review processes to support value from Digital Core EAM and WFM outcomes	
Risk and Climate Resilience	• Review key design and construction standards for constraints and against latest practice and changing environment • Establish Asset Performance Management Framework • Support assessment of climate change on the network to ensure existing assets are resilient to greater bushfire frequency, changing climatic conditions, and environment	• Further Develop Asset Performance Management Framework and Critical Control Management • Build long term asset climate strategy and business cases for future investment where required • Enhanced risk KPI dashboards and reporting	
Asset Information Processes and Systems	• Revise data standards and procedures around TransGrid's defined data governance dimensions • Identify gaps in Asset (EAM) and Workforce Management systems created by a lack of information and close these gaps in collaboration with information systems Digital Core Transformation	• Work with key stakeholders to build on EAM as the foundation for our future state asset information system • Implement new technology to enhance information collection • Optimise planned maintenance tasks and frequencies through use of analysis tools	• Develop the insights for automated decisions where there are benefits for the business • Investing in the future to bring together systems, technology and information that seamlessly connects field data to insights and on to the program of works
Network of the Future Transition	• Determine gaps against current systems, people and processes to support AEMO's 2025 commitment to 100% instantaneous renewables	• Continue to develop the capability and technology needed to support increased levels of renewable generation penetration	
Contestable Works Competitiveness	• Improve standards and designs to be more competitive • Work with Lumea to change asset related processes to facilitate growth of our infrastructure services business • Improve spares management to meet contestable objectives	• Increased flexibility in AM processes to serve the dynamic nature of Lumea's business	
Consumer Confidence and Social Licence	• Identify opportunities in existing network to utilise existing capacity to improve service capability • Review current processes and capabilities to identify gaps in supporting the new Designated Network Asset (DNA) framework. • Improve defensibility of revenue reset to ensure customer outcomes are achieved. • Continue to strive for best practice community engagement	• Effectively manage the interfaces with the new Designated Network Asset framework to meet all stakeholder requirements and expectations • Achieve sustainable funding for the business through demonstrable risk and value based processes • Maintain compliance with regulatory requirements and community expectations	

Achieved objectives and valued outcomes

- Sustainable growth by developing the right infrastructure
- Service provider of choice to the non-regulated market
- Development of new and innovative technologies
- Industry leader for regulatory reform
- Managed Network Safety Risk
- Maintained Network Reliability
- Efficiently managed assets
- Information that informs business-wide decisions

Appendix A Asset Base Overview

A.1 Prescribed Transmission Network

Transgrid's prescribed electricity transmission network assets sit within its Regulatory Asset Base (RAB).

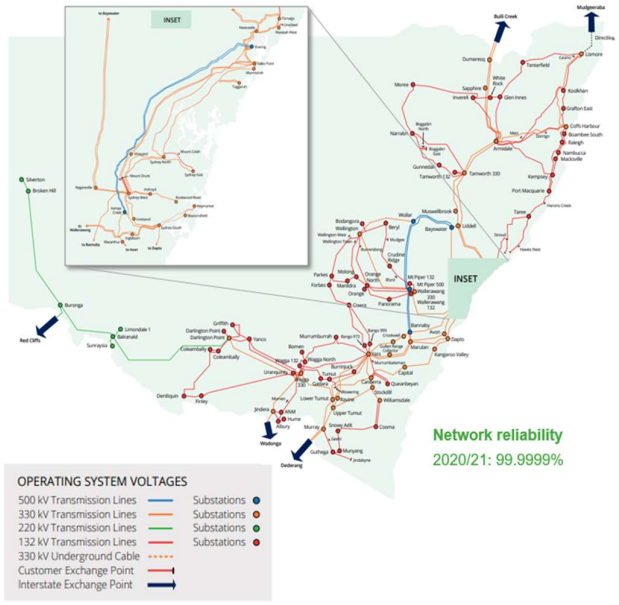
A.2 Overview

Transgrid's prescribed electricity transmission network is shown in Figure 10. It is one of the largest in Australia, extending from the Queensland border to the Victorian border. It connects the major load supply points and the major power stations throughout NSW and the ACT. The network operates at voltage levels of 500kV, 330kV, 220kV, 132kV and 66kV.

The Network Asset Strategy will assist the prescribed business in delivering its objectives by:

- Managing lifecycle costs effectively to protect business earnings
- Ensuring asset management activities related to the prescribed assets deliver safe and reliable power.
- Assisting in the provision of an efficient, high performing business to enable continued commercial competitiveness.

Figure 10 – Transgrid's prescribed transmission network



Transgrid Prescribed Assets							
Substations	**500kV**		**330kV**	**220kV**		**132kV**	**66kV**
	6		44	3		42	0
Transmission Lines and Cables	**500kV**	**330kV**	**220kV**	**132kV**	**66kV**	**Cables**	**Total**
	1,023	5,486	717	5836	21	88 (+20 PSF)	≈13,230
	Steel Tower	Steel Pole	Wood Pole	Concrete Pole		Cables	Total
	14,716	1,119	12,823	9,502		7 (+PSF)	38,167
Digital Infrastructure	Sites / buildings		Optic Fibre	Communications Towers		Services	
	• 95 Substations • 83 Radio repeaters • 230+ buildings / shelters		4,472 km (OPGW & UGFO)	140		• 3927 Protection • 996 Metering • 1875+ Comms Elements	

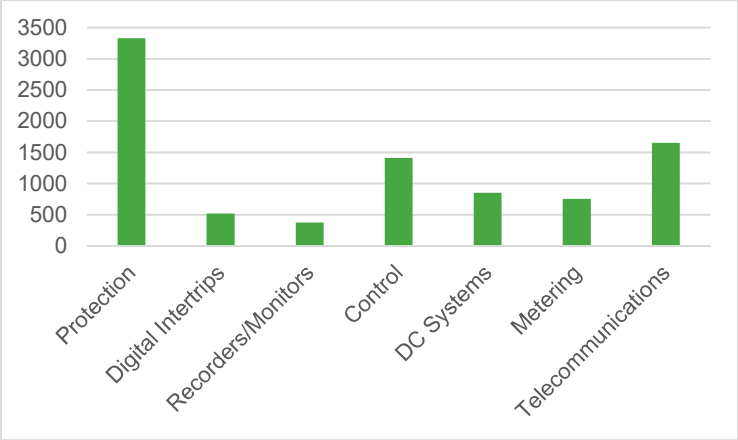
Appendix B Asset Class Strategies

B.1 Digital Infrastructure

Digital Infrastructure technology is evolving at a rapid rate that is revolutionising the ways TransGrid can operate its network. Managing the risks in transitioning to the network of the future and embracing new technologies is a challenge requiring a consistent and aligned approach to maximise value.

Asset Review

Digital Infrastructure (DI) assets facilitate the operation of the transmission network. From allowing automatic and remote operation of network elements to providing real-time and long term trending feedback, DI assets are central to providing a safe, reliable and efficient transmission service. A breakdown of DI asset types is shown in below. In addition to this there are 83 telecommunication Radio Repeater Sites and approximately 4,000km of fibre optic cable.



Achievements

In FY2020/21 DI achieved significant goals including:

- Commissioning of Stockdill 330kV and Molong 132kV Substations (new IEC61850 sites)
- Deployment of IEC61850-7 and IEC61850-8 into conventional standard solutions
- Completion of significant cyber security enhancement works within the OT network
- Delivery of compliance works across our NEM metering fleet to achieve an AEMC driven metering rule change to 5 Minute Settlement (5MS)
- Progression from pilot to rollout phase for the MPLS-TP telecommunications network upgrade project
- Integration of radio tower inspections into the Asset Inspection Manager (AIM) system
- Development of a new Special Protection Scheme standard design
- Developments works initiated for new asset monitoring system technologies

Challenges

- Adapting to increased network complexity as a result of the energy transition. Large-scale renewable generation is transforming ‘load supply’ from a traditional ‘generator to consumer’ model to one with

multi-directional flow pathways. This requires information that considers many differing contingencies across multiple sites
- Enhancing the communications network servicing this transition, which requires strengthening in areas which have not previously been critical
- Overcoming cyber security challenges associated with increasing quantities of generator related secondary equipment interfacing with our OT network
- Enabling new technology to realise capital efficiencies through both convergence of functions and interoperability into assets
- Developing capability and competency to manage risks related to cybersecurity, complexity of the functions being implemented and complexity of the devices themselves
- Monitoring and improvement of systems to ensure consistent and accurate data capture by Transgrid or outsourced contractors
- Addressing known gaps in our internal IEC61850 standard designs

Initiatives

- Establish direction and technological solution for metering communications due to upcoming withdrawal of relied upon telecommunication carrier services
- Fit for purpose assessment of ageing metering data aggregator database
- Reconciliation of telecommunications data currently residing in disparate unconnected systems
- Implementation of best practice cybersecurity measures that will provide additional layers of assurance within our systems
- Horizon plan development works to transform the existing Substation Security Zone into an industry best practice OpsWAN
- Substitution of NiCd based battery systems with VRLA to mitigate safety risks and maintenance expenditure

B.2 Network Property

Transgrid's network is made up of property assets covering over 150 sites and dating back to 1940. The aging asset base and increasing costs required to maintain fitness for purpose are presenting ongoing challenges. Asset condition information is being enhanced to better model asset health and ensure corrective and replacement activities are performed at an optimal time and cost.

Asset Review

Transgrid's network property portfolio covers over 150 sites and all their associated infrastructure. These assets are a result of many different technologies, approaches and applicable standards. The network property portfolio can be summarised as those assets which house and secure our electricity network assets to provide a safe working environment for our staff and ensure the reliable operation of our electricity assets.

Achievements

In FY2020/21 Network Property achieved significant goals including:

- Enhanced portfolio level understanding of costs and maintenance requirements
- Translation of new security standards into a delivery portfolio

- Completion of accelerated Access Control upgrade and commencement of wider site based security upgrade program

Challenges

- High defect rates place continuous pressure on available budget with balanced trade-offs a common requirement
- Better defining the linkage of property asset risks to the network assets they impact
- Achieving cost reductions and efficiencies with an aging asset base
- Monitoring and improvement of systems to ensure consistent and accurate data capture by Transgrid or outsourced contractors
- Alignment of systems for consistency between planned and corrective maintenance activities

Initiatives

- Review of asset fitness for purpose
- Review of technology capabilities to improve asset monitoring and defect response
- Fire trail ownership audit to better understand our ongoing obligations and potential risk exposure
- Third party review of asset installation and maintenance requirements to meet legislative and regulatory obligations
- Third party review of APZ requirements

B.3 Substations

This strategy focuses on high voltage and supporting equipment which have been installed in our substations progressively over the last 60 years. The ageing asset base and increasing costs required to maintain and operate equipment are presenting challenges. Asset data is being collected to better assess asset health, which in turn informs repair, replacement or refurbishment decisions.

Asset Review

Substations are currently located across NSW and ACT. They range in voltage from 500kV to 66kV, with the majority being the 330kV and 132kV network.

Achievements

In FY20/21 Substations achieved significant goals including:

- Continuation of asset replacement programs for the current regulatory period, including circuit breakers, current transformers, voltage transformers and bushings to reduce the risk of failure.
- Updates to health index, bushfire, worker and public safety risk models.
- Initiating various Needs for replacement and refurbishment of substation assets for the next regulatory period.

Challenges

- The average age of assets continues to grow. This puts greater pressure on capturing condition data on assets and analysis to ensure the continued safety and reliability of the assets.
- COVID-19 has disrupted labour and supply chains, which has had a flow on effect to the delivery of maintenance and replacement programs. This includes repair work on key GIS substations as well as oil containment system remediation work.
- Management of disconnectors and earth switches has on-going challenges due to unavailability of data and having a large ageing population.
- Higher than anticipated early life component failures in particular models of new circuit breakers requiring development of asset specific strategies.

Initiatives

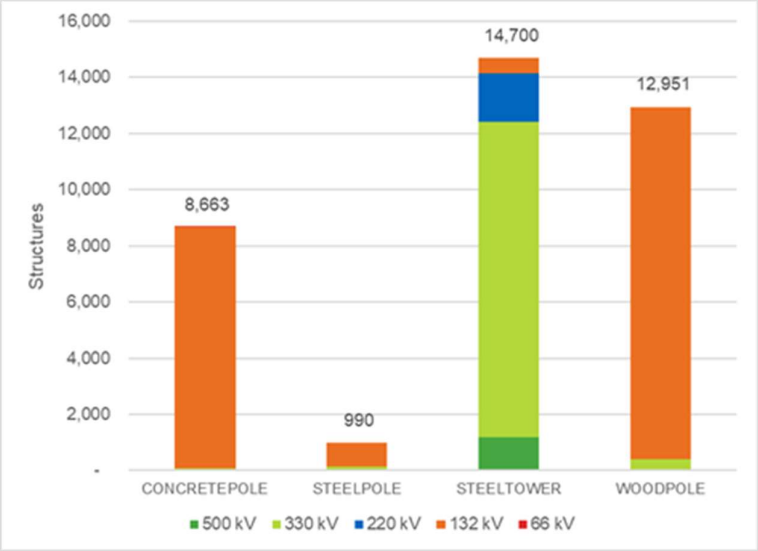
- Improvement of the use of asset failure modes in strategy analysis tools to assist in asset risk modelling and maintenance strategy optimisation.
- Initiate trials of disconnector refurbishment to enable a greater understanding of benefits compared to replacement.
- Investigate new substation technologies, such as hybrid circuit breakers and optical fibre current transformers to remove problematic asset types.
- Commence a program to upgrade substations to Transgrid's revised physical security standard to meet our Network Safety risk obligations.
- Review of regulations and standards application to gas filled HV electrical equipment as pressure vessels and supporting documentation requirements
- Evaluate the trial of online paper moisture monitoring on oil filled transformers for real time monitoring and analytics.
- Initiate trial of substation steelwork replacement to inform the strategy of managing aging steelwork assets.
- Develop strategy to support achievement of emissions targets to SF6 management and new technologies.

B.4 Transmission Lines

Transgrid's transmission line network is made up of assets ranging from 66 kV to 500 kV dating back to 1940. The ageing asset base and increasing costs required to sustain the network are presenting ongoing challenges. Asset condition information is being collected to better model asset health and ensure corrective and replacement activities are performed at an optimal time and cost.

Asset Review

Transgrid's transmission line network covers a route length of 11,315 km strung on 37,578 structures across NSW and the ACT. A breakdown of transmission line asset structure types is shown in below.



Achievements

In FY2021 Transmission Lines achieved significant goals including:

- Replacement of deteriorated poles on Lines 9U3, 9UH and 99D with concrete or steel poles.
- Remediation of Line 993 low spans by installing steel poles. Project also included replacing of an earthwire with OPGW. There are now no wood pole structures remaining on Line 993.
- Lines 4 and 5 grillage tower remediation.
- Line 959/92Z tower refurbishment complete.
- Successful completion of AER bushfire pass-through submission.
- Update to health index, bushfire and public safety risk models.
- Initiation of various needs for replacement and refurbishment of transmission lines asset for the next regulatory period

Challenges

- The average age of the assets continues to increase requiring further monitoring and data capture to manage the safety and reliability of the assets.
- The ageing wood pole assets are causing increased defect maintenance spend.
- Achieving cost reductions and efficiencies with an aging asset base.
- Optimising replacement and operating programs based on the data obtained in the inspection program and limited condition information.

Initiatives

- Wood pole replacement program to extend the life of 132 kV assets.
- Steel tower refurbishment, insulator replacement, conductor replacement and grillage foundation remediation program.

- Managing hazard tree risk.
- Initiate an Early Fault Detection trial to detect, locate, and diagnose asset failure before adverse outcomes occur e.g. conductor and insulator failures).
- Initiate a Public Safety Camera trial on “High Risk Location” to manage public safety risk.
- Improving asset data collections methods to better model asset health and ensure maintenance and replacement activities are performed at optimal cost.

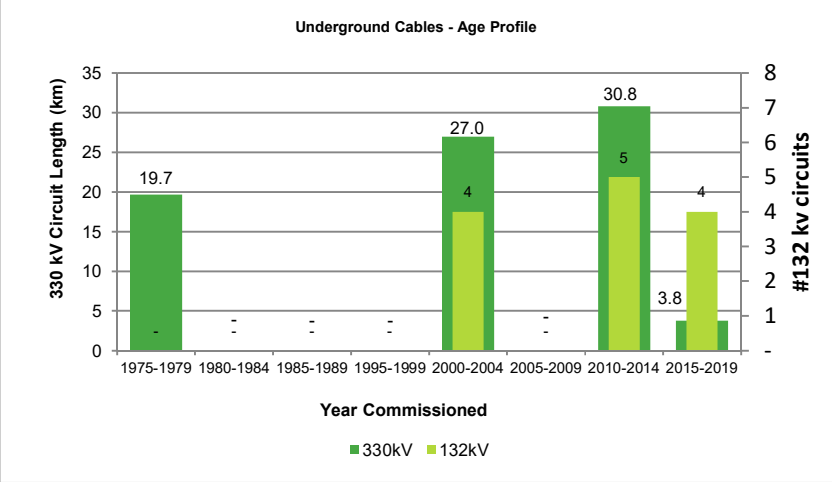
B.5 Underground Cables

Transgrid’s underground cables provide transfer of electricity to the Sydney CBD. Repairs and investigations are costly, time consuming and disruptive as the cables are mostly in public roads. Being ‘invisible’ to the public makes the cables prone to damage by public interference.

Asset Review

Transgrid has 15 high voltage cables 132 kV and above, including internal substation connections. Whilst small compared to the overhead network, Transgrid cables represent a disproportionate portion of the asset base. Cables represent about 0.6% of the total route length but are approximately 13% of the circuits by value in the RAB. The prescribed cables are located within the Sydney region. A breakdown of cable assets is shown below.

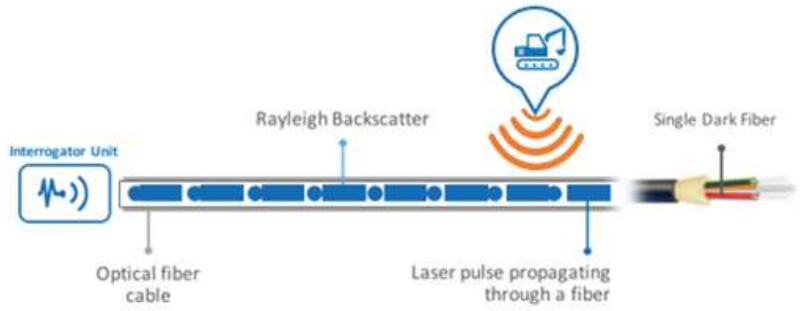
Figure 11 – Underground Cables age/circuit profile



Achievements

Fibre Sense monitoring was installed on Cable 42. This enabled patrols on Cable 42 to be reduced by two thirds whilst providing continuous monitoring for rogue activity.

Figure 12 – Fibre Sense Monitoring



Challenges

- Members of the public digging in the vicinity of Transgrid HV cables damaging the cable assets without authorisation.
- Achieving cost reductions and efficiencies with an aging asset base.
- Managing issues on Cable 41 as it approaches end of life.
- Developing strategy for self-contained fluid filled cables (Cables 41 and 42) after manufacturer support finishes.
- Controlling threats from major infrastructure works near existing cables (e.g. Sydney Metro).

Initiatives

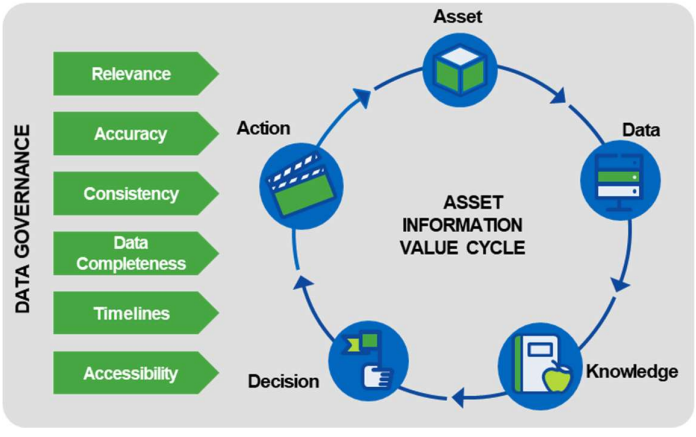
Expansion of Distributed Acoustic Sensing onto Cables 43/44, 39 and Powering Sydney's Future.

B.6 Asset Analytics & Insights

Asset Analytics & Insights (AAI) leads the investment governance and process framework to ensure Transgrid adheres to best practice and delivers maximum value for Transgrid's security holders without compromising on cost efficient outcomes for consumers.

Overview

Figure 13 - Asset Management Information Lifecycle



Managing the quality and relevance of asset information is central to ensuring maintenance and renewal decisions are prudent, sustainable and aligned to business needs.

Leveraging its ability to connect data from various systems and sources, Asset Analytics & Insights (AAI) translates data into knowledge and value-add decisions through the development of new tools and reports.

Data-driven insights on the network assets underpin the optimisation of Transgrid's works programs for capital and operating expenditure that ensure the cost, risk and performance are managed effectively

throughout their lifecycles. Figure 14 shows the process by which inputs are processed into actions within asset management plans.

Achievements

Enhancement of Asset Information and Cost Effectiveness

- Enhancement of the Asset Inspection Manager (AIM), a critical operating tool, to capture accurate failure information, improve the issue management process and prioritise corrective work to address the challenges with budget constraints.
- Work has been completed to enable external contractors to load data directly into Transgrid Systems using a mobile application feeding into AIM. This included moving the mobile platform from IOS to HTML5. This allows contractors to use any device and saves expenditure managing an IOS application.

Enhanced Asset Decisions and Replacement Capex Program for RP3

- The network asset criticality modelling has been enhanced based on feedback from the AER and other key stakeholders received during and after the previous revenue reset submissions. This has introduced improved rigour and defensibility of the criticality values currently used in the investment business cases, particularly for the purposes of revenue reset proposal for the Regulatory Period 3 (RP3). This methodology improves the manner in which external physical factors including network demand, restorative switching, market constraints and equipment availability are used to calculate the criticality of an asset.
- Enhancement of the Repex forecasting model to provide the top-down analysis of the replacement capital portfolio for the purposes of the RP3 revenue reset submission.
- Development of the sensitivity analysis model to (a) test sensitivity of the proposed RP3 repex portfolio due to change in inputs, and (b) demonstrate stability of the proposal despite potential uncertainties around data and calculations.
- Completion of the automation of health indices modelling across all three asset classes. This has allowed asset health indices to be updated dynamically with the latest condition data gathered from the field and hence improved the quality of asset decisions.
- Automation of the process and models underpinning the identification and prioritisation of transmission line assets that require remediation.
- Automation of the network risk index developed comprehensively from group up, in line with the most up-to-date risk and criticality assessment methodologies.
- Enhancement of the Asset Analytics & Insights tool to include the probability density function (PDF) to provide a more accurate estimation of asset failure risk and timing.

Enterprise Asset Management (EAM)

- Transgrid is in the final stages of the Enterprise Asset Management (EAM) implementation and is expected to go live in mid-2022. Asset Management has been providing the necessary subject matter expertise (SME) support and advice to ensure the new EAM tool Maximo delivers the requirements set out at the start of the Digital Core program.
- The project is expected to provide: (a) replacement of functions currently carried out in Ellipse, (b) re-integration of all to be retained be-spoke applications, primarily Transgrid Spatial System, Asset

Analytics & Insights Tool and Asset Monitoring Information Platform, (c) retirement of bespoke applications where functionally will be provided by new systems.

Enhanced Reporting

- Further development of a BI tool that facilitates analysis of historical defects and other work on individual assets which then feeds into life-cycle strategies, maintenance and renewal decisions.
- Improved visibility of capital and operating information by introduction of a number of new suite of PowerBI reports that present multiple views of asset information, management of network issues and various actual maintenance expenditure (vis-a-vis budget) to stakeholders. These reports are updated without manual effort and ensure consistency in the information analysed by groups across the business.

Challenges

Asset Data Framework

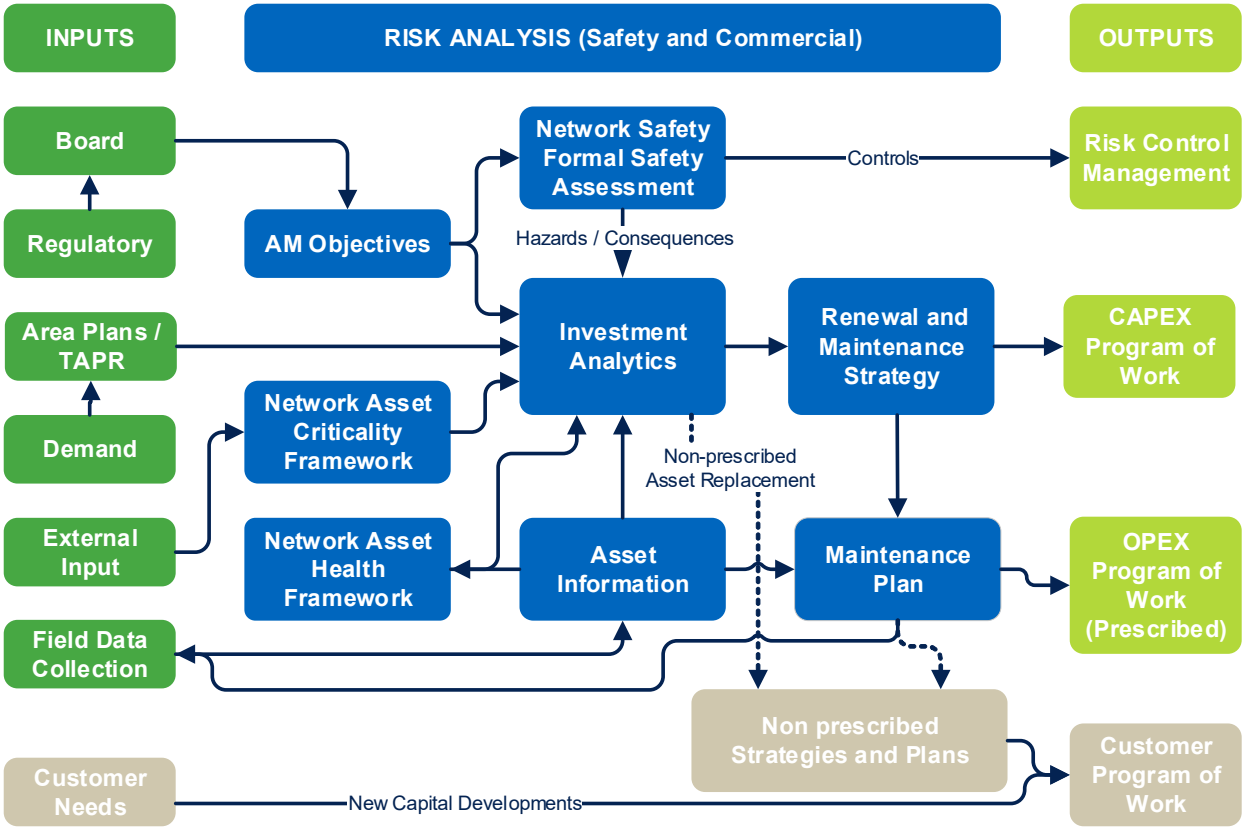
- With a focus on data-driven decisions, data quality is under greater scrutiny. An Asset Data Framework is critical to providing a methodology to manage emerging data requirements as well as monitor and improve existing data. The framework will apply a continuous improvement model to identify and address data issues prioritised by the impact on the business. This is under consideration as part of the EAM implementation. Concurrently, the wider business is implementing more formal data governance that will provide tools to support the methodology. Asset Management is in a good position to meet the challenge of formal data governance, with a number of detailed data definition documents and data quality reports in place.

Initiatives

AAI is undertaking a number of key initiatives aimed at enhancing data governance and further improving the effectiveness of Transgrid's network investment and performance scheme performance:

- Development of an interface that leverages off the Asset Management Information Platform to provide on-demand real-time views of asset condition information to enhance assessment of asset health indices. The initiative will explore the integration of the platform to feed asset health indices directly into the Asset Analytics & Insights Tool in the context of the ongoing Digital Core program.
- Improve data quality by developing reports that highlight gaps, quality and lack of consistency in asset data. Data governance is fundamental to developing defensible decisions. This is an ongoing initiative with some asset quality reports already available for Asset Managers.
- Development of analysis, insights, asset reporting and KPIs within the Asset Management Information Platform (AMIP) to be collectively used by both Asset Management and Asset Monitoring Centre (AMC) as the main 'go to' cross functional asset data platform cc Invest in Data Science: Advanced Statistical Analysis and Machine Learning for Predictive.
- Start the groundwork to invest in Data Science for the purposes of advanced statistical analysis and machine learning for predictive value-add analysis.

Figure 14 – Process for development of plans to address asset risks and opportunities



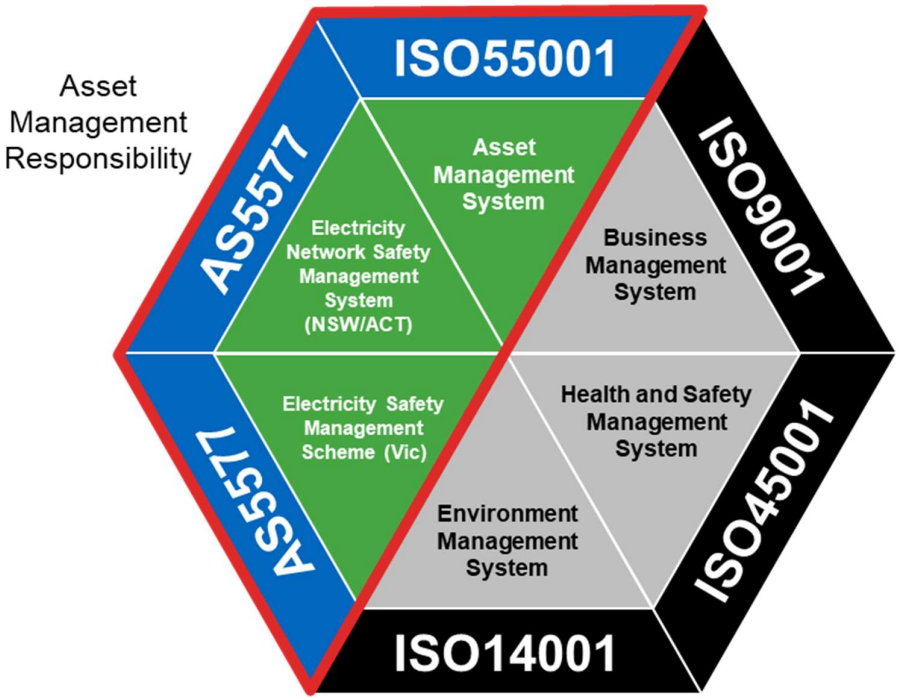
Appendix C Asset Systems and Compliance

Transgrid must maintain an ISO55001 certified Asset Management System and Electricity Network Safety Management Systems for multiple jurisdictions compliant to AS5577. We strive to continually improve these systems with a focus on supporting value in an environment that contains increasing challenge to network safety requirements.

Review

Asset Systems and Compliance manages the Asset Management System and Electricity Network Safety Management Systems. These systems operate in conjunction with the other management systems at Transgrid as shown in Figure 15.

Figure 15 - Transgrid's management systems



Achievements

In FY20/21 significant goals were achieved in progressing the development of the AMS and ENSMS systems including:

Improve

- Commenced development of a technical design competency framework to support a need to manage competency of people undertaking technical activities.
- Redeveloped the formal safety assessment Bow-Tie process to be based around loss of control of Transgrid's internal and external hazards.

Assure

- Strengthened the corrective action processes through a more disciplined use of the new CAMMS system.
- Carried out a pilot of Critical Control Management indicators.
- Integrated the Standards and Equipment Engineering functions into Asset Management

Compliance

- Successful AMS re-certification audit and ENSMS compliance audits for bushfire and public safety implementation with no new major non-compliances
- Obtained approval from Energy Safe Victoria for the first revision of its Electric Line Clearance Management Plan.

Challenges

The challenges in meeting Asset Management objectives for FY22 are:

- Increasing pressure directly and indirectly from external stakeholders to demonstrate management of network safety risk, particularly with regards to bushfires.
- Ensuring the Risk Assessment Methodology is updated to defensibly support the next revenue reset.
- Delivering value to the non-prescribed business (Lumea) with its inclusion in the certified AMS.
- Managing multiple management systems and regulators in a way that minimises costs to the AMS.
- Ensuring that technical and network risk is managed in effectively during the transition of the network.
- Competition for resources due to EAM and regulatory reset.

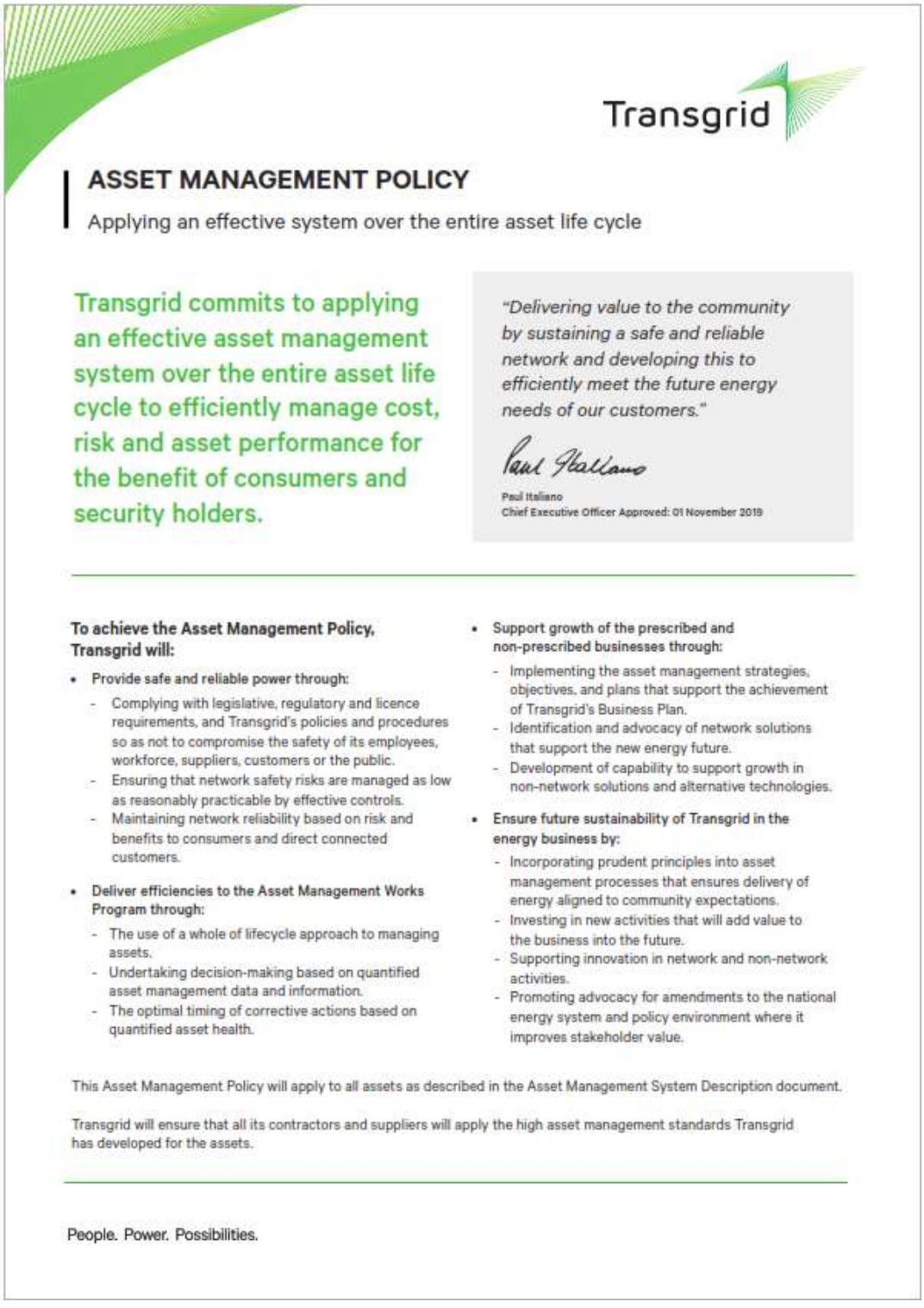
Initiatives

- Continue developing technical competency frameworks and assessments for all critical technical activities.
- Establish a technical authority framework linked to these competencies to ensure only competent people are undertaking these critical activities.
- Improve non-prescribed asset management processes including data management, spares optimisation, and corrective maintenance processes.
- Develop modified design standards to account for the non-prescribed market drivers and risk appetite.
- Continue the Critical Control Management process and implement across relevant forums.

Review performance indicators and develop relevant information dashboards across the prescribed and non-prescribed portfolio.

Appendix D Supporting Information

D.1 Asset Management Policy



Transgrid

ASSET MANAGEMENT POLICY

Applying an effective system over the entire asset life cycle

Transgrid commits to applying an effective asset management system over the entire asset life cycle to efficiently manage cost, risk and asset performance for the benefit of consumers and security holders.

"Delivering value to the community by sustaining a safe and reliable network and developing this to efficiently meet the future energy needs of our customers."

Paul Italiano
Chief Executive Officer Approved: 01 November 2019

To achieve the Asset Management Policy, Transgrid will:

- **Provide safe and reliable power through:**
  - Complying with legislative, regulatory and licence requirements, and Transgrid's policies and procedures so as not to compromise the safety of its employees, workforce, suppliers, customers or the public.
  - Ensuring that network safety risks are managed as low as reasonably practicable by effective controls.
  - Maintaining network reliability based on risk and benefits to consumers and direct connected customers.
- **Deliver efficiencies to the Asset Management Works Program through:**
  - The use of a whole of lifecycle approach to managing assets.
  - Undertaking decision-making based on quantified asset management data and information.
  - The optimal timing of corrective actions based on quantified asset health.
- **Support growth of the prescribed and non-prescribed businesses through:**
  - Implementing the asset management strategies, objectives, and plans that support the achievement of Transgrid's Business Plan.
  - Identification and advocacy of network solutions that support the new energy future.
  - Development of capability to support growth in non-network solutions and alternative technologies.
- **Ensure future sustainability of Transgrid in the energy business by:**
  - Incorporating prudent principles into asset management processes that ensures delivery of energy aligned to community expectations.
  - Investing in new activities that will add value to the business into the future.
  - Supporting innovation in network and non-network activities.
  - Promoting advocacy for amendments to the national energy system and policy environment where it improves stakeholder value.

This Asset Management Policy will apply to all assets as described in the Asset Management System Description document.

Transgrid will ensure that all its contractors and suppliers will apply the high asset management standards Transgrid has developed for the assets.

People. Power. Possibilities.

D.2 Management Systems

Transgrid's asset management and electricity network safety management systems are fundamental to delivering value to the organisation by providing the foundations for leading asset management practice.

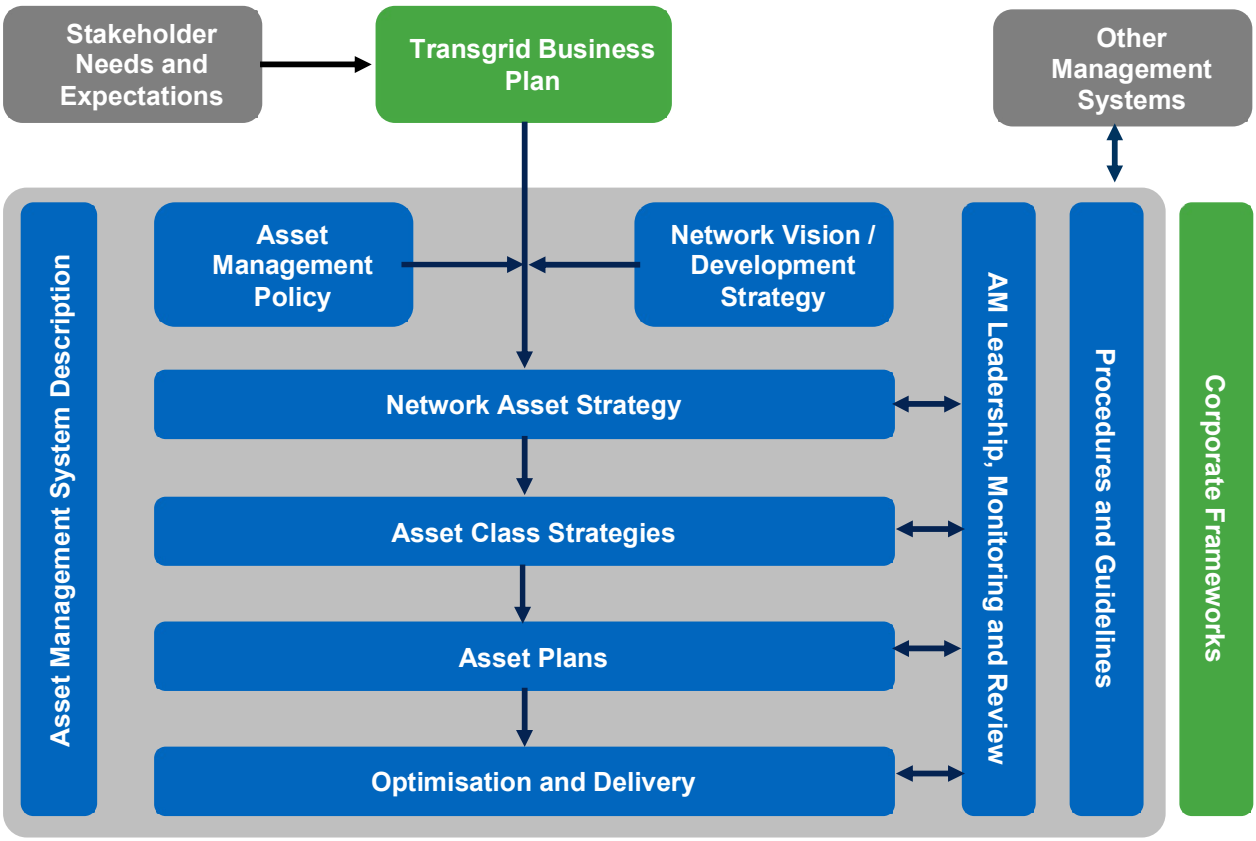
Asset Management System

Transgrid's Asset Management System is certified as being consistent with ISO 55001 (the international standard for asset management).

The Asset Management System Description details the integration of the Asset Management System within our business Operating Model. It also identifies the key interfaces with the Asset Management System Framework.

This integration is a key feature of our maturity as an asset management practitioner. It provides for streamlined, efficient and effective asset management within the broader business operations. Figure 16 shows the document hierarchy of the Asset Management System Framework.

Figure 16 – Transgrid Asset Management System structure



The Network Asset Strategy is central to achieving the objectives of our FY20 – 24 Business Plan insofar as the network assets contribute to those objectives. This Strategy covers all assets that are included within the scope of our AMS as defined in the Asset Management System Description document. This currently includes:

- All electricity network infrastructure (both prescribed and non-prescribed).

- Telecommunications infrastructure (prescribed assets only).
- The purpose of the Asset Management System Description is to articulate how we achieve our Network Asset Strategy through:
- Establishing our strategic drivers:
  - Reinforcing the commitment of our senior leaders in supporting a robust strategy that delivers immediate value.
  - Translating the context and strategy of the business into defined asset management challenges and uncertainties that our strategy must address.
  - Outlining our current performance in relation to our strategic objectives.
- Developing our strategy and objectives:
  - Establishing strategy and objectives through the lens of our corporate Strategic Themes.
  - Defining how we will measure the success of our strategies in achieving our objectives.
- Defining the outputs and how we will continually improve:
  - Summarising the underpinning asset plans going forwards.
  - Providing an overview of longer term forecasts based on strategy implementation.
  - Outlining initiatives to implement which will drive our continual improvement.

Electricity Network Safety Management System

Transgrid's regulatory environment requires an electricity network safety management system to be in place. Transgrid has developed an electricity network management system framework as shown in Figure 17. The ENSMS has been designed to complement both the certified Asset Management System, and has applicable linkages to Transgrid's health, safety and environment management systems.

The Electricity Safety Management Scheme outlines how Transgrid will manage its electricity transmission network to reduce network safety risks as low as reasonably practicable (ALARP) and fulfil its commitment to provide Transgrid's customers with a reliable and safe electricity supply.

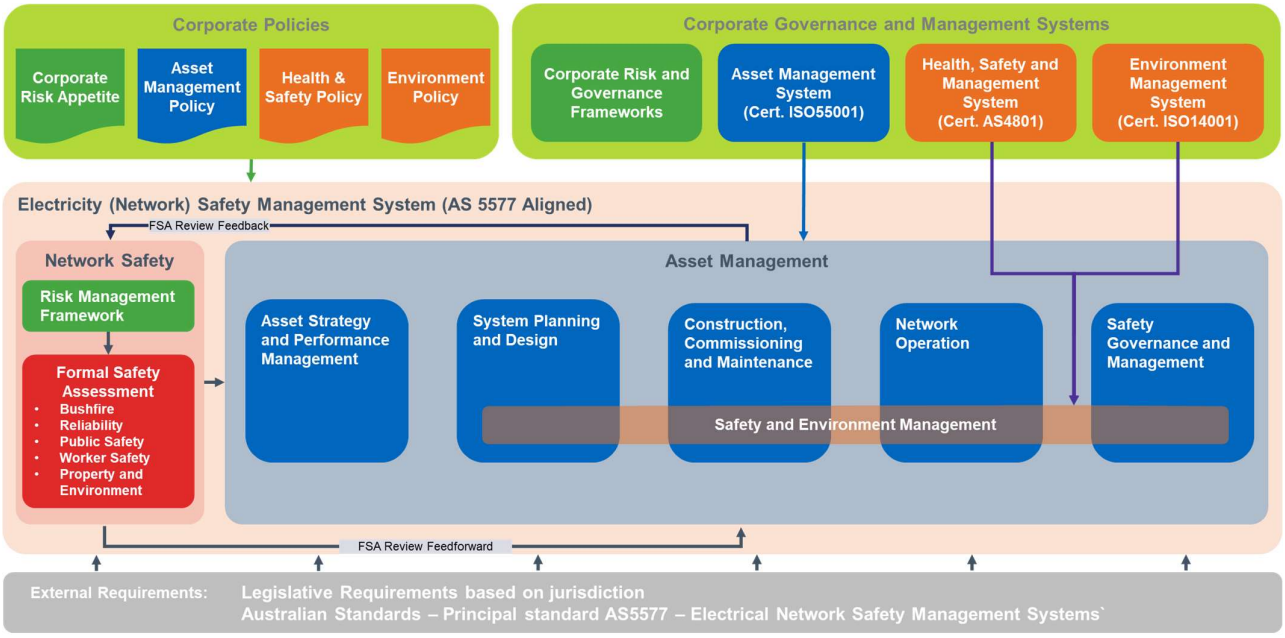
Transgrid seeks to achieve the following objectives during the development and implementation of its ENSMS:

- Demonstrate Transgrid's commitment to regulatory compliance requirements.
- Formalise and communicate how risk from assets is managed and reduced ALARP.
- Demonstrate alignment to the requirements of AS5577 in managing the hazards and risks throughout the asset lifecycle.
- Educate and gain the commitment of internal and external stakeholders (e.g. executive management/board, employees, etc.).

Transgrid has developed ENSMS systems that cover:

- New South Wales
- Australian Capital Territory; and
- Victoria.

Figure 17 – Integration of Electricity Network System



D.3 Stakeholder Management

It is essential to deliver best practice stakeholder engagement to effectively satisfy stakeholders' needs in the management of assets. At Transgrid, we actively identify and engage with our stakeholders, understanding their needs and expectations with respect to asset management, and incorporate stakeholder feedback into the criteria applied to asset management decision making and information reporting.

Transgrid operates in a complex environment, with operational constraints, varied and competing stakeholder needs, increasing regulatory pressure and societal scrutiny, within an industry that is transforming to a new energy future (see Figure18 for an overview of key challenges and the range of key stakeholders).

The Business Plan calls out the following challenges:

- There is increased risk of government intervention and regulatory scrutiny as persistent high wholesale energy prices drive increased levels of media, political and community scrutiny.
- There is near universal acceptance amongst key stakeholders and market participants that the current regulatory framework is not meeting energy transition challenges.
- There is increased acknowledgement and support for transmission in light of heightened reliability and security concerns.
- The rapid pace of the clean energy transition is pushing the energy system into a constrained environment that will require significant investment to address.

We recognise it is essential to deliver best practice asset and stakeholder engagement to effectively manage and mitigate these challenges and satisfy stakeholders' needs in the management of assets.

At Transgrid, we actively identify and engage with our stakeholders, understanding their needs and expectations with respect to asset management, and incorporate stakeholder feedback into the criteria applied to asset management decision making and information reporting.

Table 1 outlines the stakeholders' needs, expectations and priorities we consider in the development, implementation and continual improvement of our asset management system.

Transgrid's values and strategies embodied within our stakeholder management practices include:

- Being open and consultative with consumers and local communities in order to protect its licence to operate.
- Positioning itself as a trusted advisor to Government and regulatory bodies.
- Valuing input from stakeholders as part of the asset management decision making process.
- Testing the alignment of proposed services to the needs and expectations of customers and other stakeholders on a regular basis.

Figure 18 – Stakeholders and related challenges

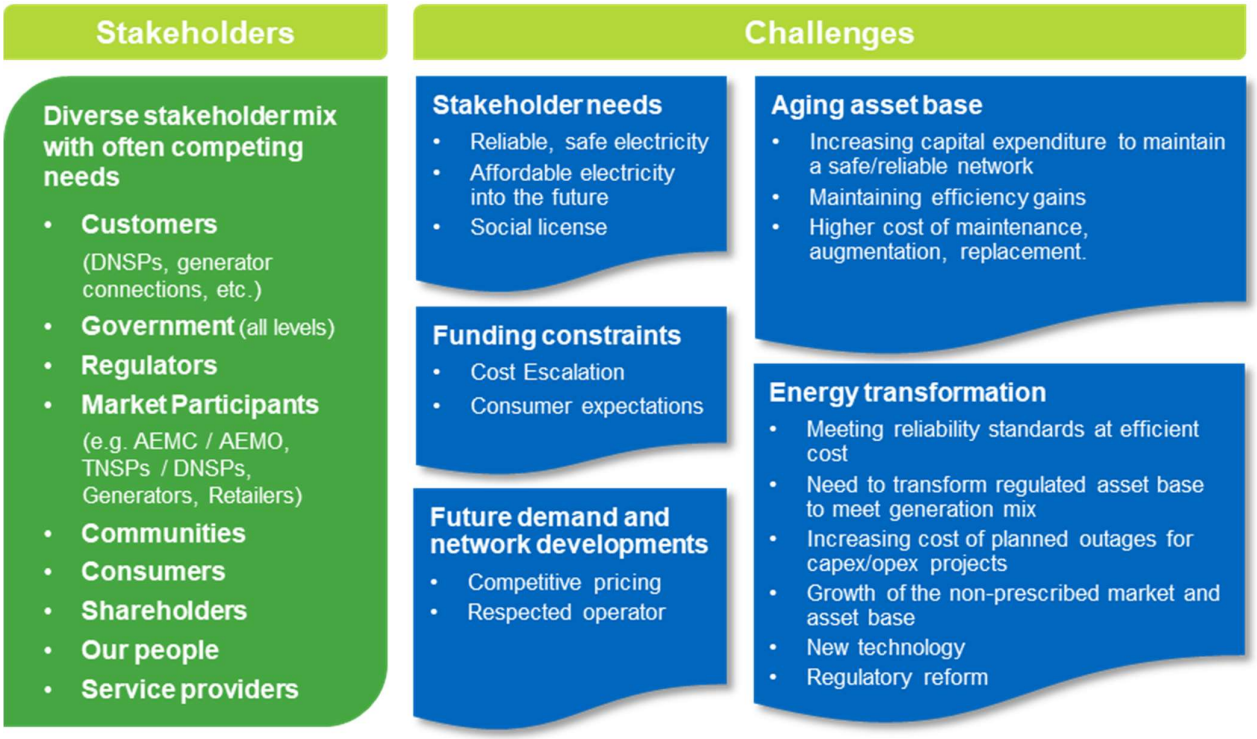


Table 1 - Stakeholder needs and expectations

Stakeholder group	Needs and expectations
Customers • Distribution Network Service Providers • Large energy users • Generator connections • Infrastructure customers	• Clear understanding of costs for works and deliverable time frames • On time and on budget delivery of major capital and emergency response works • Collaborative engagement and coordination for capital and maintenance works, and system events • Maintenance or improvement of existing reliability • Effective communication on bushfire response, major projects, load forecasting • Effective engagement for the Transmission Annual Planning Report
Governments • Federal • State and Territory • Local Councils	• Understanding future energy system requirements and adopting necessary policy setting • Understand Transgrid's network operations, requirements and challenges • Energy affordability and reliability • Federal Government requirements for critical infrastructure and its protection from cyber and related attacks • Impact of new investments on local communities and that Transgrid is treating people with honesty and respect • Impact of investments on wider economic success of NSW
Regulators • AER • IPART • ESC / ESV	• Ensure compliance with all regulatory obligations • Build trust in Transgrid's operation amongst regulatory bodies in preparation for next revenue determination • Effectively engage with stakeholders on priorities, plans and projects • Achieve regulatory approval for forward capital program including contingent projects
Market Participants • AEMC / AEMO • TNSPs / DNSPs • Generators / Retailers	• Collaborative engagement for system planning and development • Communication and coordination for capital/maintenance works and emergency procedures • Adherence to regulatory requirements
Communities • Landholders • Schools • Developers	• To be treated with honesty and respect • To understand the rationale for new assets and that impacts to communities and landholders is kept to a minimum • Environmental performance in construction and operation of our assets • Social responsibility and the importance of safety around our infrastructure
Consumers • Residential and Commercial • Consumer Groups	• Energy affordability and reliability • Improve industry perception as a business that is committed to driving efficiencies in the best interest of customers and consumers
Security holders • Owners and Directors	• The needs and expectations of our shareholders are articulated within our Business Plan
People • Individual staff • Families	• Safe working conditions • Clear understanding of how we manage assets and what is my role • Competencies suitable to roles performed
Service providers • Interfacing business functions • Contractors and consultants	• Safe working conditions • Clear understanding of how we manage assets and what is my role • Competencies suitable to roles performed