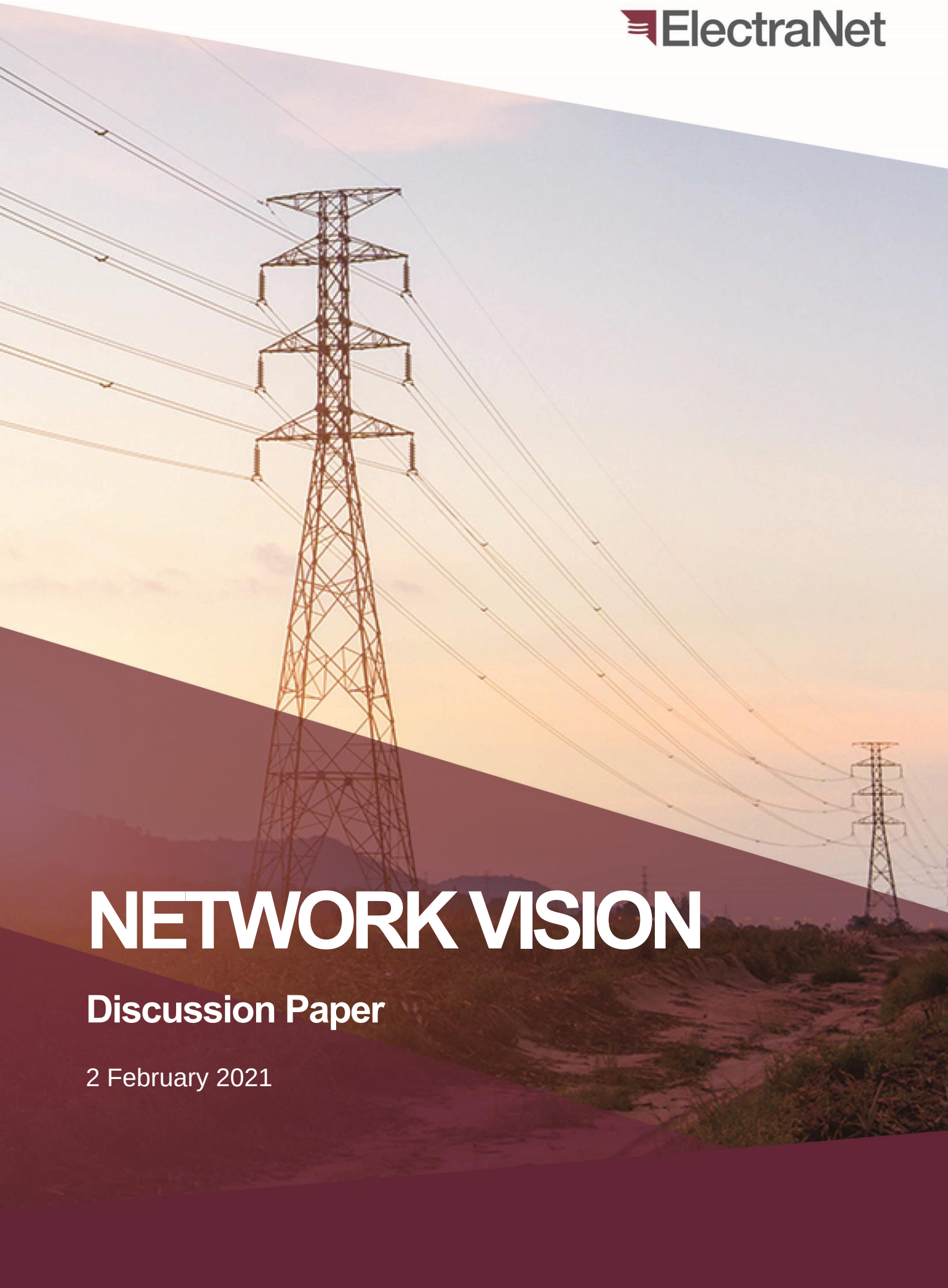
ElectraNet



NETWORK VISION

Discussion Paper

2 February 2021

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1. Introduction

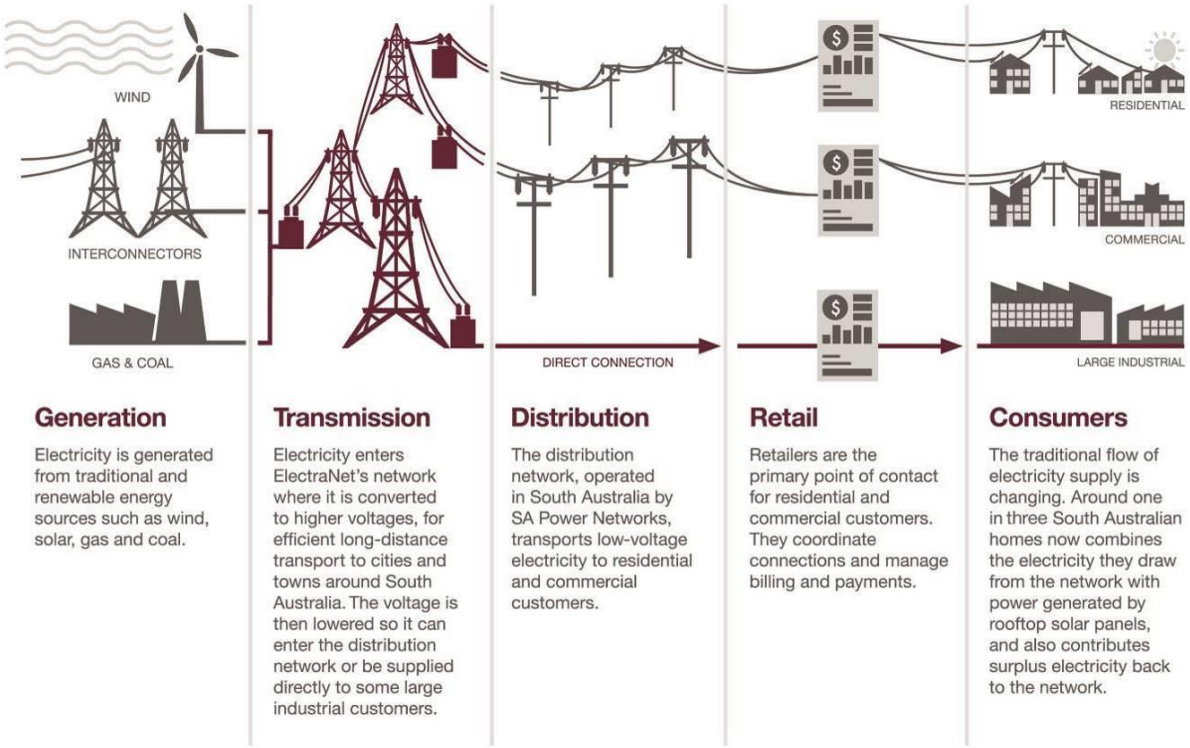
The Role of the Transmission Network

ElectraNet powers people's lives by delivering safe, affordable and reliable solutions to power homes, businesses and the economy.

As the owner and operator of South Australia's electricity transmission network, we are a critical part of the electricity supply chain.

We build, own, operate and maintain high-voltage electricity assets, which move energy from traditional and renewable energy generators in South Australia and interstate to large load customers and the lower voltage distribution network, and increasingly provide system security services such as system strength and inertia to support the growth in renewable energy.

While transmission is a small part of the overall cost of electricity (typically less than 8%) the network plays a key role in ensuring the safe, secure, reliable and affordable supply of electricity and in supporting the ongoing transformation of the electricity supply system.



Purpose of the Network Vision

ElectraNet's Network Vision considers changes and influences impacting on the delivery of electricity transmission services over the medium to longer-term and sets out directions and priorities for South Australia's transmission network over a 5-10-year planning horizon.

These directions and priorities in turn drive our expenditure plans and proposals for managing the network.

The development of the Network Vision provides customers and stakeholders a key opportunity to provide input on the emerging trends and needs impacting on the supply of electricity and to help shape our priorities for developing and operating the transmission network to deliver the services required by customers.

Updating the Network Vision

ElectraNet last published its Network Vision in 2016. In forming our Vision, ElectraNet undertook a comprehensive discussion with customers and stakeholders to understand their needs and perspectives and explored how the changing market would impact on the grid.

This Discussion Paper considers the current state of the energy market, examines the key drivers influencing the development of the market over the coming years and provides a view of the implications of these changes for updated directions and priorities for the transmission network.

This Discussion Paper is intended to prompt conversation, seek feedback and develop a shared understanding that helps align the planning and operation of the transmission network with the needs of our customers and wider stakeholders.

Since the 2016 Network Vision, AEMO's role as the National Transmission Planner has been extended to include publication of the Integrated System Plan (ISP). The ISP's role is to ensure the timely and coordinated development of the grid in the face of the transformational changes occurring across the electricity supply system to ensure a reliable, safe and secure supply of electricity into the future.

AEMO undertakes a thorough and wide-ranging engagement to ensure inputs to the ISP are as robust and as accurate as possible, based on a scenario approach. Our planning builds on the assumptions published by AEMO and will be informed by the AEMO Inputs, Assumptions and Scenarios Report (IASR), currently undergoing consultation.

After we have considered all views and feedback, we aim to publish an updated Network Vision.

This in turn will help guide our capital and operating expenditure plans and requirements for the next 5-year regulatory period commencing on 1 July 2023, on which we plan to consult in the second half of 2021.

Input Sought

We would like to hear from customers and stakeholders on the change drivers and influences impacting on the delivery of transmission services in South Australia and on the proposed directions and priorities we have identified.

Your feedback would be appreciated by **28 February 2021**.

To share your thoughts with us or arrange an opportunity to discuss, we can be contacted as follows.

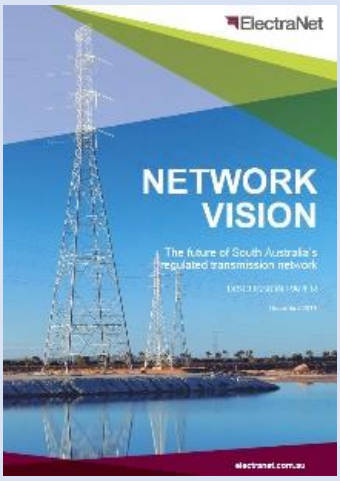
Email	consultation@electranet.com.au
Phone	1800 243 853
Post	Hugo Klingenberg Manager Network Development PO Box 7096 Hutt Street Post Office ADELAIDE SA 5000

2. The 2016 Network Vision

We engaged extensively with customer representatives and stakeholders to develop our 2016 Network Vision:

ElectraNet's vision for South Australia's transmission network is that it will deliver affordable and reliable power supplies that support customer choices for a sustainable future

Network Vision consultation



A key vehicle for the initial engagement was the release of a detailed Network Vision Discussion Paper.

This was designed to support a collaborative approach in order to prompt discussion, develop a shared understanding and help build an agreed set of directions and priorities for the transmission network to meet the needs of our customers into the future.

Our engagement with stakeholders in the development of the Network Vision included:

- Consulting on the Discussion Paper
- Holding a transmission network stakeholder forum
- Engaging with ElectraNet's Consumer Advisory Panel
- Holding a regional stakeholder workshop
- Conducting in-depth stakeholder interviews

Changes in how customers use, produce and value electricity services are transforming electricity systems worldwide. Nowhere is this clearer than in South Australia, where we are leading the world in the adoption of rooftop solar PV systems.

However, not all customers are the same and this diversity will increase in the future as customers have more choices available to them about how they use and produce electricity.

From our engagement with customer representatives and stakeholders we identified the following key elements as essential to support the delivery of the Network Vision:

- Genuine engagement – with customers and stakeholders to ensure transmission services deliver maximum value
- New connections – evolving the network to meet the changing needs of customers and the demands of new technology
- Network development – planning for more complex power quality, dynamic stability and network reliability with the changing generation mix
- Operations and maintenance – efficiently maintaining and managing the network through best practice asset management and new technologies such as energy storage
- People and organisation – a cultural shift to position the organisation for the network of the future

We continue to be guided by these expectations in the way we plan, develop and operate the transmission network.

ElectraNet consolidated these expectations into the four key themes documented in the 2016 Network Vision:

1. The transmission network will continue to play an important role into the future to support safe, reliable and affordable electricity supply
2. The ongoing uptake of distributed energy resources by customers is changing the role of the grid
3. The rapidly changing generation mix is creating new challenges for the secure and reliable operation of the grid
4. New technologies are changing the way some network services can be delivered

Built on these key themes, directions and priorities were developed to provide practical guidance on the way we go about delivering on the Network Vision and planning for the future of the network.

The balance of this paper explores the changes in trends and developments that have occurred since 2016 and explores the implications of these drivers for our directions and priorities moving forward.

Questions

- What is the role of the transmission network in providing services customers value into the future?
- Are the key elements of the 2016 Network Vision still relevant and appropriate?
- Are the four key themes of the 2016 Network Vision still appropriate?

3. Drivers of change

South Australia remains at the forefront of the changes sweeping across power systems globally, with world leading levels of renewable energy generation.

The pace of change in the energy industry has continued to increase since the 2016 Network Vision was developed.

New trends in global commodity prices, government policy, technology, customer expectations, and industry regulation are emerging alongside established longer-term trends in the age profile of the transmission network and changing sources of supply, driving significant changes in our operating environment.

This will influence the delivery of transmission services into the future to varying degrees. The relative timing and intensity of these developments will determine the timing, pace and scope of future changes impacting on the transmission network over the next 10-20 years.

Security, reliability and resilience

In September 2016 an exceptional weather pattern crossed South Australia downing transmission towers, severing the interconnector and leading to a state-wide blackout. A similar weather event occurred four years later in January 2020 in Victoria also downing transmission towers and leading to a two-week separation of South Australia from the rest of the NEM.

Unprecedented bushfires during the 2019-20 summer had a devastating impact on communities and impacted on the interstate transmission network.

Events such as these have increased the focus on reliability, resilience and safety in the grid and are leading to changes in the way the grid is planned and operated.

Numerous Rule changes have already been implemented allowing for improved alignment between the level of reliability, security and resilience of the network. However, any tightening of standards must be balanced against the cost for customers.

AEMO has also raised growing concerns about the vulnerability of the South Australian power system to loss of interconnection and subsequent islanding of the power system, highlighting the importance of stronger interconnection and ensuring the security of the evolving power system.

Climate Change

Policies to address climate change remain a dominant super trend influencing many of the changes we see nationally and in the South Australian market over the coming decades.

The South Australian Government has set a target of net 100% renewable energy by 2030. Similarly, businesses with operations in South Australia have made commitments to have net zero carbon emissions by 2050 or earlier.

Other Australian states have also adopted net zero emission targets for 2050, along with Australia's major trading partners of China[1], Japan, South Korea, United Kingdom and the incoming Biden administration in the United States has also announced zero emission goals. President Biden via executive order, returned the United States to the 2015 Paris Agreement on climate change on the first day of his presidency. On 21 January 2021 President Biden's Climate Change Envoy to the United Nations stated that targets to avoid catastrophic damage need to: phase out coal globally five times faster than recent history; ramp up renewables 6 times faster and transition to electric vehicles 22 times faster.

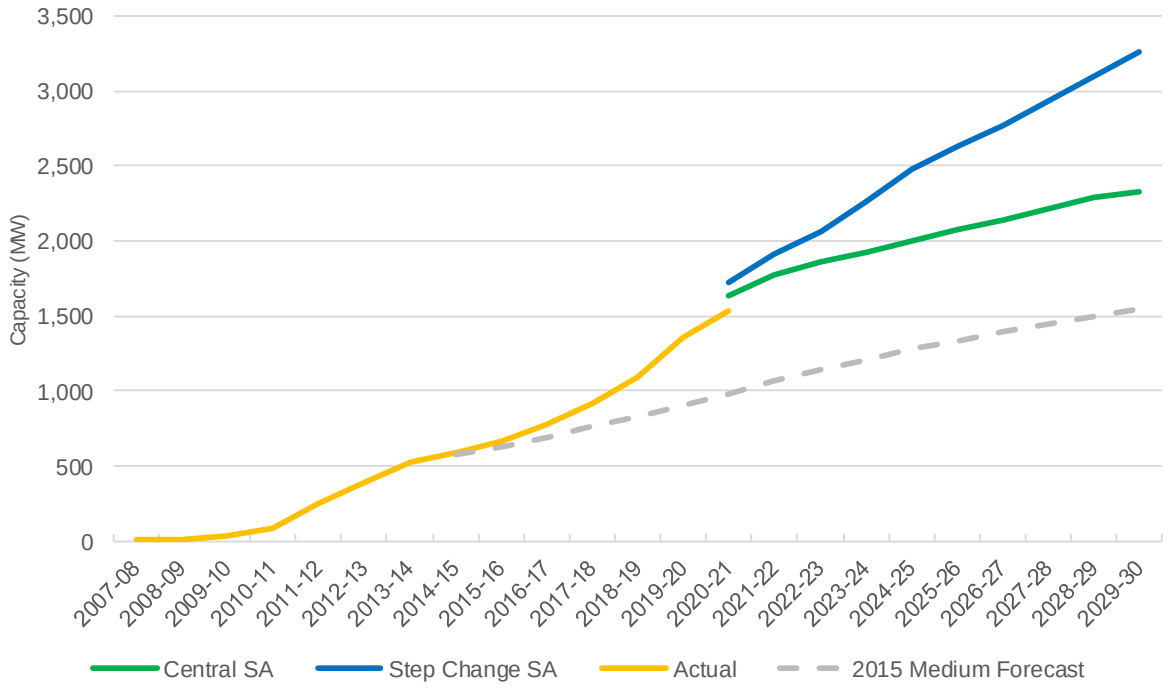
[1] Zero by 2060

The collective investment in low carbon technologies will rapidly lead to new technologies becoming available to South Australian customers and investors requiring ElectraNet to adapt on many fronts such as changing customer behaviour, modelling changing load characteristics and new generation technology responses to faults and shifting patterns of grid congestion to name just a few.

Rooftop solar

South Australia continues to be at the forefront of unprecedented penetration of renewable generation as a response to climate change, with South Australia leading Australia and the world with one in three households having a rooftop PV system.[2] Uptake rates are set to continue, and have exceeded those expected previously as shown in Figure 1.

Figure 1 - Actual, 2015 forecast and latest forecasts of rooftop solar capacity



Note: actual value for 2020-21 is capacity for half year as at 1 January 2021.

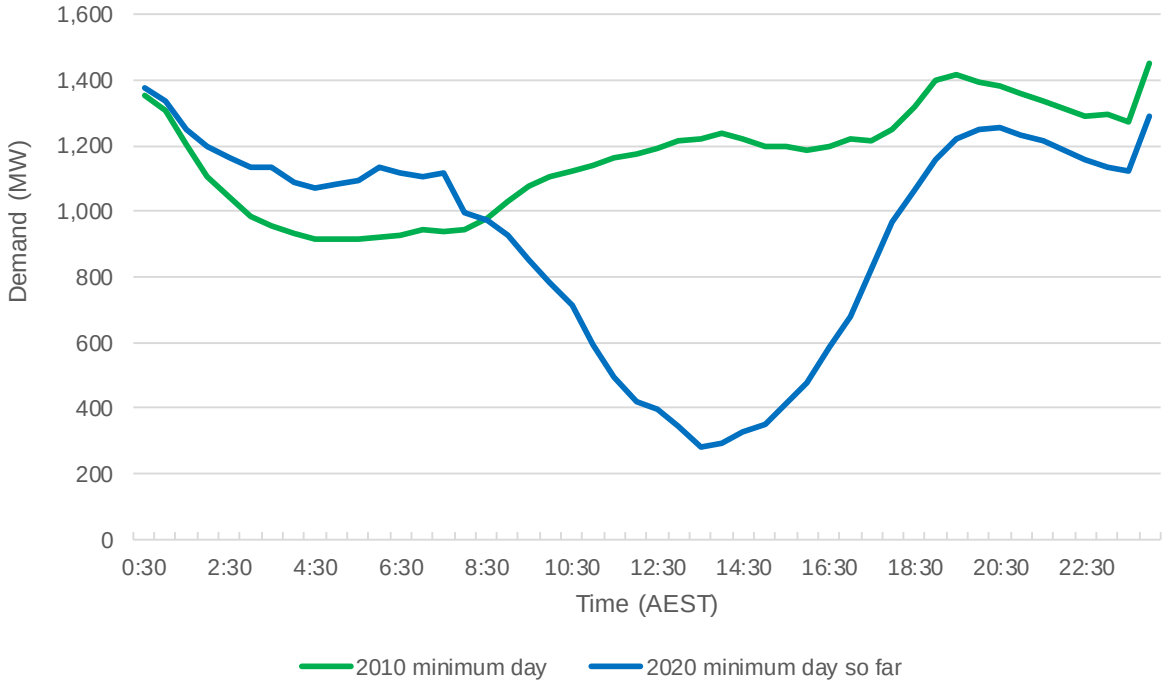
Source: AEMO, SA Power Networks

As a result of the growth of distributed PV resources, the daily shape of demand is changing.

South Australia's midday operational demand is declining and is forecast to continue declining with latest estimates forecasting zero midday grid demand by 2024-25.

[2] AEMO, South Australia Electricity Report, November 2020

Figure 2 - Changing daily shape of South Australia's minimum demand



Source: AEMO

Declining minimum demands are creating operational and planning challenges in South Australia with the South Australian Government's action plan “South Australian's Energy Solution” leading to actions to integrate the increasing levels of rooftop solar and move towards secure and affordable 100% renewable energy.

Grid scale renewables

South Australia is well on the way to meeting the South Australian Government's goal of 100% net renewables by 2030 with enough wind and solar now in place to fully meet electricity demand under a growing range of operating conditions.

In addition to rooftop solar, investment in grid scale renewable generation in South Australia has continued with an increase of 600 MW in grid connected wind and solar since 2016.

Currently there are existing or committed wind farms of 2,400 MW capacity and 650 MW of grid connected solar capacity in addition to the 1,500 MW of distributed rooftop solar PV.

Renewable energy projects such as Neoen's Goyder South and Crystal Brook energy parks, SIMEC Energy's Cultana Solar and SA Water's Zero Cost project are expected to increase this further.

Electrical Storage and dispatchable loads

Storage technology is another important aspect of the energy transition, augmenting the ability of intermittent renewables to provide dispatchable capacity to meet customer requirements when needed.

At the time of the 2016 Vision, grid scale battery storages were yet to be deployed. Since then, three grid scale projects have been deployed in South Australia, with one already upgraded, for a total of 205 MW of capacity. When first commissioned, the 100 MW Hornsdale battery – now 150 MW – was the largest in the world.

ElectraNet also commissioned the ESCRI Battery Energy Storage System, at Dalrymple, in 2019 as the first of its kind to demonstrate how energy storage can strengthen the grid and improve reliability.

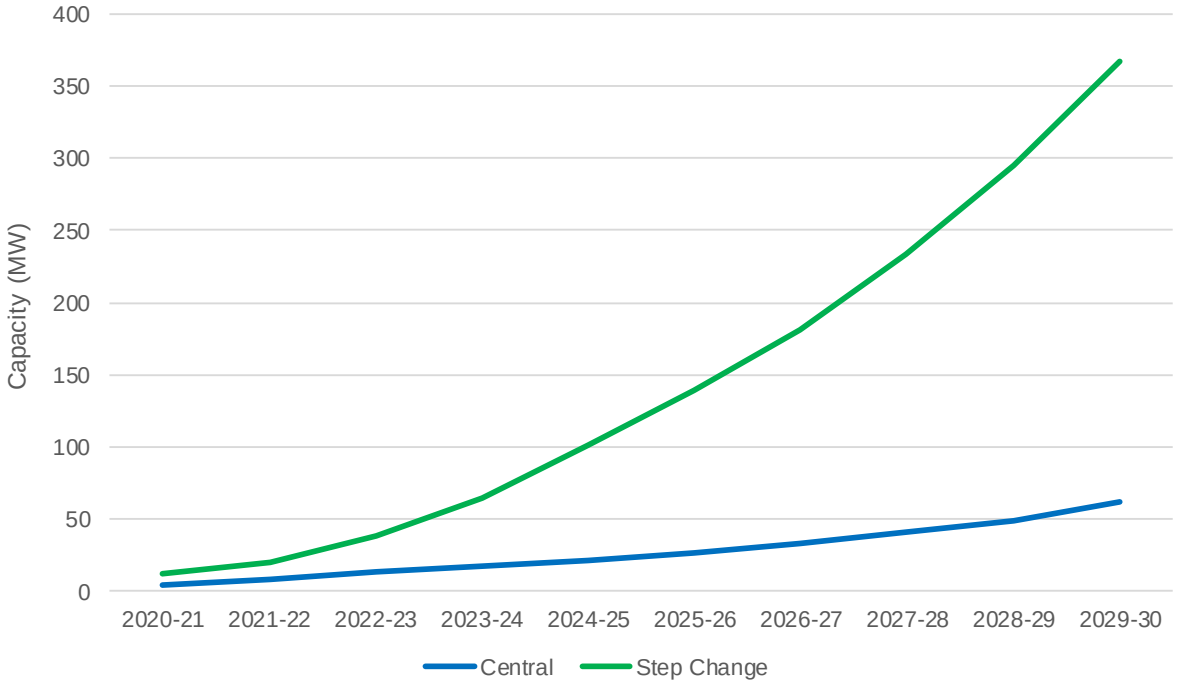
Continued investment in solar generation including rooftop PV will require increasing levels of storage to fill gaps in output and meet demand on a daily and seasonal basis. Major National Electricity Market developments include interstate pumped hydro storage facilities such as the Snowy scheme and Tasmania's proposed Battery of the Nation. The Federal Government’s technology road map has a target of reaching firming capacity at a cost of $100/MWh.

Distributed storages such as the South Australian Government's Virtual Power Plant (VPP) trials will introduce new opportunities to manage customer energy usage. Whilst a potential boon for customers, this will dramatically increase the number of price responsive agents on the grid and associated complexities.

The speed with which VPPs will be adopted is unknown at present with AEMO's IASR predicting a central expansion to 50 MW by 2030 and a step-change scenario representing 350 MW by 2030.

Demand management is also growing to assist in meeting maximum demand and may take the next step into more complex renewables following business electricity demand facilitated by advancing algorithmic processes that can take advantage of low prices during the day.

Figure 3 - AEMO's 2020 ISP Central and Step-change scenarios: VPP capacity forecasts for South Australia



Source: AEMO

Deployment of new battery storage technology will redefine the use of networks and create space for innovation and improved network utilisation as the new service requirements of the evolving grid become evident.

Recent examples of this include the use of batteries in ElectraNet's special protection scheme to reduce the incidence of separation from the Eastern States and the potential to provide fast frequency response to assist in the provision of inertia services.

Major investments in battery storages ranging up to several hundred megawatts are under consideration by multiple parties in South Australia including: AGL Energy, Origin Energy, Neoen and Zen Energy.

Off-river pumped hydro is also being explored in South Australia to provide longer duration storages than batteries are expected to be able to provide.

Electric Vehicles

Electric vehicles are emerging in Australia (and globally) as a viable alternative to internal combustion engine vehicles. A shift to electric or alternative zero emission transport over time is considered essential to meet zero carbon emission goals.

In the first instance, electric vehicles have the potential to increase demand for grid supplied electricity and may be well suited to using low-priced power in the middle of the day driven by high solar output.

Beyond this, with appropriate vehicle to grid integration, electric vehicles could also prove to be a provider of storage services to the grid like those provided by stationary storage providers.

For example, most electric vehicles contain batteries that are several times larger than typical home battery installations and may accelerate the rate of uptake of distributed storage. The mobile nature of car storage will introduce different challenges for the integration of distributed storage and the supply of network services where charging and discharging may lead to new patterns of supply and demand.

At the same time, the uncoordinated rollout of electric vehicles may exacerbate maximum demands and put further pressure on the grid.

Hydrogen economy

Hydrogen exports are presenting South Australia with an opportunity to export vast amounts of renewable energy to the rest of the world.

The state and federal governments have adopted strategies to facilitate the development of hydrogen exports. The scale of this transformation could lead to further unprecedented growth in renewable generation in Australia.

In some scenarios, AEMO is testing electrical generation that could be five times higher in Australia by 2050. The South Australian Government's climate change action plan also anticipates South Australian renewable generation being five times greater than current local grid demand by 2050.

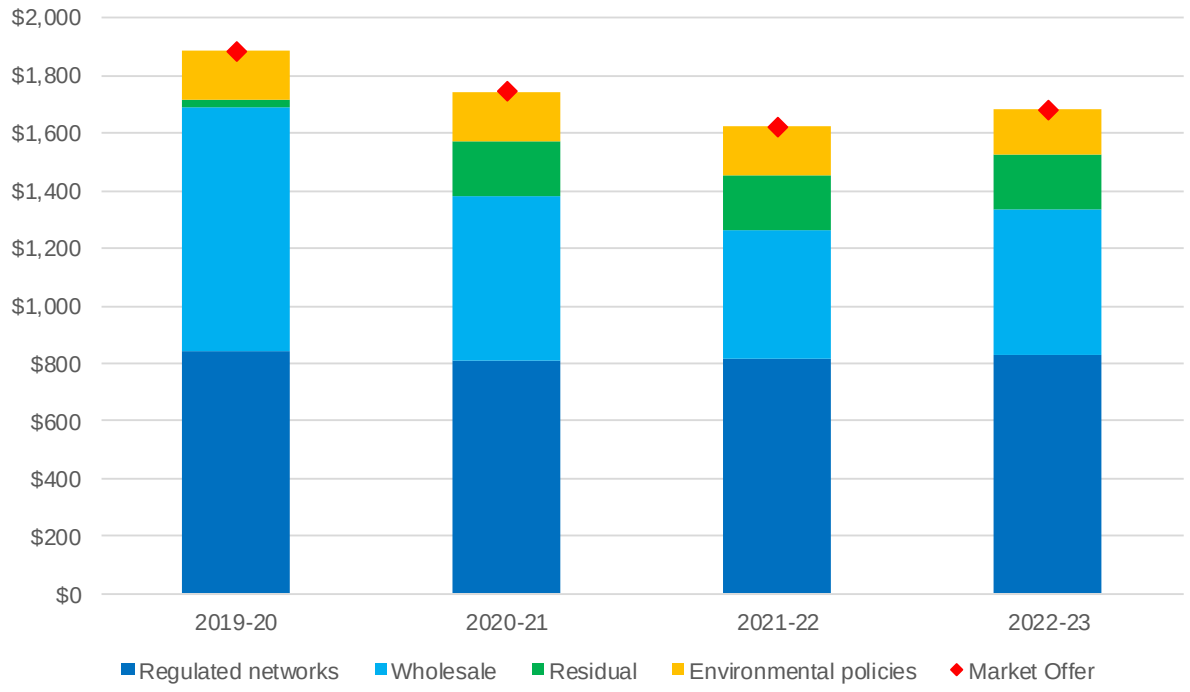
If hydrogen becomes a central pillar of the global energy economy, it would likely follow that Australia's domestic energy markets would also feature hydrogen energy supply in the medium to long term.

Affordability

Recent trends have shown an improvement in the affordability of South Australia's retail offerings with the AEMC identifying that the highest standing offer in 2020 was 25% lower than offered in 2019.

The AEMC has stated that households in South Australia can expect this trend to continue with the latest annual residential electricity price trend report estimating an 11 per cent reduction in retail prices to 2023.

Figure 4 – Forecast trends in SA supply chain components



Source: AEMC 2020

South Australia’s transmission network is playing a key role in helping to drive down the delivered cost of energy.

Subject to receiving all necessary approvals, Project EnergyConnect is expected to continue this trend beyond 2023 by enabling an increase in the supply of renewable generation connected to the South Australian network while enabling greater access to renewable investment in New South Wales through the Electricity Industry Roadmap.

Independent modelling undertaken by ACIL Allen forecasts Project EnergyConnect delivering a net price reduction to residential customers of $100 per annum, with the wholesale component falling by $110 per annum and the network component increasing by $10 per annum.

Scenario Planning

The need to test various scenarios is an essential planning tool to explore and understand the impacts of alternative futures and to identify “least regret” actions that should be taken in the short term. ElectraNet actively engages with AEMO through various forums and consultations to shape the range of planning scenarios that will apply over the coming years.

AEMO's enhanced role as the National Transmission Planner now includes the Input Assumptions and Scenario Report (IASR) which guides the assumptions that Transmission Network Service Providers (TNSPs) should use in planning.

When applying the Regulated Investment Test for Transmission (RIT-T) to an actionable ISP project, the Rules require that these assumptions should be adopted. Hence, ElectraNet's priorities for the coming period will be framed around meeting the needs of the network under these planning scenarios.

AEMO has identified five scenarios, including a Central scenario that reflects the most probable values for each input variable. This scenario is required to be used for transmission planning purposes under the Rules and the AER's cost benefit analysis guidelines. The additional scenarios put forward by AEMO are described below.

Scenario	Description
Sustainable Growth	Reflecting a possible future world that encompasses high global and domestic decarbonisation ambitions, aligned with strong consumer action on DER, and higher levels of electrification of other sectors. This would be supported by strong economic and population growth.
Slow Growth	Reflecting a possible future world that encompasses prolonged lower levels of economic growth following the global COVID-19 pandemic and increasing probability of industrial load closures. Included in this scenario would be targeted stimulus to aid the recovery from COVID-19, that increases the uptake of distributed photovoltaics (PV) initially, and without direct policy for long-term decarbonisation.
Diversified Technology	Reflecting a possible future world that encompasses lower domestic gas prices due to government incentives and interventions. Higher global investment in alternative low emissions technologies and local research and development in carbon capture and storage (CCS) provide opportunities for greater dispatchable technology diversity than other scenarios.
Export Superpower	Reflecting a possible future world that encompasses very high levels of global electrification, Australian hydrogen export opportunities, and domestic hydrogen usage that supports low-emission manufacturing, fuelled by strong policy to support growth and strong decarbonisation.

Questions

- Have we appropriately identified the key changes since the 2016 Vision that should be considered in updating the Network Vision?
- Are there any other emerging trends or developments that should be considered?

4. South Australia's unique challenges

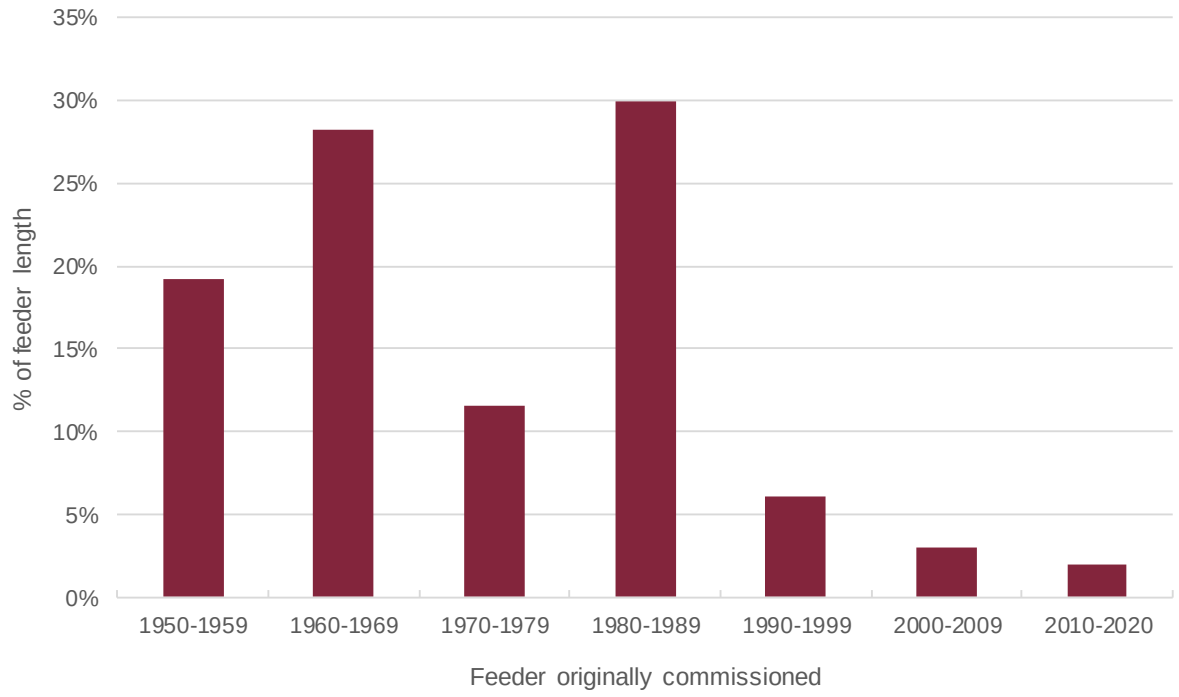
In addition to the impacts of the energy transformation, South Australia faces unique challenges in managing the efficient delivery of its power supply with the core population centred around the greater Adelaide metropolitan area, while the network extends across a vast area to serve one of the least densely populated areas of the country, as shown on the map below.

Figure 5 - South Australia's transmission network

The need to pro-actively manage the transmission asset portfolio judiciously will continue to be a priority for ElectraNet, to ensure that only efficient investments are undertaken and no more is spent on the transmission network in South Australia than is necessary.

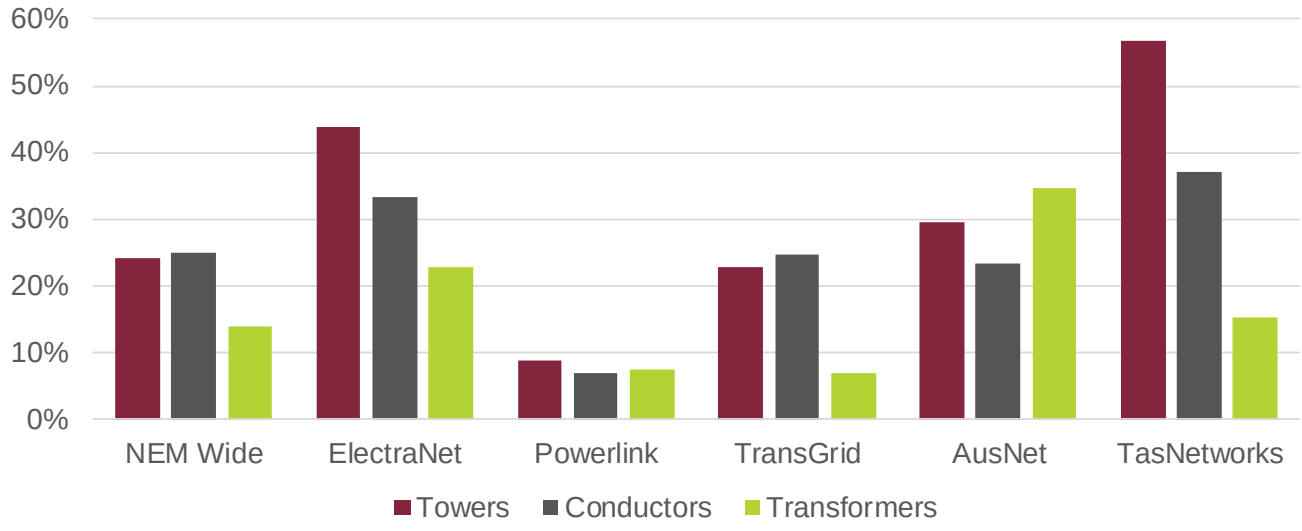
A key factor impacting on the need for network investment is the ageing network with 90% of the infrastructure built over 30 years ago and almost half over 50 years ago and now nearing or reaching the end of its service life.

Figure 6 - Asset age profile by circuit km



Source: ElectraNet

Figure 7 - Percent of assets older than standard asset life



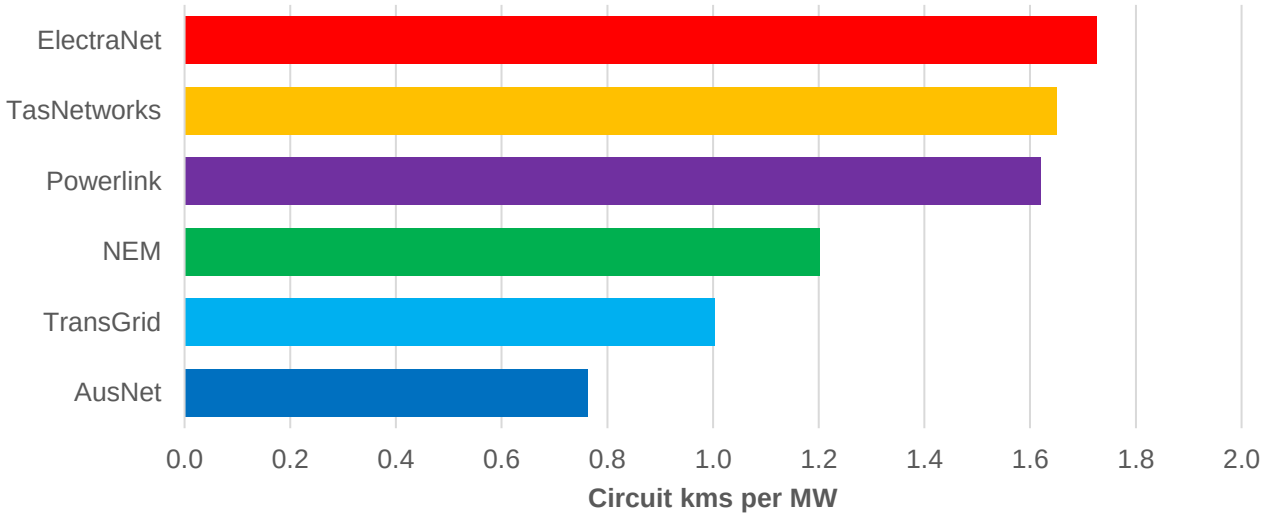
Source: ElectraNet

South Australia's older transmission network requires greater ongoing maintenance and investment to maintain required levels of service.

The large geographic size of South Australia and its low population and customer density leads to the distance covered by South Australia's transmission network per unit of energy delivered being the longest in the NEM.

This means more poles and wires are needed to deliver each unit of electricity in South Australia at times of peak demand.

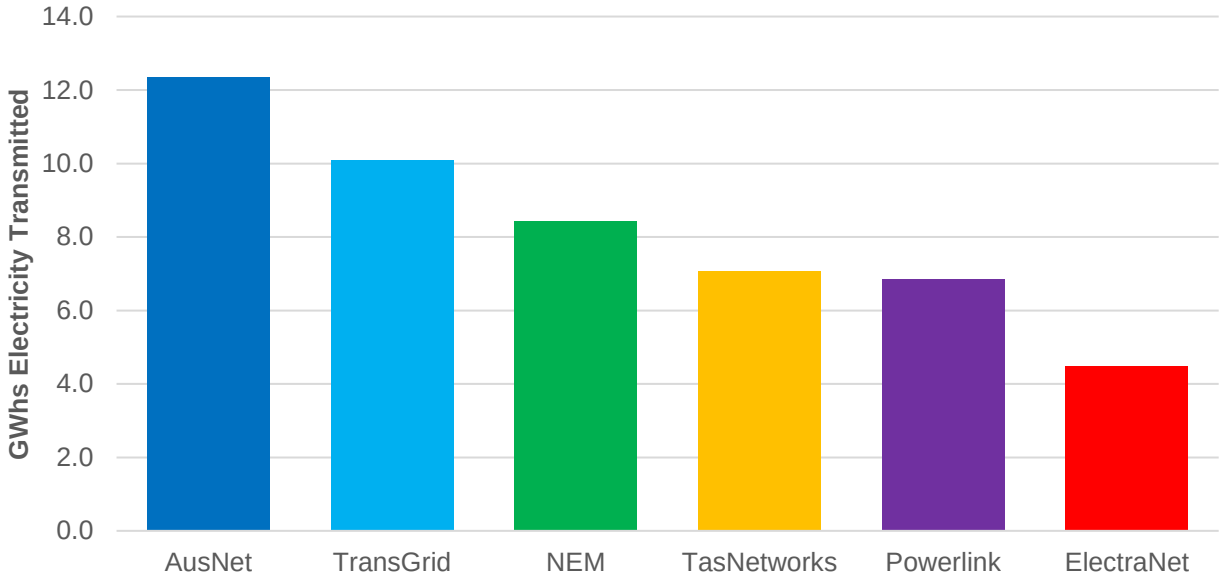
Figure 8 - Circuit kilometres to supply each MW of peak demand



Source: ElectraNet

The transmission network delivers less energy per unit of asset value than interstate networks. This means that relatively more poles and wires are needed to deliver electricity to customers in South Australia.

Figure 9 - Electricity transmitted per $1m of transmission asset



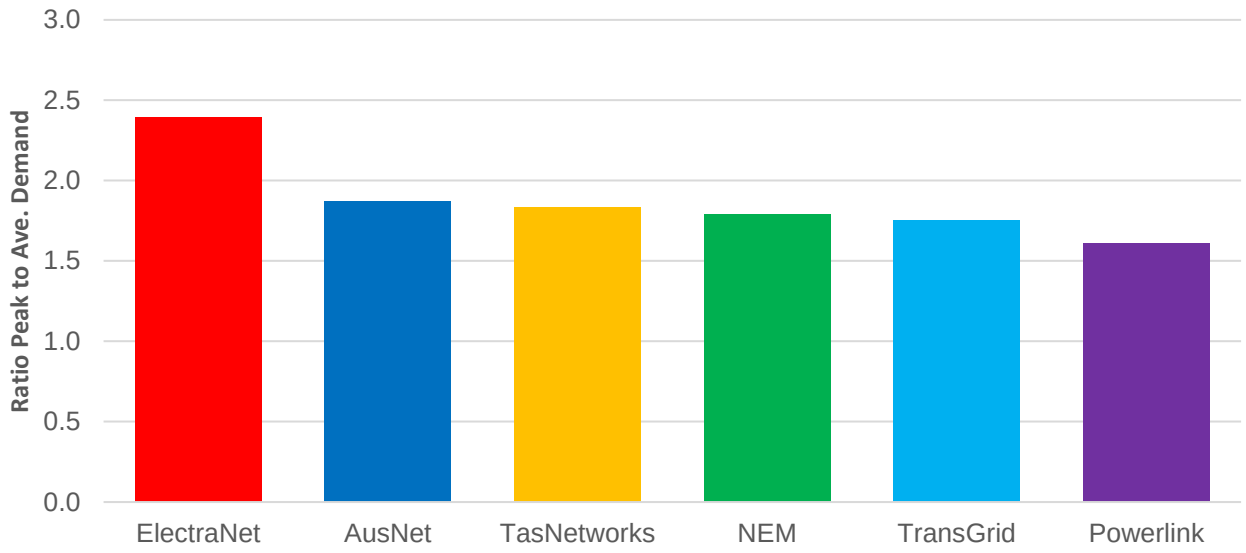
Source: ElectraNet

The growth in distributed energy resources continues to widen the operating envelope that the transmission network must provide for with maximum demand levels holding steady and minimum operational demand declining rapidly with the ongoing expansion of rooftop PV.

This is demonstrated below showing that the ratio between average and maximum demand in South Australia is already the highest in the NEM.

This means more network capability is required in South Australia relative to average load levels, thereby increasing the efficient unit cost of electricity in South Australia.

Figure 10 - Ratio of historic peak demand to average demand



Source: ElectraNet

These factors mean that the efficient costs of South Australia's transmission network are relatively high compared to other states.

5. Updated Directions and Priorities

The latest information on the change drivers discussed above has led us to revisit and propose updates to the 2016 Network Vision directions and priorities for the management and operation of the transmission network, as presented in the following pages.

We are not proposing fundamental changes to the four key themes of the Network Vision.

In general, we consider that anticipated changes are happening faster than expected five years ago with considerable uncertainty on whether established trends will continue or will the begin to abate.

Emerging themes such as electric vehicles and hydrogen may also begin to influence the operation of the grid over the medium term.

Key changes from the priorities in the 2016 Vision include:

- The role of the transmission network to support and enable the transition to renewable energy and lower the overall cost of electricity
- An increasing focus on advanced monitoring of the grid's ability to ride through faults with real time metrics taking advantage of the latest in system performance and response monitoring;
- The development of wide area control schemes to better manage reliable and secure supply to consumers;
- Actively seeking to engage with new service providers in South Australia to better understand how customer needs can be fulfilled with new technologies;
- Exploring the delivery of services through new technologies such as battery storage and distributed technologies such as virtual power plants.

Theme 1: The transmission network will continue to play an important role into the future to support safe, reliable and affordable electricity supply

The transmission network has been identified as playing an increasingly important role in the ongoing transformation of the electricity supply system.

AEMO's ISP highlights the expected retirement of coal generators and their replacement with intermittent generation sources and large-scale storage, with a greater role for transmission as electricity supply becomes more diversified. Another consideration is the emerging role of the Hydrogen Economy.

Directions

- Customers are seeking material electricity price reductions
- Customers and stakeholders want ongoing and genuine engagement
- The transmission grid will continue to be needed to support economic growth and the rapid transition to a low-carbon future
- Change requiring new generation investment and supporting transmission investment may occur much faster than forecast
- The grid needs to be maintained to deliver services efficiently, safely and reliably
- Maximum demand driven investment is expected to be minimal
- Network utilisation will continue to fall, placing ongoing pressure on unit costs
- The age and condition of network assets will be an increasing challenge to manage efficiently, considering the ongoing requirement to maintain transmission services and potentially lower utilisation
- Evolving market and regulatory frameworks are increasing the role of TNSPs to procure essential system support services

Priorities

- Create a sustainable network for the long term by seeking to deliver the most cost-effective solutions for customers, using scenario-based approaches for decision making, given the uncertainties of the future
- Show leadership in helping drive down the delivered price of energy
- Build trust by undertaking ongoing genuine engagement with customers, consumer representatives and other stakeholders
- Focus on efficiently prolonging asset life wherever possible and deferring major asset replacement while maintaining reliability
- Develop improved system monitoring capability to better manage asset utilisation, and develop wide area control schemes to better manage reliable and secure supply to consumers
- Maintain network reliability as safely and efficiently as possible through Reliability Centred Maintenance, a risk-based approach
- Explore more efficient and transparent pricing arrangements to reflect asset use, provide clarity and certainty
- Manage any major uncertain transmission network investment requirements (e.g. mining loads, renewable energy zones, future system security challenges) as contingent projects within the regulatory framework

Theme 2: The ongoing uptake of distributed energy resources by customers is changing the role of the grid

The accelerated uptake of distributed energy resources continues in South Australia at world leading levels.

South Australia has around 1,500 MW of solar PV connections as at December 2020 and its first day of zero grid demand is forecast for as early as 2023.[3] This creates a range of challenges and opportunities for managing the secure and reliable operation of the network.

Directions

- A greater role for active demand side participation in the market is expected
- Further significant installation of rooftop solar PV capacity is expected to lead to periods of zero grid level demand as soon as 2023, with South Australia becoming what is believed by AEMO to be the first gigawatt system to reach such a milestone.
- The impact of energy storage at a customer level along with advances in data analytics and control is likely to see Virtual Power Plants play an increasing role over the planning horizon
- The impact of electric vehicles is expected to be modest over the planning horizon but could lead to meaningful levels of distributed and mobile storages relatively quickly with the right incentives
- Growth rates of distributed energy resources are likely to remain high but uncertain as they will be driven by customer preferences, technology costs and policy outcomes.
- Forecasting technology uptake will continue to be challenging, so scenario planning will be important to consider a range of possible futures
- Managing the impacts of distributed energy resources on the secure operation of the power system will continue to be a growing challenge

Priorities

- Actively monitor and respond to trends, developments and expectations to ensure the grid is ready to meet the needs of customers as distributed energy technology is adopted
- Plan for emerging technologies in order to maintain safe, reliable and secure supply under reasonably foreseeable demand and supply conditions
- Actively engage with new providers of services to ensure cost effective demand side solutions and technological innovations are available and ready to meet emerging needs on the transmission network
- Develop a wide area monitoring system to maintain adequate operation, modelling and control of the power system during system disturbances

[3] SAPN, 2021

Theme 3: The rapidly changing generation mix is creating new challenges for the resilient, secure and reliable operation of the grid

The changing generation mix has already led to significant changes in the South Australian power system, including our investment in synchronous condensers to provide system strength and inertia services and the connection of multiple grid scale batteries.

As the grid continues to evolve with less conventional generation and declining demand levels, operational challenges will increase the need for new system security services and new control schemes to manage the secure operation of the power system. Hydrogen projects may begin to emerge in future, with implications for the transmission network.

Directions

- The withdrawal of conventional generators and their substitution with intermittent supply sources will place greater reliance on dispatchable generators/ loads, storage and interconnectors
- AEMO has raised concerns about the increasing vulnerability of the South Australian power system to loss of interconnection and subsequent islanding of the power system
- With the ongoing substitution of synchronous generators with inverter connected generation and storage and the intermittency of renewable generation, the operation of the power system is becoming more complex and challenging
- The risk and potential consequences of state-wide outages after rare interconnector separation events is increasing
- The transmission network needs to support the integration of extremely high and growing levels of renewable generation to help maintain secure and reliable electricity supply

Priorities

- Develop efficient solutions to maintain a secure and reliable network with less conventional generation
- Deliver Project EnergyConnect to benefit customers by facilitating market competition and supporting competitive, secure and stable power supplies and renewable generation exports and reduce the risk of state-wide outages after rare interconnector separation events
- Monitor and adopt new technology to maintain secure and reliable power supply at lowest whole-of-system cost to customers, including the expansion of Wide Area Protection Schemes
- Ensure the rapid development of renewables is accompanied by the appropriate reviews of protection systems and control schemes
- Explore possibilities of increasing power transfer capacity by using technologies such as storage

Theme 4: New technologies are changing the way some network services can be delivered

Rapidly changing technologies are creating both challenges and opportunities for the delivery of transmission services and the evolution of the electricity supply system.

This potentially opens new options to meet network service requirements and unlock more capacity to connect new generation and support the transition to a low carbon future.

Directions

- The delivery of essential system services continues to evolve, and transmission is expected to play an increasing role in the delivery of these services
- Storage technology is likely to be economic in the short term offering a new potential option to efficiently deliver network and ancillary services
- In a flat demand environment, non-network solutions and new technologies such as storage may offer more economic alternatives to traditional network options
- Ongoing advances in information technology and network control systems provides access to a wealth of 'big data' to inform network decision making
- Technology is advancing at the fastest rate in human history, with Australians adopting new technologies at world leading rates
- Market frameworks must continue to develop and adapt to meet the challenges of an evolving energy supply system
- New technologies are becoming more capable of addressing existing network constraints in ways previously considered uneconomic providing economic opportunities to remove these constraints and deliver additional value to customers

Priorities

- Improve visibility of the behaviour of the grid, customers and generators to ensure the network continues to operate in a safe and efficient manner
- Investigate the potential to alleviate existing network limits with the integration of very fast acting technologies into the grid
- Engage with emerging service providers ahead of the identification of needs to maximise involvement in option analysis
- Continue to investigate the application of grid scale energy storage and gain experience in the deployment and operation of this emerging technology
- Adopt best practice data analytics to improve decision making in asset management and network operation

Questions

- Do you agree with the amended directions and priorities that ElectraNet has proposed?
- Are there any other directions and priorities that should be identified?
- What are the most important directions and priorities for the transmission network over the next 5-10 years?

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