

## NETWORK VISION UPDATE

### DIRECTIONS AND PRIORITIES

November 2020

### Background

ElectraNet's Network Vision sets out the future directions and priorities for South Australia's electricity transmission network. By developing The Network Vision we are giving our customers and stakeholders the opportunity to provide input on emerging trends and needs and to influence our priorities in managing and operating the network to deliver the services they require.

ElectraNet's Network vision was last published in September 2016. The vision can be accessed on our website [here](#). It centres around the following four key themes:

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 generation mix is changing creating new challenges for the resilient, secure and reliable operation of the grid
4. New technologies are creating opportunities to change the way some network services can be delivered

ElectraNet has commenced a review of the Network Vision with a view to publishing an update in early 2021.

Our initial view is that the four themes from the previous Network Vision (set out above) remain relevant. Our initial thoughts on amended directions and priorities moving forward are set out in the following pages.

At this stage in the process we seek input from customer representatives and other stakeholders. This will help us shape our Network Vision moving forward and guide the key directions and priorities that will guide the way transmission services are delivered into the future.

### Input Sought

We are keen to hear from stakeholders on these proposed directions and priorities.

To obtain more information or share your thoughts with us, please contact us as follows:

Phone **1800 243 853**

Online **[electranet.com.au](http://electranet.com.au)**

Email **[Consultation.ENet@electranet.com.au](mailto:Consultation.ENet@electranet.com.au)**

Or attend one of our upcoming webinars or workshops.

**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 Integrated System Plan 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 Network**

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. This creates a range of challenges and opportunities in 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

**Theme 3: The generation mix is changing 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 increasing 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 creating opportunities to change 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 up 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 Australia's 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 services 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