



# EXPLORING SOUTH AUSTRALIA'S ENERGY TRANSFORMATION

November 2016

**ElectraNet is exploring potential solutions to help address the increasing challenges of transitioning towards a low-carbon future and the changes this is creating in the electricity generation mix and supply networks.**

## Regulatory Investment Test for Transmission

To understand the best solution to the challenges arising within the South Australian electricity market, we will follow an established process called the Regulatory Investment Test for Transmission (RIT-T).

The RIT-T is a cost benefit test that applies to major network investments in the National Electricity Market (NEM) and is overseen by the Australian Energy Regulator (AER). The process requires network service providers, like ElectraNet, to consider and compare a range of technically and economically feasible network-based and non-network options that can meet the identified need.

The options considered in this case will include new transmission links between South Australia and the eastern states, as well as non-network alternatives that provide benefits to the market and system security.

A new interconnector project, or non-network alternative, will only proceed if sufficient benefits to customers can be demonstrated and it is subsequently approved by the AER.

# South Australia is at the forefront of change in the energy industry in Australia

Australians and our governments are taking action on climate change by reducing carbon emissions from the energy supply chain. State and federal governments have established emission reduction and renewable energy targets, electricity generators are building large scale wind and solar farms, and businesses and households are installing rooftop solar photovoltaic (PV) systems.

South Australia is leading the world on the integration of renewable energy, with about 45% of the state's power generation now coming from renewable energy sources. There are 18 wind farms in operation with a total capacity of about 1,500 MW with more commitments underway, and more than a quarter of homes have installed solar power with a total capacity of about 700 MW.

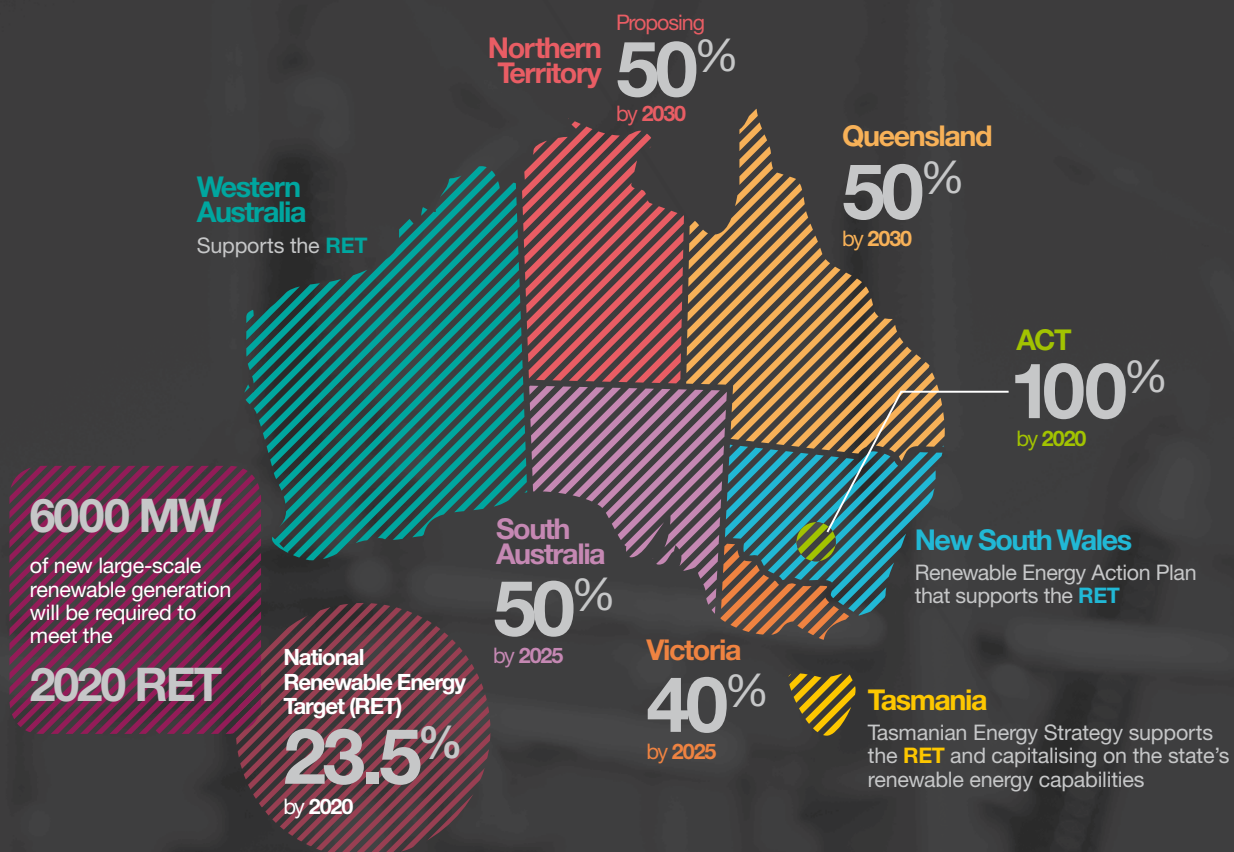
The combined capacity of wind and solar generation (about 2,200 MW) far exceeds average and minimum demand levels in South Australia (about 1,500 MW and 800 MW respectively).

New challenges are emerging from these higher levels of intermittent renewable energy and the

resulting closure or mothballing of conventional thermal generation. These challenges, which include more volatile wholesale market prices and ensuring system security and reliability expectations continue to be met, are expected to require a range of new solutions. Stronger interconnection is one of these solutions.

South Australia's renewable energy penetration is remarkable especially because of the low level of interconnection between South Australia and other regions – import capacity is only about 30% of South Australia's peak demand. By comparison, Denmark – which also generates more than 40% of its electricity from intermittent (wind) energy – can meet more than 80% of its peak demand via interconnectors with Norway, Sweden and Germany.

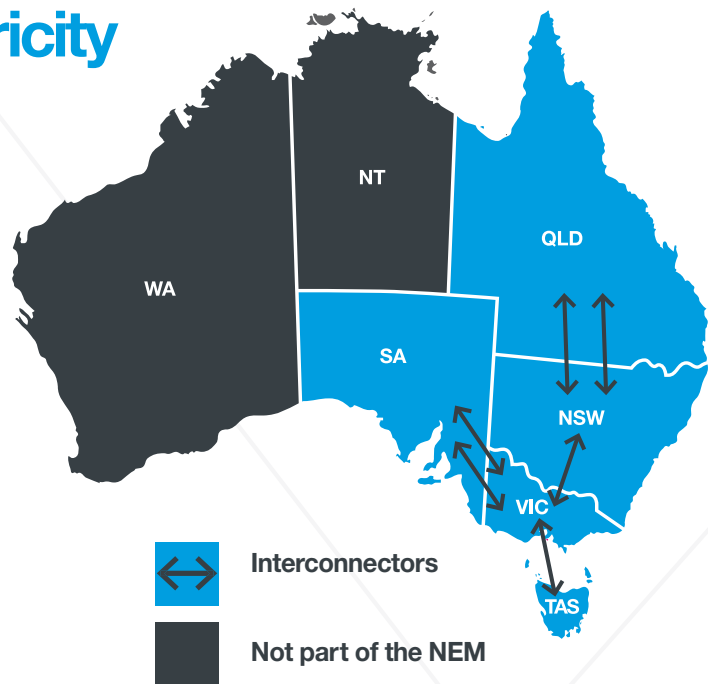
International experience such as this shows that stronger interconnection is needed to support the increasingly high levels of intermittent renewable energy in South Australia, and Australia's transition towards a renewable energy future.



## The National Electricity Market (NEM)

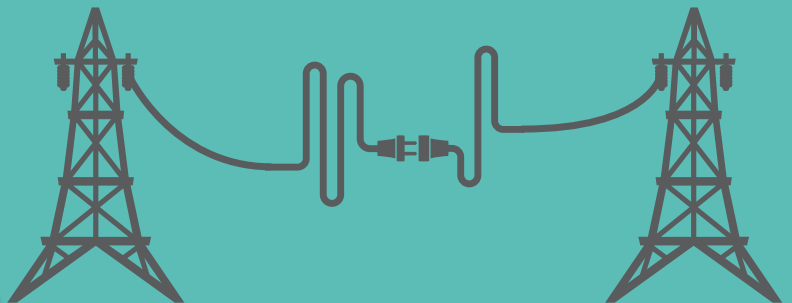
The NEM operates across an interconnected power system and incorporates Queensland, New South Wales and the ACT, Victoria, South Australia and Tasmania. The NEM has around 51,000 km of transmission lines and cables and serves over nine million customer connections.

The system combines and schedules outputs from all generators in real-time to meet the electricity demand of customers.



## Interconnectors

Interconnectors are connections between state transmission networks. They are comprised of high-voltage overhead transmission lines or sub-sea cables. Interconnectors allow electricity to be transferred between areas of low and high demand, or price.



## The recent South Australian state-wide blackout

On 28 September 2016 a severe and wide-spread weather event resulted in a state-wide blackout and damaged parts of the transmission network.

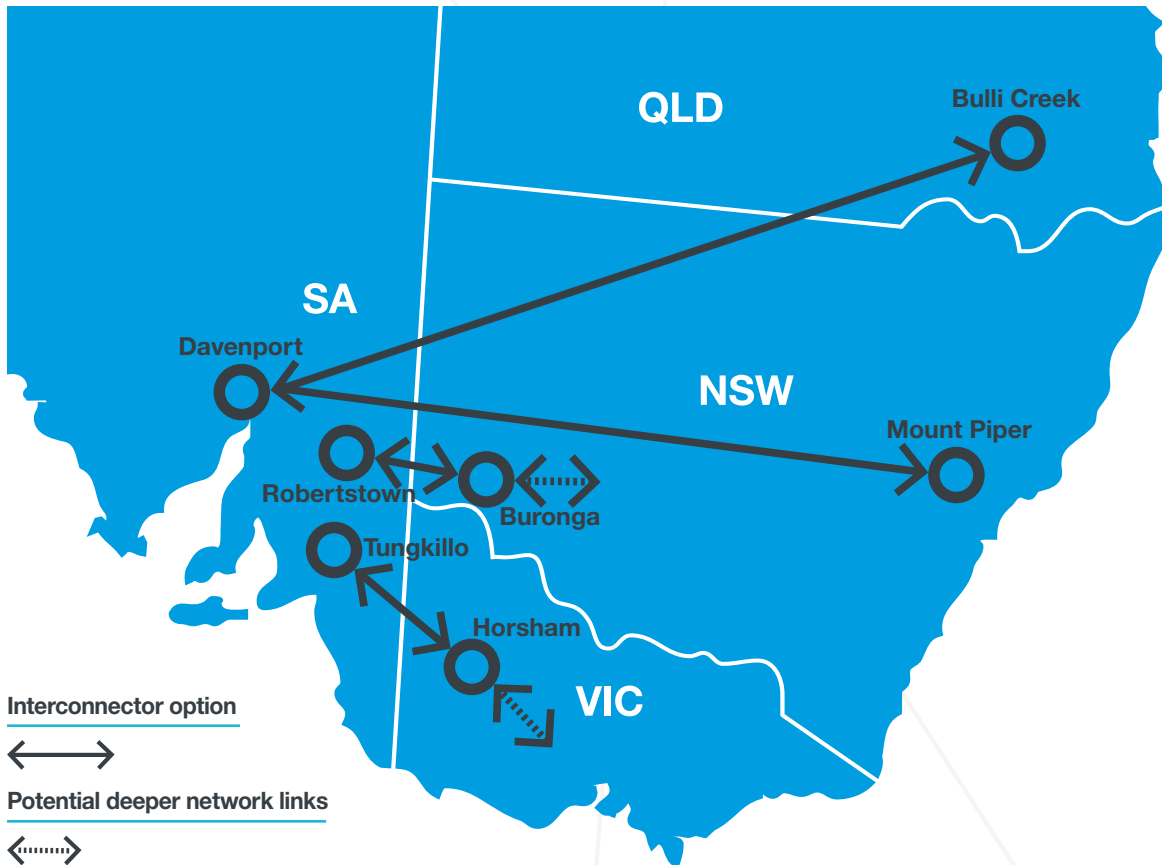
Work to explore South Australia's energy transformation had begun long before the storm.

While another interconnector may not completely prevent a similar event from happening in future, it would make the network more resilient.

# Potential new interconnector options

Our early work indicates a new high-voltage electricity interconnector between South Australia and the eastern states is one option that could be economic and help facilitate lower electricity prices, system security, and renewable energy goals.

ElectraNet has identified four credible network options, all of which involve constructing a new interconnector between South Australia and the eastern states, and these are explored more in the first stage of the RIT-T process.



	Option	Length (km)	Indicative Capex (\$m)	Notional Increase in capacity (MW both ways)	Estimated construction time (years)	Potential energisation
1	Central SA to Victoria (Tungkillo to Horsham, and beyond)	350 - 600	500 - 1,000	300 - 650	1-2	2021
2	Mid north SA to NSW (Robertstown to Buronga, and beyond)	350 - 800	500 - 1,500	300 - 1,200	1-2	2021
3	Northern SA to NSW (Davenport to Mt Piper)	1,100 - 1,300	1,500 - 2,000	1,000 - 2,000	2-3	2022
4	Northern SA to Queensland (Davenport to Bulli Creek)	1,450 - 1,600	2,000 - 2,500	1,000 - 2,000	2-3	2022

Please refer to the Project Specification Consultation Report for full details of the network and non-network options.



# The benefits of increased interconnection

## Increased interconnection between South Australia and the eastern states can:

- improve wholesale market competition in South Australia and deliver positive price impacts for customers, by allowing greater access to lower-cost generation at times of high demand
- improve system security by allowing frequency control services to be sourced from a wider pool of generators, which in turn will allow customers to continue to pursue decentralised choices for home-based generation and storage, while enjoying the back-up provided by a stable grid
- provide access to a more diverse range of supply sources, allowing greater sharing of reserves across regions and improving fuel and supply security for South Australia
- insure against wide-spread loss of supply and disruption following a system event that could separate South Australia from the National Electricity Market (NEM)
- open up access to the market for more renewable generation in South Australia, which has among the best renewable resources in Australia, allowing its clean, renewable energy to help the nation meet renewable energy targets more efficiently

## Non-network options

Non-network options could also provide benefits to the market, particularly in relation to system security.

Non-network options could provide additional inertia, fast frequency response and/or voltage response capabilities.

Technological advances might mean that a storage device now has a broader range of applications and benefits than was previously the case.

ElectraNet is interested to hear from parties regarding the potential for non-network options to satisfy, or contribute to satisfying, the identified need.

## Get involved!

The RIT-T process is about engaging the market and public to explore options and determine the best solution that benefits all parties, and we encourage feedback throughout the process.

Feedback on the PSCR is due on or before 6 February 2017.

As the process progresses, reports will be issued with corresponding feedback timelines.











You can provide feedback by:

✉ emailing [consultation@electranet.com.au](mailto:consultation@electranet.com.au)

☎ calling us on **1800 243 853** or

🖱 visiting [electranet.com.au](http://electranet.com.au)

# Timeline

	DATE	EVENT
	Pre-June 2016	ElectraNet's pre-feasibility study found a potential new interconnector, estimated to cost around \$500 million, could be economic.
	July 2016	The South Australian Government announce a \$500,000 contribution towards ElectraNet's costs of progressing feasibility studies and the RIT-T.
	November 2016	ElectraNet publishes a Project Specification Consultation Report (PSCR). This is the first formal consultation report involved in the RIT-T process which seeks market and public feedback on potential solutions.
	Q2 2017	The second stage involves assessing feedback and any proposed solutions, and publishing the findings in a Project Assessment Draft Report (PADR).
	Q3 2017	Once all feedback and advice has been received and analysed, a Project Assessment Conclusions Report (PACR) will indicate the final preferred option.
	Late-2017	If the PACR identifies a preferred option that satisfies the RIT-T, ElectraNet can apply to the AER to accept the project as part of its capital program, and approve the costs associated with it.
	End 2017 onwards	If an interconnector option is identified as the preferred option, a period of detailed design will determine the engineering requirements of the potential new lines, connection points and supporting systems.
	2018 and 2019	Planning and environmental approvals.
	2019-2021/22	Construction
	2021/22	Energisation

### Flexible regulatory arrangements

The COAG Energy Council is currently reviewing the RIT-T process to ensure it is effective in the current market, with an initial report due in December 2016.

### Local community engagement

If an interconnector option is the preferred option, local communities and landholders around the nominal connection point areas, and between them, will be involved in site and route selection processes.

### Delivering 20 years of benefit

Despite continually developing technology and change in the energy sector, early work indicates a new South Australian interconnector could deliver at least 20 years of significant benefit to electricity customers.