EIS Volume 1 Chapter 2

Project Justification

JBS&G

project energy connect

Contents

List of Figures

List of Tables

2. Project Justification

2.1. Introduction

The justification for the Project is driven by the changing nature of electricity generation in Australia, the dynamics of the National Electricity Market (NEM) in response to that change, and the implications of these on energy affordability and security in South Australia. Justification for the Project and the expected benefits are discussed in this chapter in this context.

ElectraNet considered a range of alternatives to the Project which were thoroughly investigated, as described in Chapter 3 Alternatives to the Project. The process used to evaluate the route options and select the transmission line corridor and alignment considered in this EIS is presented in Chapter 4 Route Selection.

2.2. EIS Guidelines

The EIS Guidelines require a statement of the objectives and justification for the proposed Project as set out in Table 2-1.

Table 2-1: EIS Guidelines addressed in the Project Justification chapter

EIS Guidelines and Assessment Requirements	Assessment level
General Requirements	
• The specific objectives that the proposal is intended to meet, including market requirements.	
• Expected local, regional and state benefits and costs, including those that can be adequately described in monetary or physical terms (e.g. effects on aesthetic amenity).	
• A summary of environmental, economic and social arguments to support the proposal including the consequences of not proceeding with the proposal.	
Land Use and Economic Effects *Assessment Requirement 2*: The proposal will have an impact on the State's economy during construction and operation and may result in immediate and long-term effects on landowners and surrounding uses.	
• 2.13: Identify any economic implications for the State and the region if the proposal does not proceed.	Critical
Planning and Environmental Legislation and Policies *Assessment Requirement 16: A range of planning, environmental and energy related statutory requirements would need to be met for the construction and operation of the proposed development*	
• 16. 3: Outline any other Commonwealth or State Government initiatives that may relate to the proposed transmission line, including greenhouse issues, principles of ecologically sustainable development, power generation, and the conservation or protection of the biological environment. Describe the proposal in terms of its consistency with these initiatives	Standard

Aspects of assessment requirements identified in Table 2-1 above which are not addressed in this chapter are listed in Table 2-2 together with the applicable chapter.

Table 2-2: Aspects of assessment requirements addressed in other chapters

Assessment Requirement	Chapter
16.3 Commonwealth or State Government initiatives that may relate to the proposed transmission line including the conservation or protection of the biological environment.	Chapter 5 Legislative and Planning Framework Chapter 11 Flora and Fauna

2.3. Overview of the National Electricity Market

2.3.1. Operation of the National Electricity Market

The Australian NEM is one of the world's longest interconnected power systems and consists of around 40,000 km of transmission lines and cables across six states and territories[1], regulated by the Australian Energy Regulator (AER). The NEM enables electricity to be exchanged as a commodity between generators, transmission network service providers, distribution network service providers, electricity retailers and market customers.

Electricity is traded to match power supply and demand requirements in real time through a centrally coordinated dispatch process managed by the Australian Energy Market Operator (AEMO), enabling electricity demand to be met in the most cost-effective way (AEMO 2018a). AEMO oversees the operations and security of the NEM and is responsible for maintaining secure electricity and gas systems, managing electricity and gas markets and leading the design of Australia's future energy system.

The Australian Energy Market Commission (AEMC) sets the rules to ensure the market delivers efficient, reliable and safe energy for electricity and gas consumers and provides independent advice to policy makers.

2.3.2. System connectivity

The interconnection of otherwise separate electricity networks allows local electricity markets to be integrated into the NEM, enabling customers to purchase power from electricity generators in different regions at a price determined by the supply and demand dynamics of the market. The effect of interconnection is to increase pricing competition through supply of lower-priced electricity to regions experiencing relatively high electricity pricing. When states are unable to generate sufficient electricity to meet local demand (due to factors such as low supply, high demand or damaged transmission infrastructure), interconnectors facilitate the transfer of electricity to fulfil the market's needs.

As shown in Table 2-3 and Figure 2-1, the NSW electricity grid is directly connected to Victoria and Queensland, while the South Australian and Victorian networks are linked through the Heywood Interconnector and Murraylink. Victoria and Tasmania are connected via the undersea Basslink Interconnector.

There is no interconnector between SA and NSW.

Table 2-3: Current interconnectors

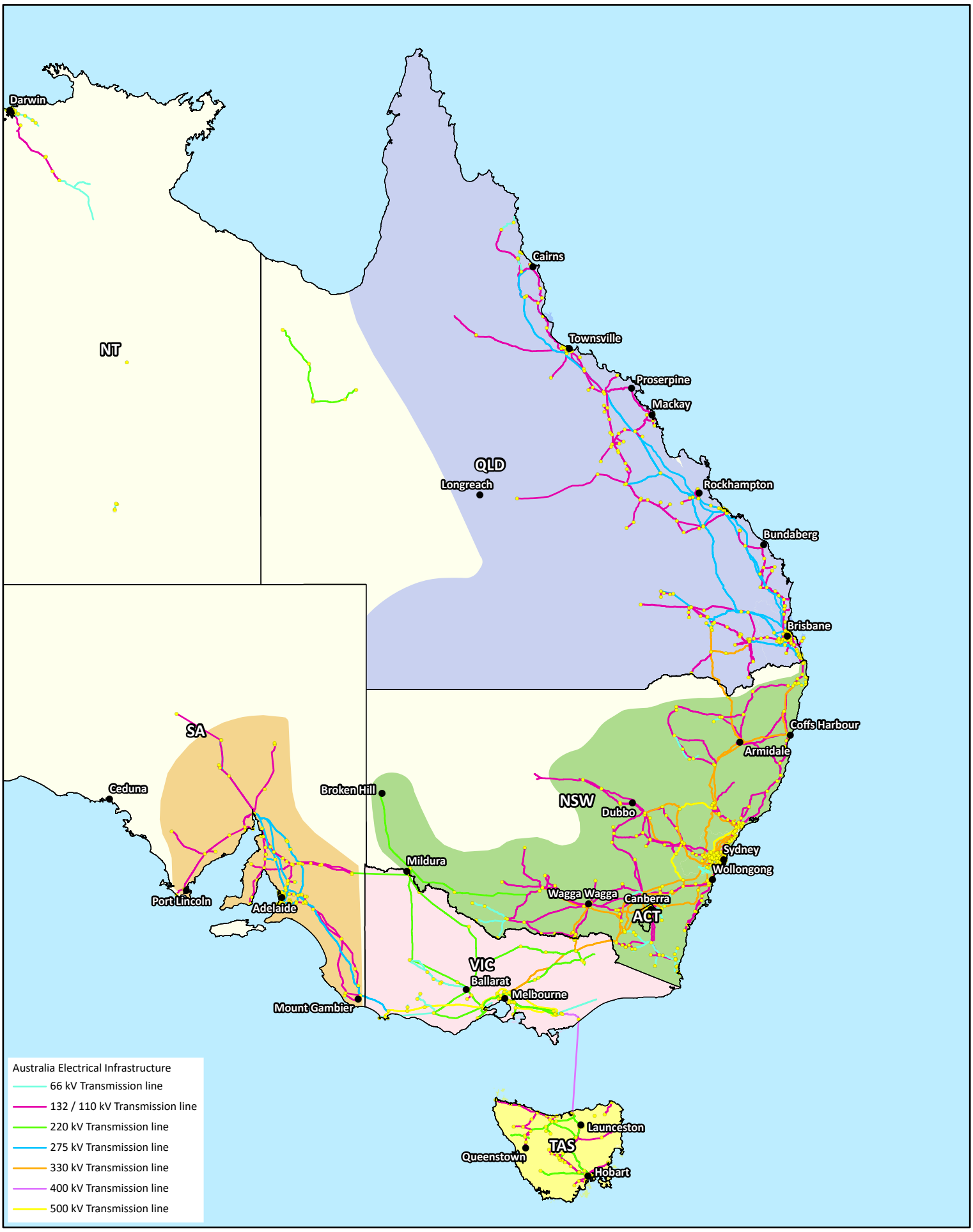
Interconnector	Description
Terranora Interconnector (N-Q-MNSP1)	110 kV lines from Mudgeeraba in Queensland to Terranora in NSW
Queensland to NSW (QNI)2	330 kV lines between Dumaresq in NSW and Bulli Creek in Queensland
Victoria to NSW (VIC1- NSW1)	330 kV line between Murray and Upper Tumut 330 kV line between Murray and Lower Tumut 330 kV line between Jindera and Wodonga

[1] The NEM interconnects five regional market jurisdictions comprising Queensland, New South Wales (including the Australian Capital Territory), Victoria, South Australia and Tasmania. Western Australia and the Northern Territory are not connected to the NEM, largely due to the large distances between them and the other participating states. The statistics for the Australian Capital Territory are incorporated into the New South Wales data.

[2] Proposed upgrades to QNI will be brought forward to mid-2022, delivering an extra 190 MW capacity into NSW during peak periods (AER 2020a).

Interconnector	Description
	220 kV line between Buronga and Red Cliffs 132 kV bus tie at Guthega
Basslink (T-V-MNSP1)	DC cable between George Town in Tasmania and Loy Yang in Victoria
Heywood Interconnector (V-SA)	275 kV lines between Heywood substation in Victoria and South East substation in SA
Murraylink (V-S-MNSP1	200 MW DC cable between Red Cliffs in Victoria and Monash in SA

Source: *Interconnector Capabilities: For the National Electricity Market 2017* (AEMO 2017)



NEM Region
- New South Wales
- South Australia
- Tasmania
- Queensland
- Victoria

Substation

Figure 2-1
National Electricity Market installed capacity

0 500
Kilometres

N

ElectraNet

project energy connect

JBS&G

2.3.3. Energy market transition

The Australian energy market is in the midst of a well-documented transition from a largely centralised generation fleet dominated by fossil fuel generation, to a more variable energy mix. This transition is characterised by increased penetration of renewable energy generation, dispersed generation and storage infrastructure, wide-scale behind the meter solar and storage installations, and the advent of emerging technologies including large scale batteries and virtual power plants.

There are many factors influencing the energy market transition including:

- decommissioning of the ageing coal-fired generation fleet
- government policies including renewable energy targets and state-based incentives
- greater awareness and positive sentiment for low-emission generation
- cost of electricity which is driving uptake in 'behind the meter' installations
- corporate power purchase agreements to underpin new utility-scale energy projects.

Over the next 20 years the retirement of ageing coal-fired generators is likely to result in the loss of around 70,000 Gigawatt hours (GWh), or one-third of the entire annual generation within the NEM. It is widely accepted that this generating capacity will be largely replaced by wind, solar (both small and large scale) generation and to a lesser extent hydropower and gas-fired generation (Figure 2-2) (AEMO 2020a).

This is particularly the case for NSW, where over 38,800 MW will be progressively retired over the next 15-18 years (refer Figure 2-3) representing over 80% of NSW coal-fired generation. The Clean Energy Council estimated that as of November 2020, there were 95 renewable energy projects in construction or due to start construction soon in Australia, which would generate around 12,021 MW of new renewable energy capacity (Clean Energy Council 2020).

As these new generation projects are more widely distributed, this transition will require significant investment in transmission and energy storage infrastructure to manage the diversity and intermittency of the future generation mix (AEMO 2020a).

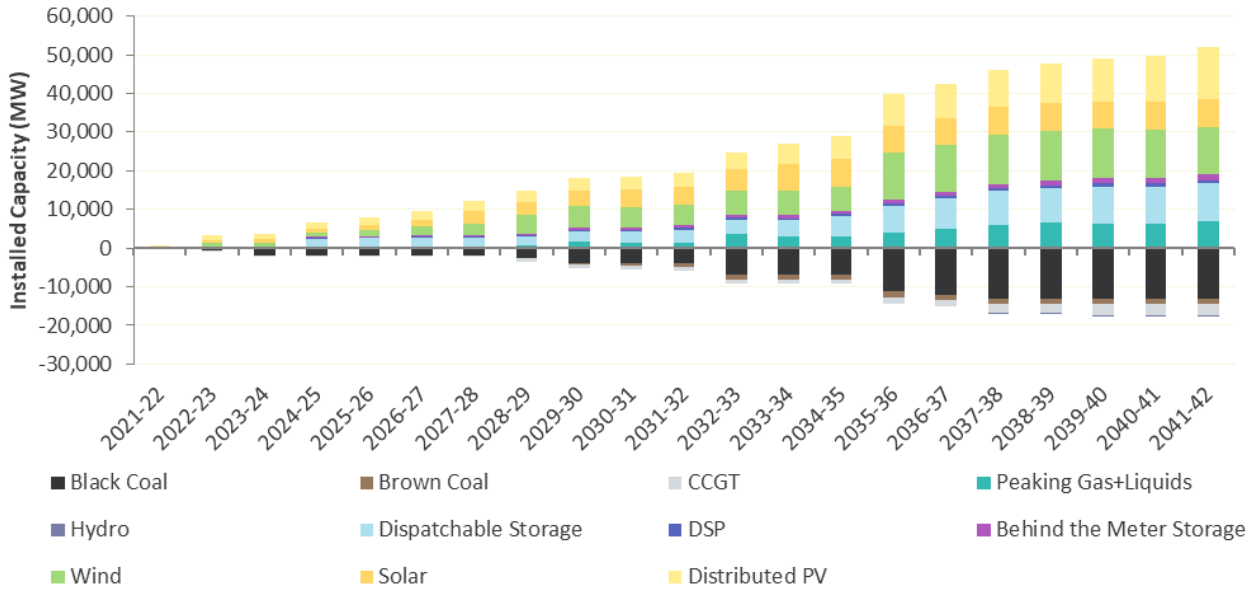


Figure 2-2: Forecast relative change in NEM installed capacity by generation type
(Source: AEMO 2020a)

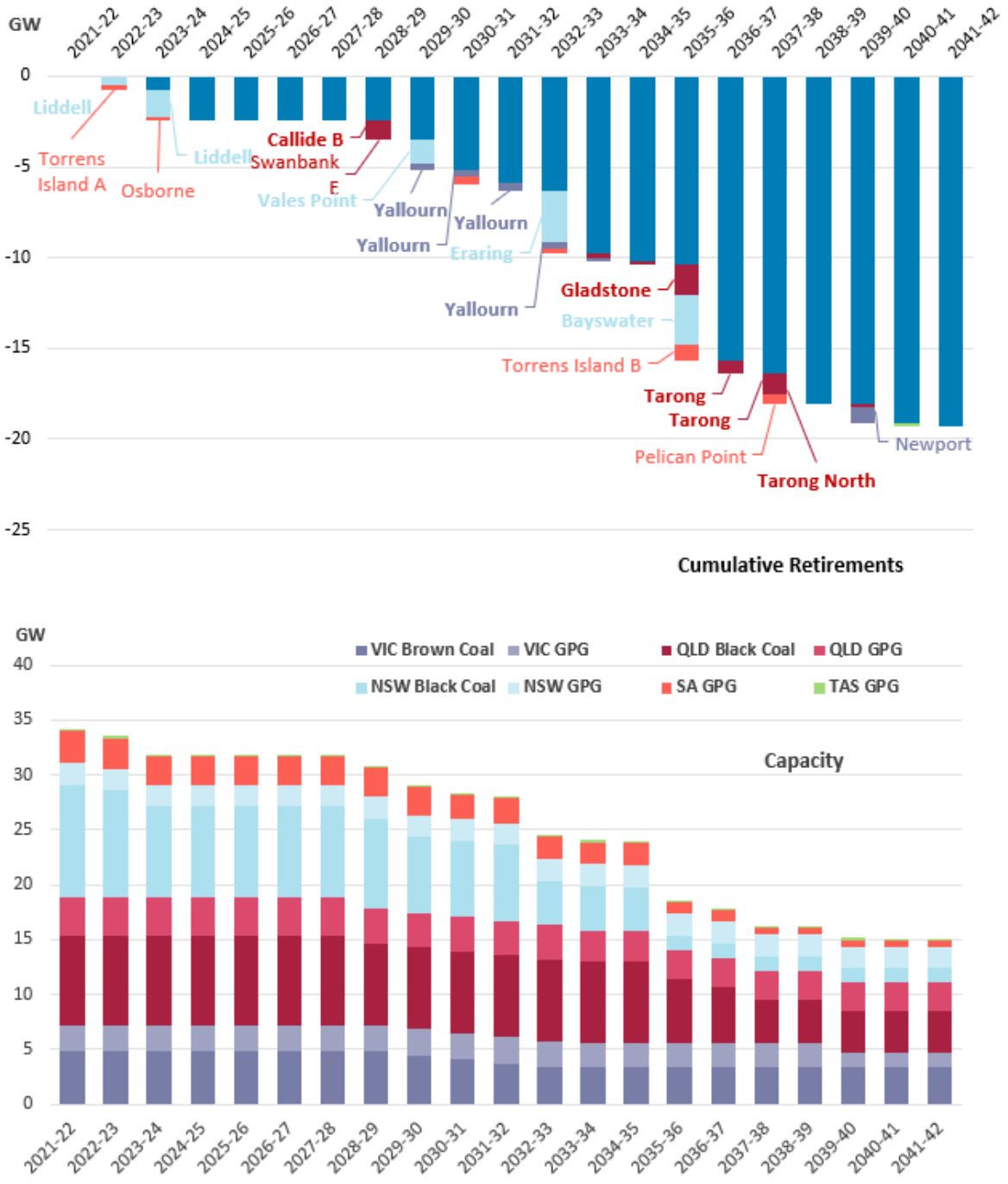


Figure 2-3: NEM coal-fired and gas-powered generation (GPG) retirements (top) and capacity (bottom)
(Source: AEMO 2020a)

2.3.4. South Australian context

Since the closure of the coal fired Northern Power Station in Port Augusta in May 2016, marking the end of coal-generated power in the state, SA has progressed to be a national leader in renewable energy capacity with the highest proportion of solar and wind of any state at 53%, and the second highest renewable energy penetration after Tasmania (which is dominated by hydropower) at 73% (refer Figure 2-4). In SA, gas and wind provide 71% of the energy generated compared to the significantly coal dependant networks in NSW and Queensland (refer Figure 2-4). Battery storage provides 1% of generation.

New investment and installations in SA are continuing with an overall increase of 9.3% in total installed capacity in 2019–20 compared with the previous year. This increase is mainly due to growth in wind, rooftop photovoltaic (PV) (particularly in the commercial sector), and gas generation (AEMO 2020a).

The largest energy generators in SA are currently the gas-fired Torrens Island, Pelican Point and Osborne power stations, and the Snowtown Wind Farm (Stages 1 and 2 combined). The Torrens Island A power station is scheduled to be progressively closed by September 2021, with two of the four turbines to be replaced by the 210 MW Barker Inlet Power Station. The Osborne Power Station is scheduled for closure in 2023–24.

The Barker Inlet Power Station commenced operation in November 2019 and will meet the increasing need for technologies that can complement the natural variability of renewable generation by providing rapid start capabilities and high operational flexibility. The Barker Inlet facility will be capable of increasing output to full capacity within five minutes at a higher level of efficiency than the pre-existing gas-powered generation fleet. The four Torrens Island B units will continue to operate until their currently-scheduled decommissioning in 2035–36 (AEMO 2020a).

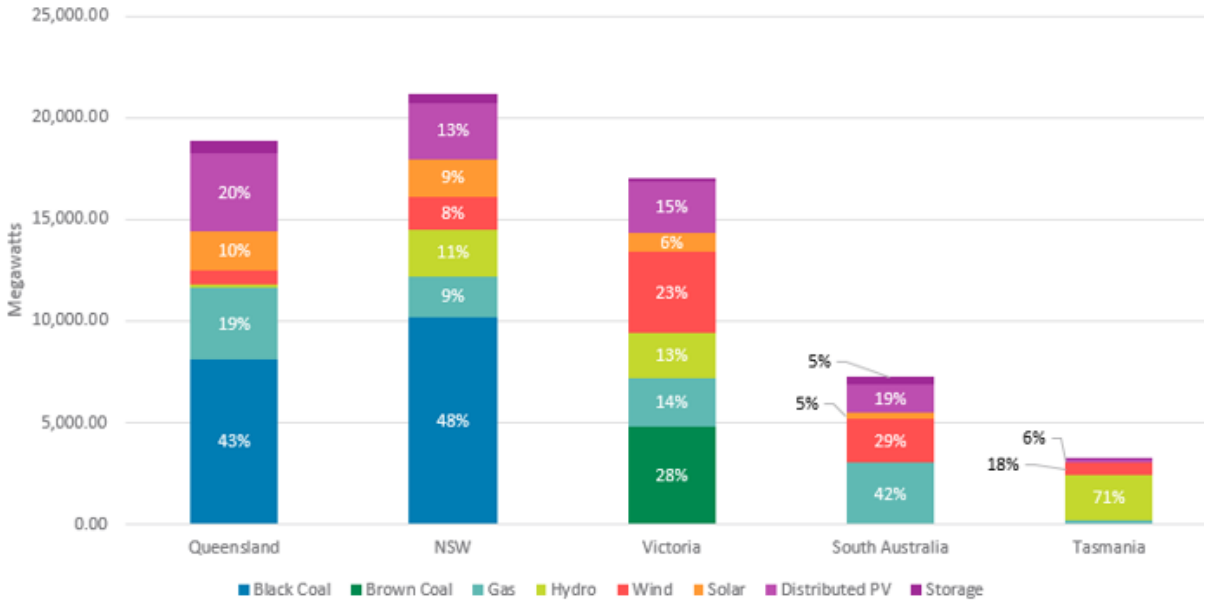


Figure 2-4: Generation capacity in the NEM, by region and fuel source
(Source: AEMO 2020a)

Changes to energy generation are presenting significant challenges for the South Australian electricity network, with flow on effects for all consumers. This is demonstrated by:

- the vulnerability of the State's electricity market to major and unforeseen events affecting the interconnectors connecting the State to the rest of the NEM
- variability in demand and supply causing significant price fluctuations influenced by intermittent supply and significant behind the meter installations
- the need for high cost gas peaking plants and battery energy storage systems to provide fast response dispatchable energy capacity during low supply or high demand scenarios.

In the recent past, these factors have collectively contributed to high wholesale electricity prices in SA, affordability concerns for consumers, system strength issues and vulnerability to major weather events and network damage resulting in wide-spread blackouts. Project EnergyConnect has been developed to address the need for improved affordability and reliability of electricity in SA, and to facilitate the ongoing transition of the NEM toward low emission energy sources.

2.3.5. New South Wales context

All electricity consumed through the NSW grid is generated within the State and supplied via the NEM. Thermal generation (i.e. burning fuel sources such as coal to propel turbines) and to a lesser extent gas, is the dominant electricity generation technology, however other technologies such as hydropower, wind and solar are playing an increasingly important role (DPIE 2019).

NSW is home to five operating coal power stations (and four of Australia's six oldest coal power stations) which generated almost 80% of NSWs' electricity in 2018 – 2019 (DPIE 2019). The Liddell coal power station is nearly 50 years old and scheduled to close by 2023, while three other coal power stations are also due to close by 2035–36 (DPIE 2019). This has the potential to put pressure on the future supply of energy, with electricity consumption across NSW increasing consistently over recent years and forecast to continue accelerating over the next decade (TransGrid 2018).

Approximately 40% of the State's energy generation in 2019–20 comes from renewable energy sources. The bulk of this comes from distributed PV, including rooftop solar comprising 13% and hydropower stations which contributed 11%. Wind and large-scale solar combined comprised 16% (AEMO 2020a). More recently, more than 30 wind and solar farms across the state (particularly in south-east and western NSW) have joined the grid (AEMC 2020) and there is a substantial investment pipeline of new wind, solar, gas and generator upgrade projects which have received or are seeking planning approval.

TransGrid has identified that the existing transmission network outside the Sydney – Wollongong – Newcastle – Hunter Valley area will reach its existing capacity to connect renewable generation in 2020 (SoE 2018) with only one in 20 of these projects being able to connect to the network (TransGrid 2020). The transmission grid will therefore require targeted augmentation, including strategically placed large-scale interconnectors and transmission line extensions, to balance resources and unlock Renewable Energy Zones (REZs) in new regions.

2.4. Electricity Network Planning

Finkel Review

In 2017, the Council of Australian Governments (COAG) Energy Council established a major independent review into the future security of the NEM, chaired by Australia's Chief Scientist Alan Finkel (Finkel 2017). The review was prompted in part by electricity blackouts in SA in September 2016 which focussed national attention on energy security and the implications of the changing electricity market.

The Finkel Review highlighted the need for better system planning as one of three pillars for ensuring that national energy security is preserved and costs are managed in each region as the generation mix evolves. Comprehensive network planning was promoted to ensure that emerging renewable energy resource regions can be economically accessed. Protecting the integrity of energy infrastructure against damage from extreme weather and future climate change, was also a key recommendation of the review.

2.4.1. Integrated System Plan

To address the findings of the Finkel Review, AEMO prepared the first Integrated System Plan (ISP) in 2018 which forecast the overall transmission system requirements for the NEM over the next 20 years. The 2018 ISP identified that the transmission network will play a critical role in the transformation of the national power system, by providing an 'interconnected energy highway' which allows diverse resources to be shared across the NEM more efficiently. Increased investment in an interconnected grid will provide the flexibility, security, and economic efficiency associated with a power system designed to take maximum advantage of existing resources, integrate variable renewable energy, and support efficient competitive alternatives for consumers (AEMO 2018a).

The 2020 ISP issued in July 2020 (AEMO 2020a) noted that the pace of development in new renewable and distributed energy generation has been even faster than that anticipated in the 2018 ISP and that this transition is predicted to continue over the next 20 years (AEMO 2020a). The 2020 ISP estimates that over 26 GW of new grid-scale renewable energy is needed to replace the approximately 15 GW (63%), of Australia's coal-fired generation that will reach the end of its technical life and likely retire by 2040. This will increase pressure on energy supply, particularly as energy consumption continues to rise in NSW (TransGrid 2018).

Project EnergyConnect was recommended in the 2018 ISP as an immediate priority project and confirmed as 'no regret' actionable[3] project in the 2020 ISP because it will 'increase transfer capacity between SA and NSW by 750 MW, deliver fuel cost savings and unlock already stranded renewable investments' (AEMO 2020a).

Renewable Energy Zones

AEMO have identified the benefits in concentrating development of grid-scale renewable energy projects in designated REZs to reduce total system and transition costs. The 2018 and 2020 ISPs assessed resource quality for potential new solar and wind installations and analysed these by region to identify potential REZs. Thirty-five potential REZs with good renewable resources were identified across the NEM through consideration of a mix of resource, technical and other considerations which were evaluated using a range of criteria (refer Figure 2-5).

The 2020 ISP prioritises REZ developments which are based on actionable projects and identifies Project EnergyConnect as development which is supportive of renewable energy projects (primarily solar) and will improve network capability in the Riverland REZ in SA (+800 MW), the South West NSW REZ (+380 MW) and the Victorian Murray River REZ near Red Cliffs (+600 MW) (AEMO 2020a). Incorporation of these REZs has been fundamental in the consideration of the transmission line corridor studies, assessment of alternatives in Chapter 3, and the route evaluation process described in Chapter 4 (refer Figure 2-5).

The NSW *Electricity Infrastructure Roadmap 2020* released in November 2020 also seeks to strengthen transmission development for REZs in NSW, which includes the South West NSW REZ traversed by Project EnergyConnect.

The establishment of Project EnergyConnect through these regions is expected to provide economic benefits by increasing the capacity of the network, opening the way for approximately 900 MW to 1,200 MW of renewable generation development in NSW (AEMO 2018a).

In SA, the Mid North REZ which incorporates the region at the western end of the proposed transmission line alignment would also potentially benefit from the Project.

New electricity network investments

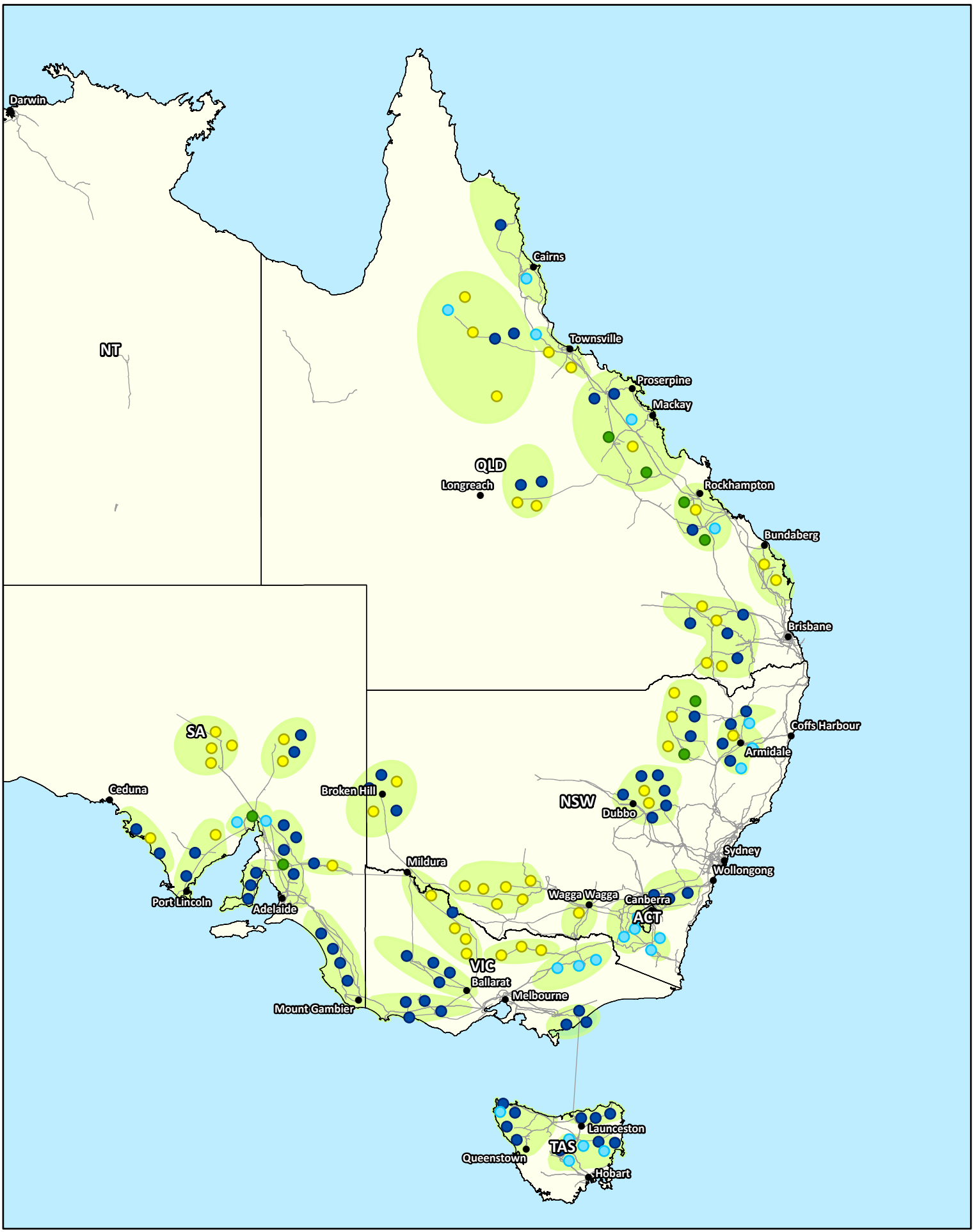
As an 'integrated' approach to network planning, the 2018 and 2020 ISPs note that the current NEM was historically developed primarily to connect large centres of thermal and hydro electricity generation to major demand centres. As the energy market transitions to a greater mix of generation, the NEM transmission network will need to adapt by investing in new network infrastructure in a strategic way to efficiently connect and transmit large amounts of dispersed renewable generation to more dispersed demand centres.

The 2018 ISP confirmed that a new interconnector between SA and NSW was an important element of the 'roadmap' for the NEM, and it was identified as one of the immediate priorities that would deliver positive net market benefits as soon as it can be built (AEMO 2018a). As noted above, a new

[3] Actionable ISP projects are projects which are identified in the 2020 ISP as critical to address cost, security and reliability issues, and are either already progressing or are to commence immediately after the publication of the 2020 ISP.

interconnector between SA and NSW has again been identified as a priority project in the 2020 ISP confirming Project EnergyConnect as a 'no regret' actionable ISP project.

The analysis within the 2018 ISP highlights the importance of new network investments to create an interconnected energy system which would enable greater transfer and trading of renewable energy, provide access to lower cost generation and realise the benefits of diversity from different resources in different locations with different generation profiles (AEMO 2018a). The 2018 ISP also proposes that further network investment would facilitate better use of the less flexible thermal generation assets by enhancing connectivity to meet the net operational demand of renewable generation.



Renewal Energy Zones - location

- Indicative pumped hydro
- Indicative solar farm
- Indicative wind farm
- Indicative battery storage

Existing electrical infrastructure

Renewable Energy Zone (REZ)

Figure 2-5
Renewable Energy Zones and indicative projects

0 500
Kilometres

N

ElectraNet | project energy connect | JBS&G

2.4.2. New energy projects in South Australia

By November 2020, publicly announced future energy supply projects in SA totalled 6,049 MW, with approximately 400 MW of this classified by AEMO as committed for development. New wind and open-cycle gas projects comprised the majority of new investment interest however there was a noticeable increase in the number of new battery, pumped hydro, and virtual power plant (VPP) projects publicly announced compared to previous years (AEMO 2020b).

Notwithstanding the increase in proposed rapid start gas and energy storage projects, overall the high penetration of intermittent renewable energy generation in the South Australian market is expected to continue, together with the challenges this brings to energy prices and system stability.

Figure 2-6 shows the mix of energy generated in SA by fuel type from 2015 – 2016 to 2019 – 2020 from:

- all scheduled generators
- all semi-scheduled and market non-scheduled wind farms
- all semi-scheduled solar farms
- selected smaller market and non-market non-scheduled generators
- estimated distributed PV.

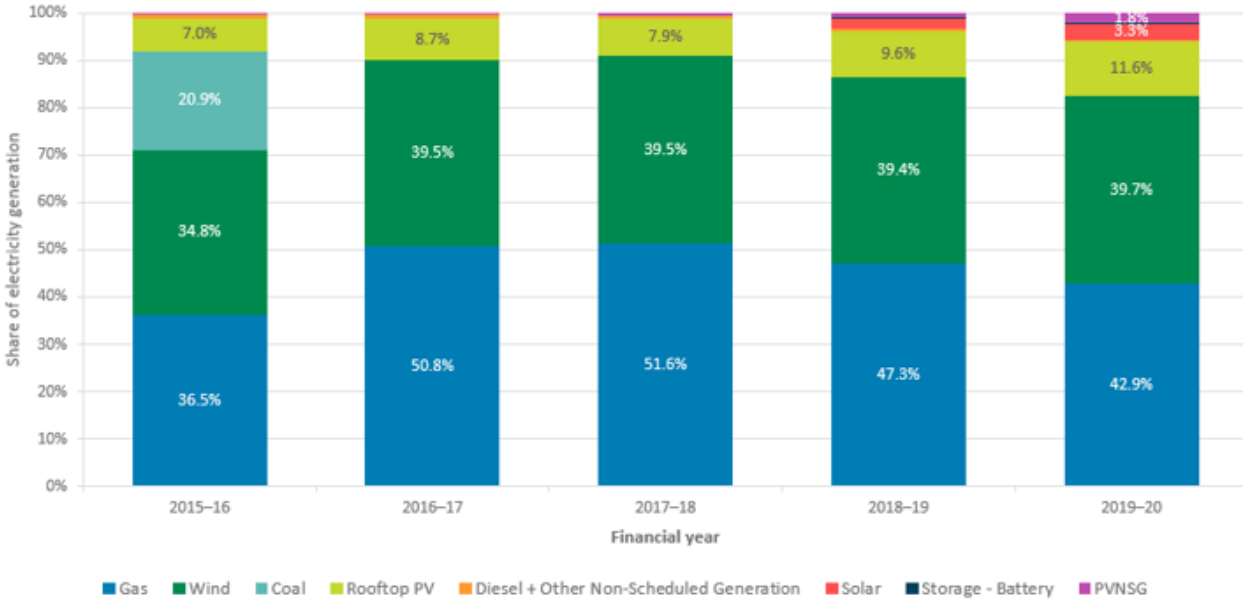


Figure 2-6: South Australian energy generation by fuel type
(Source: AEMO 2020b)

The above analysis demonstrates that the NEM is progressing at a rate which requires investment in transmission infrastructure to improve the affordability, reliability and sustainability of electricity supply for all electricity users.

2.5. Commonwealth and State Energy Policy Context

Commonwealth and State Government energy and emissions reductions policies reflect the need to adapt to and manage the transition of the energy market highlighted by the Finkel Review and the ISPs prepared by AEMO. Government policies at the national and state level are generally focussed on lower electricity prices, increased grid stability and protection from grid outages, and support for the transition of the Australian energy market to low emission / renewable sources.

2.5.1. Commonwealth policies

Energy policy

The Commonwealth government's stated priority is to ensure energy consumers receive affordable, reliable, sustainable and secure energy (DISER 2019). To this end, energy policies include implementation of an 'electricity price safety net' and proposals to:

- penalise poor electricity market practices
- establish a program to underwrite new generation investments
- require companies to invest in dispatchable energy to deliver the right level of 'on demand' sources (e.g. coal, gas, pumped hydro and batteries) needed in each state.

Emissions reduction

Emissions reduction and renewable energy policies are driven by the Commonwealth government's commitment to a reduction in emissions of 26 to 28% below 2005 levels by 2030 under the Paris Agreement4 for climate action post-2020, and net zero emissions in the second half of the century. In the international context, Australia's largest trading partners including Japan, the European Union, South Korea and the United Kingdom have all adopted a shorter-term goal of net zero emissions by 2050, with China setting the same target for 2060.

The Technology Investment Roadmap is a core element of the Commonwealth government's long term emissions reduction strategy and is aimed at accelerating the development and commercialisation of new and emerging low emissions technologies. The Roadmap envisages bilateral agreements between the Commonwealth and the State and Territory governments on initiatives that deliver increases in the supply of electricity and gas, improve grid security and reduce emissions (DISER 2020a).

The Commonwealth government's goal for emissions reduction has significant implications for the future operation of the NEM as meeting this commitment will necessarily lead to further replacement of some of Australia's emission intensive generators with lower emission alternatives, such as renewable energy generation.

Electricity generation is Australia's largest source of greenhouse gas emissions, accounting for 34% cent of Australia's total annual emissions (CCA 2020) and the NEM delivers around 80% of Australia's electricity consumption. The NEM therefore needs to significantly transition from traditional energy sources to lower emission alternatives including renewable energy for Australia to meet emission reduction targets (ElectraNet 2019a). The electricity sector is currently delivering on this outcome with the sector's emissions predicted to fall by 43 per cent between 2005 and 2030, in comparison to other sectors where stationary energy emissions are up 25%, transport emission are up 21% and fugitive emissions are up 45% (Ludlow 2020).

Renewable Energy Target

The Renewable Energy Target (RET) is an Australian Government scheme designed to reduce emissions of greenhouse gases in the electricity sector and encourage the additional generation of electricity from sustainable and renewable sources. Policies in place as part of the RET create financial incentives for the establishment or expansion of large-scale renewable energy power stations (e.g. wind and solar farms, or hydro-electric power stations) and small-scale renewable energy systems such as solar PV systems and small-scale wind or hydro systems.

The establishment of the RET has accelerated the progress of the renewable energy industry, assisted in the establishment of the necessary supply chains and expertise in Australia, and helped the industry

[4] A global agreement for climate action post-2020 was concluded at the Conference of the Parties (COP21) to the United Nations Framework Convention on Climate Change (UNFCCC) in December 2015.

mature to its place as a mainstream energy source today. In September 2019 the Clean Energy Regulator announced that the large-scale RET of 33,000 GWh of additional electricity from renewable sources by 2020 has been achieved (CEC 2019). The small-scale scheme continues to build momentum with a total cumulative capacity of 11,427 MW at the end of 2019-20 (CER 2020).

ARENA and CEFC

The Australian Renewable Energy Agency (ARENA) was established to fund research, development and commercialisation of renewable technologies including solar PV, hybrid, solar thermal, bioenergy, hydrogen, battery and pumped hydro storage projects with a focus on projects that integrate renewable energy into the electricity system (AER 2020b).

The Clean Energy Finance Corporation (CEFC) was launched in 2012 as a government-owned 'green bank' to promote investment in clean energy and provide financing for projects that will deliver a positive return. CEFC finance of around $5.5 billion has delivered 1.6 GW of large-scale solar capacity and 2 GW of wind capacity, and significant investment in storage and energy efficiency (AER 2020b).

As Australia's coal fired generation continues to close down, there is a clear need for further policy and regulatory reform so that the continued deployment of renewable energy and storage can help reduce Australia's energy sector carbon emissions, secure system reliability and lower energy prices.

2.5.2. South Australia and New South Wales energy policies

State-based policies in SA and NSW also place a significant focus on assisting the uptake of renewable technologies for households and businesses, energy affordability, emissions reductions and security and investment in new infrastructure (refer Chapter 5 Legislative and Planning Framework for further detail on the South Australian energy legislation framework).

South Australia

The South Australian government has a target to achieve 100% of the State's electricity supply from renewable energy sources by 2030. To achieve this, a range of policies have been adopted to progress uptake of renewable energy at the household, commercial and utility scales. Policies include a grid-scale storage fund to accelerate investment in utility scale energy storage, integration of grid-scale storage to address the intermittency of SA's energy supply and adoption of emerging technologies, including bioenergy and 'green hydrogen' for new markets.

Central to the South Australian government's target is the delivery of Project EnergyConnect to ensure the security of energy supply in a market which AEMO regards as the first gigawatt-scale power system in the world which, in coming years, may be capable of generating sufficient power from rooftop solar to provide its midday needs (DEM 2020). However the underlying risk of this capability is that, under extreme conditions, the dominance and growth of rooftop solar PV will pose a threat of disruption to energy supply. As a result of advice from AEMO requested by the SA government, the *South Australia's Energy Solution* policy statement was released by the government in June 2020 (DEM 2020). One of the primary recommendations for implementation during 2020 – 2023 was to ensure that Project EnergyConnect proceeds in order to underpin future power system operability (AEMO 2020a).

The State government's *Climate Smart South Australia* policy statement sets out the agenda for climate change and clean economic growth. The policy identifies the opportunities for the State in low emissions electricity supply and as an overall exporter of renewable energy, noting that the proposed SA-NSW interconnector will enable renewable electricity to be more easily exported to other states (DEW 2019a).

In December 2020, the SA government announced its *Climate Change Action Plan 2021 – 2025* which reiterates the State's goal for South Australian greenhouse gas emissions to be reduced by at least 50% (below 2005 levels) by 2030, to achieve net zero emissions by 2050 (GoSA 2020). Fast-tracking of the

SA-NSW interconnector for energy security and the export of excess renewable energy is also a key initiative of the action plan.

The South Australian government has established a specialist agency, Renewables SA, to focus on the implementation of its renewable energy and energy storage policies and demonstrate its commitment to maximising the economic opportunities associated with such projects that will help meet SA's current and future energy needs and Australia's Paris climate emission agreements.

New South Wales

In October 2018, the NSW Government released its Transmission Infrastructure Strategy to guide the development of new transmission projects (DPE 2018). The strategy outlines the need for new transmission to connect new wind and solar farms (and pumped hydro storage) to the electricity grid, which in some cases are located long distances from existing transmission capability which was built to accommodate coal-fired power generation.

Four priority projects are identified in the strategy, including a new interconnector with SA and interconnection expansions with Victoria and Queensland. The transmission infrastructure strategy also prioritises the development of three REZs in the New England, central-west and south-west regions of NSW (DPE 2018).

The NSW Electricity Strategy released in November 2019 re-emphasised the importance of unlocking regional investment in new energy generation infrastructure and connection of renewable energy projects to the power grid (DPIE 2019). The *Net Zero Plan Stage 1* for emissions reductions announced in March 2020 is also aligned with the objectives of the NSW Electricity Strategy (DPIE 2020a). The *Electricity Infrastructure Roadmap 2020* (DPIE 2020b) further builds on the state's energy policy platform by laying out the NSW government's 20-year plan to deliver Renewable Energy Zones, energy storage such as pumped hydro, and on demand supply like gas and batteries. The Roadmap complements the economic benefits of Project EnergyConnect and the NSW Government has committed to accelerate the development of Project EnergyConnect as one of four priority transmission projects.

A Memorandum of Understanding between the NSW and Commonwealth governments was signed in January 2020 with the objective of increasing gas and electricity supply in NSW, driving investment n transmission, achieving emissions reductions and working cooperatively with other States and Territories on areas of joint agreement and interest.

SA-NSW Interconnector

An interconnector to close the loop on South Australia's connection to the NEM was part of the South Australian government's energy policy platform when elected in 2018 and energisation of the Project by 2024–25 remains a significant priority for the government. As noted above, proceeding with Project EnergyConnect is regarded by AEMO as essential to protect SA from islanding and the resulting interventions that may be required to manage risks to system security.

The NSW government has also focussed on network connection through the NSW Transmission Infrastructure Strategy which is a plan aimed at encouraging private sector investment in priority energy infrastructure projects (DPE 2018). A NSW-SA interconnector is one of the four priority transmission projects under the strategy, as a means to unlock up to 750 MW of low-cost energy from SA and to assist in transmission of energy generated from renewable sources in the South-West Energy Zone of NSW to major demand centres.

The proposal for an interconnector between SA and NSW has been supported by governments of both States since the early 1990s and as noted above continues to be a priority of energy policy and planning in these two States. To this end, a Memorandum of Understanding on the establishment of an interconnector to carry electricity between SA and NSW was signed by the respective governments in

December 2018, establishing a framework for cooperation between the two governments that seeks to expedite the delivery of the Project.

2.6. The Need for a New Interconnector

2.6.1. Existing South Australian interconnections

Energy generated in SA is currently imported from and exported to the rest of the NEM via the Heywood and Murraylink interconnectors.

The Heywood interconnector comprises a 275 kV overhead transmission line between Heywood substation in Victoria and South East substation in SA. The interconnector was originally commissioned in 1989 and upgraded in 2015–16 from a nominal transfer capacity of 500 MW to a nominal design limit of up to 650 MW in either direction of flow. The Heywood Interconnector has generally operated at or near rated capacity, particularly during peak demand times in SA, with the upgraded capacity of 650 MW realised in the summer of 2018–19. Murraylink is a 180 km long 150 kV underground DC cable between Red Cliffs in Victoria and Monash in SA, with a much smaller 220 MW capacity commissioned in 2002 (AEMO 2018b).

These interconnectors are important transmission infrastructure as they are particularly relied upon during times of high power demand in SA. Should there be a loss of connection to the Heywood Interconnector, SA can effectively become separated from the rest of the NEM (i.e. 'islanded') due to limitations in the capacity and transmission infrastructure of Murraylink. This situation occurred in September 2016 and again in January and March 2020 and can leave the State's power system vulnerable to system interruption and potential outages.

Historically SA has been a net importer of electricity from Victoria with high utilisation of the Heywood Interconnector, however there has been a reversal in this trend following the retirement of the Hazelwood Power Station in Victoria, leading to SA being a net exporter of electricity in 2017–2018 for the first time in the preceding 10 years, a trend which continued through 2019–20 (AEMO 2020b) (refer Figure 2-7). SA achieved its first energy trade surplus in 2019 (AER 2020b).

Figure 2-7: SA total interconnector imports and exports
(Source: AEMO 2020b)

SA and Victoria are characterised by similar weather patterns, with high correlation in renewable energy generation between the two states, as well as similar demand patterns with peak demand

occurring during summer. In contrast, NSW and SA are less closely correlated and in NSW peak demand historically arises in winter for heating. There remains a considerable diversity between the summer loads of NSW and those of SA and Victoria, and the weather patterns that drive the NSW summer demands are independent of the weather that drives demand in the southern States.

The reliance on one primary interconnector with Victoria, coupled with a high penetration of intermittent generation leaves SA vulnerable to extreme weather events and other disruptions. During extreme weather and prolonged summer conditions, there is a risk that supply through the Heywood Interconnector would be insufficient to meet South Australian demand. This situation is more likely to arise as Victorian coal fired generation retirements, such as Hazelwood Power Station, continue to occur in the coming years.

AEMO has highlighted that diversity in generation (fuel type and geographic distribution), as well as improved network interconnectivity is highly desirable to mitigate risks of supply interruption (AEMO 2017). The AEMC holds a last resort planning power to help ensure that sufficient investment in transmission infrastructure is occurring and assesses the need to invoke that power on an annual basis. The 2019 AEMC review was satisfied that inter-regional constraints associated with the Heywood interconnector and Murraylink (i.e. inter-regional transfers are limited in both directions) would be addressed by the proposed Project EnergyConnect interconnector (AEMC 2019).

In addition, investigations and modelling undertaken by AEMO at the request of the South Australian government determined that Project EnergyConnect was essential to reduce the likelihood of islanding of SA and to alleviate system security risks (AEMO 2020c). Constraints that limit imports on the Heywood interconnector during high solar PV generation periods have also been introduced by AEMO in response to the findings in (AEMO 2020d), to reduce the risk of SA separating from the NEM.

Direct interconnection between NSW and SA will provide the opportunity to utilise existing surplus electricity generating capacity in NSW during peak demand periods in SA and improve security and reliability of supply in SA.

2.6.2. Regulatory Investment Test for Transmission (RIT-T)

In line with AEMO's findings in the 2018 ISP which identified the benefits of an interconnector between SA and NSW, ElectraNet assessed the detailed economic cost-benefit of an interconnector through application of the RIT-T. The RIT-T is applied to all major network investments in the NEM and is overseen by the AER. The RIT-T process is discussed further in Chapter 3 Alternatives to the Project.

The South Australian Energy Transformation (SAET) RIT-T undertaken by ElectraNet explored the technical and economic feasibility of a new interconnector as well as alternative non-network solution options[5]. The four main options examined are shown in Figure 2-8 and are discussed in detail in Chapter 3 Alternatives to the Project.

The Project Assessment Draft Report (PADR)[5] prepared under the SAET RIT-T process found that of the options considered, Option C.3, comprising a new 330 kilovolt (kV) transmission between mid-north SA and Wagga Wagga in NSW, via Buronga (including a link upgrade between Buronga and Red Cliffs in Victoria), is expected to deliver the highest net market benefits (ElectraNet 2018).

As the final step in the process, a Project Assessment Conclusions Report (PACR)[5] was prepared by ElectraNet (ElectraNet 2019a) which further revised the credible options, addressed submissions from stakeholders and presented updated economic modelling. The analysis in the PACR took into account the extensive consultation and stakeholder engagement undertaken by ElectraNet over two years in

[5] South Australian Energy Transformation SAET RIT-T documents can be found here: https://www.electranet.com.au/projects/south-australian-energy-transformation/

the SAET RIT-T process, to ensure that the identified need for the investment as well as the options to address it, were thoroughly tested.

The SAET RIT-T process concluded that Option C.3 would result in the highest net market benefits and meet other objectives for security of supply in SA, energy affordability and support the transition of the Australian energy sector to a lower carbon emissions future. The AER announced its decision to approve the SAET RIT-T on 24 January 2020 , describing the business case for project as “robust” and determining that the proposed interconnector remained the most “credible option that maximises the net economic benefit” in the NEM, ultimately benefiting electricity customers (AER 2020c).

ElectraNet and TransGrid are proposing to deliver this option jointly as Project EnergyConnect involving construction of an approximately 900 km-long interconnector between SA and NSW with an added connection into Victoria.

An updated Cost Benefit Analysis undertaken by ElectraNet in September 2020 based on the latest information on the costs and benefits of the project – aligned with the inputs and assumptions of the ISP 2020 – confirms that Project EnergyConnect remains the preferred option under the RIT-T and continues to deliver positive net market benefits. While this was based on the central scenario under the ISP, this analysis also found that increased benefits could be expected under the majority of alternative scenarios considered in the ISP.

ElectraNet has lodged their Contingent Project Application (CPA) with the AER, which is the final step in the regulatory approval process.

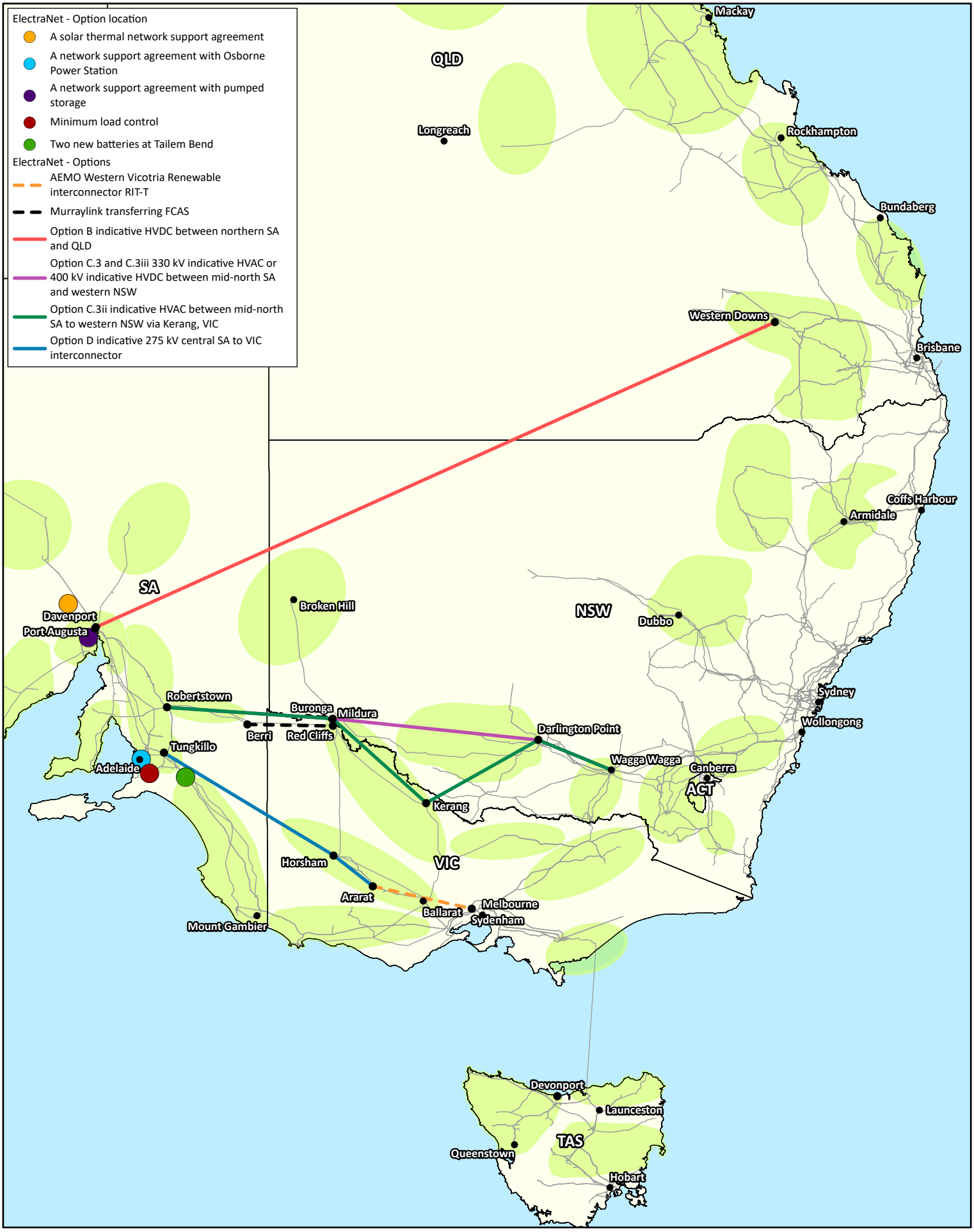


Figure 2-8
Overview of options assessed in SAET RIT-T

2.7. Benefits of Project EnergyConnect

Network interconnection provides a range of efficiency benefits which serve the long-term interests of consumers. These includes allowing electricity in lower priced regions to flow to higher priced regions, which dampens price volatility within regions and allows investment in generation and transmission to be optimised. Interconnection may also defer the need for investment in generation or intra-regional transmission which may otherwise have taken place, and contributes to reliability of supply across the NEM as regions can draw upon a wider pool of electricity supply and demand response (AEMC 2019).

The AEMC (AEMC 2019) has also noted that the growing proportion of generation coming from renewable sources is likely to increase the potential benefits of interconnection because:

- renewable energy sources are often geographically further removed from centres of demand than conventional generation
- the potential to exploit the geographic diversity of intermittent generation sources, may lead to more efficient generation siting decisions, and smoothing of the intermittency in aggregate across the NEM
- the potential for price separation between regions may increase as a result of lower variable-cost renewable energy in some regions
- the intermittency of some renewable energy sources such as wind and solar (without storage) in some circumstances may require sources of energy or load that can respond to instructions to increase or decrease output or usage to facilitate a reliable power supply. This may be provided by sources located in another region.

The proposed high-capacity interconnector is expected to provide a range of broader benefits to the NEM and will support State and Commonwealth energy policies through lowering energy prices, increasing access to and stimulating investment in renewable and low emission energy generation and improving security and reliability of the power network.

2.7.1. Overall economic benefits

The new 330 kV interconnector between SA and NSW will deliver substantial economic benefits as soon as it is commissioned. These would include:

- provision of diverse low-cost renewable generation sources to help service NSW demand going forward, particularly as existing coal-fired generators retire
- avoiding substantial capital costs associated with enabling greater integration of renewables in the NEM
- reduction in annual residential power bills by approximately $100 in SA and up to $63.90 in NSW, and corresponding larger savings for bigger customers
- delivery of flow-on economic benefits to the wider economy of more than $6 billion across SA and NSW
- generation of over 200 regional jobs in SA and over 80 regional jobs in NSW during construction, and create around 250 and 400 ongoing jobs in SA and NSW, respectively
- improving the ability of parties to obtain hedging contracts in SA and help relieve the tight liquidity in hedging markets currently.

The flow-on effect of the reduction in power bills on the wider economy is expected to be substantial, with a projected increase in total real income over the longer term of $2.4 billion in SA and $4 billion in NSW (in present value terms) through the construction and ongoing operation of the interconnector.

This is equivalent to an increase in average real income of $1,300 per person in SA and $500 per person in NSW in present value terms (ElectraNet 2019a).

2.7.2. Benefits for the region and local communities

Modelling undertaken for ElectraNet by ACIL Allen projected the Project's benefit to the real economic output in the SA host region over the period 2021 to 2040. The benefit in the region was predicted to be $120 million with $45 million during the construction phase and an average annual benefit of $4 million a year during the operations phase (ACIL Allen 2019)

A real increase in host region income from the Project over the same period of $163 million is predicted with $82 million during the construction phase and an average annual benefit of $4 million a year during the operations phase.

New opportunities will be provided for regional businesses, landowners and Councils to participate in renewable energy projects in the target REZs in regional SA as investors in new energy projects take advantage of the transmission capacity to distribute and sell their energy.

Direct jobs will be generated in regional and local communities during the construction and operation phases of the Project when a range of locally sourced goods and services will be required. Production and provision of these inputs will further increase the demand for labour across the regional economy.

Socio-economic impacts of the Project are discussed further in Chapter 17 Socio-economic Environment.

2.7.3. Benefits for South Australia

Energy policy outcomes

The proposed SA-NSW interconnector is a central policy commitment by the South Australian State government. Proceeding with Project EnergyConnect is regarded as essential by AEMO and will fulfill the commitments made by the SA government to protect the State from the effects of islanding, the risks posed from the dominance of solar PV in extreme conditions, and the need for expensive interventions to support the grid such as a moratorium on rooftop solar PV and retrofitting of existing household solar (DEM 2020).

The proposed interconnector will enable renewable energy generated electricity to be more easily exported to other states, meeting the agenda in the 'Climate Smart South Australia' policy statement which identifies opportunities for the State in low emissions electricity supply and as an overall exporter of renewable energy (DEW 2019a). It will also contribute to meeting the State's greenhouse gas emissions target to reduce emissions by at least 50% below 2005 levels by 2030, to achieve net zero emissions by 2050.

Lower electricity prices

The Project will enable surplus lower cost generation on the east coast of the NEM to be utilised to supply SA in the near term, reducing the State's reliance on expensive gas-fired generation. This will result in a reduction in the wholesale price of electricity in SA as soon as interconnection is established and a reduction in gas consumption for South Australian power generation, freeing up gas for other uses[6] (ElectraNet 2019a).

The ability for greater sharing of resources across NEM regions will help smooth demand and supply fluctuations, and in particular reduce reliance on increasingly expensive gas generation in SA, which will in turn reduce price volatility and trading risks.

[6] The positive net market benefits for the new interconnector identified in the SAET RIT-T were present for all future gas prices investigated.

As South Australian customers currently pay more for their electricity than most other regions in the NEM, a reduction in typical prices will be particularly important for vulnerable private consumers and for the competitiveness of South Australian industry. Independent economic modelling estimates that the greater supply, diversity and competition delivered by the new interconnector will reduce electricity prices by $100 for a typical annual residential bill in SA, and $200 for a typical annual small business customer bill (ElectraNet 2019a).

Increased security and reliability of supply

The Project will improve system security and resilience by reducing the vulnerability of South Australia's network to extreme weather events and system disturbances (and therefore the risk of islanding of the South Australian network) and help to mitigate system security risks under minimum demand conditions (AEMO 2018a, 2020a).

Reliability of supply to SA will be enhanced through connection into NSW energy supply which is less heavily reliant on renewable sources (AEMO 2018a).

Interconnection will also provide the flexibility to share demand and supply with two States and in particular with NSW which is more likely to have different weather patterns to those in SA and therefore different demand and supply scenarios.

It should be noted that due to the measures and investments put in place in SA since the 2016 state-wide power outage to address immediate system security challenges, the interconnector is no longer regarded as a primary source of system security. However, the interconnector will contribute to meeting system security standards in SA at lower cost (through reduction in the requirement for dispatch of higher cost gas generators in SA) than would otherwise be the case, through its impact in alleviating two constraints:

- the RoCoF[7] constraint on the operation of the existing Heywood interconnector, which limits the capacity of Heywood in certain circumstances
- the cap on the level of non-synchronous generation that may be online in SA due to system strength requirements.

Support for renewable energy

As SA became a net exporter of electricity in 2017–18, connection to NSW and Victoria will allow this extra capacity to be shared across more regions of the NEM (AEMO 2018a). The expanded capacity to export lower-cost renewable energy to the NEM will maintain SA as an attractive destination for investment in renewable energy projects such as large-scale solar installations and wind farms. The Project would enable REZs to be developed along the corridor, particularly the Riverland REZ which was identified by AEMO in the 2018 and 2020 ISPs as one of the potential opportunities for development of renewable energy projects in conjunction with the transmission investment options (e.g. interconnection).

Employment

The Project is expected to generate over 200 jobs in regional SA during the construction phase and create around 250 ongoing jobs in SA, in addition to the jobs generated in NSW and Victoria (ElectraNet 2019a).

[7] Rate of Change of Frequency

Economic output

Based on modelling undertaken by ACIL Allen, over the period 2021 to 2040, the interconnector Project is expected to increase the real economic output of SA by a cumulative total of $4.0 billion relative to the reference case using a real discount of 7%, equating to a net present value of $2.1 billion.

In the same period the Project is predicted to increase the real income of the State by a cumulative total of $4.4 billion relative to the reference case (with a net present value of $2.4 billion, using a 7 per cent real discount rate).

2.7.4. Benefits for New South Wales

Energy policy outcomes

The NSW Government has developed the NSW Electricity Strategy and the Net Zero Plan to support the transition of the NSW energy system in a manner which meets both energy generation needs and emissions reduction targets. Project Energy Connect will underpin these NSW policy objectives through supporting the unlocking of renewable energy generation in the priority REZs and increasing overall energy supply security for NSW which is typically a net importer of electricity (AER 2020b).

Lower electricity prices

Project EnergyConnect is also expected to lower electricity prices in NSW through the delivery of lower cost renewable energy from SA. Independent economic modelling estimates that the new interconnector will reduce typical annual residential bills in NSW by up to $63.90 (FTI 2020).

A new interconnector between SA and NSW will allow increased exports from existing and new high-quality renewable generation sources in SA and NSW, enabling supply requirements in NSW to be met at a lower cost than if NSW was required to draw on other generation sources, including new gas generation, to fill the gap.

Increased security of supply

As the electricity sector transitions, coal generators are expected to continue to retire from the market over the medium to longer term. The retirement of coal generation is expected to be most rapid in NSW where black coal is currently 48% of generation capacity but where 84% of the coal fleet will be progressively retired over the next 15 years (AEMO 2020a).

The new interconnector is scheduled to be in place around the time the coal-fired Liddell power station is due to retire from the market in NSW, providing timely additional transfer capacity to allow for the sharing of reserves between SA, Victoria (due to the Buronga to Red Cliffs augmentation) and NSW. Any earlier retirement of coal generation in NSW would accelerate delivery of these benefits.

Renewable energy zone connection

Project EnergyConnect would enable connection of a significant proportion of the renewable energy resources from the Riverland REZ in SA, Murray River REZ in Victoria and the South West Energy Zone in NSW, providing increased access to the Sydney and Adelaide load centres. This will permit greater exports from existing and new high-quality renewable generation sources in SA and western NSW, enabling supply requirements in NSW to be met at a lower cost than if the state was required to draw on other generation sources, including new gas generation, to fill the gap.

The interconnector will enable new intra-regional transmission costs to be avoided, which would otherwise be required to unlock additional renewable generation resources in the Murray River and Riverland REZs in the absence of a new interconnector. These REZs were identified by AEMO in the 2018 and 2020 ISPs as being priority areas to assist NEM transition (AEMO 2018a, 2020). By opening up these REZ's, new renewable energy projects can be developed to promote economies of scale in high-resource areas and capture geographic and technological diversity in renewable resources,

providing an effective, least-cost way to integrate new generation, storage, and transmission development.

Benefits would commence as soon as the interconnector is energised due to the addition of the Buronga to Red Cliffs augmentation facilitating lower cost connection of renewables under the Victorian Renewable Energy Target (VRET).

Employment

Project EnergyConnect is expected to generate over 800 regional jobs in NSW during construction, and around 700 ongoing regional jobs in NSW in addition to jobs created in SA and Victoria (ElectraNet 2019a). The opening up of REZ's would further boost employment in the regions as renewable energy projects are developed and connected to the NEM.

2.7.5. Benefits for Australia

Market benefits

By augmenting power transfer capability between regions, interconnectors enable the efficient sharing of generation resources between regions and can encourage more efficient investment on low-cost generation sources, enabling overall demand and system reliability requirements to be met at lowest cost.

In the longer term, an enhanced ability to export low-cost renewable power from SA will provide market benefits by enabling supply in other jurisdictions to be met at a lower overall cost, as existing coal-fired plant retires. This is particularly the case for new interconnection between SA and NSW, as NSW is forecast by AEMO to experience the greatest retirement of coal plant after 2030, and which otherwise would rely on higher cost sources of generation to fill the resulting supply gap (ElectraNet 2019a).

The RIT-T assessment undertaken by ElectraNet, found that the increased output from renewable generation that is projected to result from interconnection between SA and NSW, is also expected to deliver the following classes of market benefit:

- further reductions in total dispatch costs, by enabling low-cost renewable generation to displace higher cost conventional generation, including through the ability to harness geographic diversity across different renewable generation sources
- reduced generation investment costs, resulting from more efficient investment and retirement decisions, due to high quality renewables in SA, and diversification in generation leading to reduced need for firming capacity.

Assisting in meeting renewable energy and lower carbon emission targets

Initiatives put in place by the Commonwealth government to meet Australia's Paris Agreement commitment will lead to further replacement of some of Australia's emissions intensive generators with lower emission alternatives, such as renewable energy sources. In particular the progressive retirement of around half of the NSW coal fleet by 2035 (or sooner) means that alternative low emission supply sources will be required to fill this gap whilst meeting Australia's carbon emissions policy commitments.

SA has the highest level of wind energy generation in Australia, as well as a high uptake of rooftop solar PV and more recently grid scale solar installations (refer Figure 2-4) putting it at the forefront of renewable penetration levels in power systems across the world. Interconnection with NSW, as well as the existing Victorian connections, will allow more electricity generated from these renewable sources to be utilised by other states which will assist in Australia meeting carbon emission and renewable energy targets at the lowest long run cost (AEMO 2018a).

Resilience during unexpected events

The 2018 and 2020 ISPs identified that greater interconnection would improve the power system's resilience to be able to manage unplanned events, such as unexpected exits of coal and gas-powered generation.

Greater geographic diversity

The NEM is particularly exposed to climate change impacts. An increase in the frequency and intensity of extreme weather events can increase stress on the power system in several ways (Finkel 2017) including:

- structural vulnerability of transmission and distribution networks and infrastructure to extreme weather events
- reduction in generator efficiency due to high ambient temperatures leading to breakdowns and an increase in maintenance costs
- maximum operating temperatures for many elements in the power system above which they disconnect to avoid damage.

The interconnector will contribute to greater geographic diversity in the overall system and help manage the risk of climatic events, improving resilience and energy security during major weather events.

2.7.6. Ecologically sustainable development (ESD)

The Project also seeks to meet the objectives of ecologically sustainable development (ESD) whilst achieving the economic benefits outlined above. These objectives aim to ensure that individual and community wellbeing and welfare is enhanced through economic development that safeguards the welfare of both current and future generations, whilst protecting biological diversity and maintaining essential ecological processes. The objectives of ESD also underpin a number of the State and national legislative and strategic policy frameworks which are both driving and guiding the Project (refer Chapter 5 Legislative and Planning Framework).

The specialist studies and investigations undertaken for the Project have been designed to conform with accepted scientific and assessment methodologies to ensure their rigour, taking into account relevant statutory and agency requirements. The design and siting of Project infrastructure has evolved and continues to evolve based on the findings of expert investigations and stakeholder engagement to ensure the potential impacts of the Project are understood with a high degree of certainty.

The Project will provide intergenerational benefits by facilitating a more secure electricity supply in the near-term, and the transition of the energy sector across the NEM to low emission energy generation sources in the longer term. The Project will positively benefit economic activity at the local, regional and state level, increasing regional job opportunities and assisting in unlocking the future development of large-scale renewable energy generation within the Riverland, Murray River and South West NSW REZs, all of which are identified as priority areas to assist the NEM transition.

Where impacts to the environment or community from Project construction activities or its operation have been identified, measures to mitigate these impacts have been proposed to ensure that they are minimised or eliminated. No serious or irreversible damage to the environment has been indicated during the assessment of the Project's impacts.

2.8. Consequences of Not Proceeding with the Project

The Finkel Review into the future security of the NEM noted that the national electricity system is at a critical turning point caused by the significant and inevitable industrial, technological and economic changes underway. The review stated that if managed well, Australia will benefit from a secure and

reliable energy future; if managed poorly the nation's energy future will be less secure, more unreliable and potentially very costly.

The report acknowledged that Australia needs to increase system security and ensure future reliability in the NEM. Security and reliability have been compromised by poorly integrated variable renewable electricity generators, including wind and solar which has coincided with the withdrawal of older coal and gas-fired generators. The review recommended better system planning with AEMO having a stronger role in planning the future transmission network, including the development of a NEM-wide integrated grid plan to inform future investment decisions.

It was further recommended that significant investment decisions on interconnection between states should be made from a NEM-wide perspective. The 2018 and 2020 ISPs developed by AEMO identify a list of priority transmission projects for investment, as well as enable efficient development of new REZs across the NEM. The SA-NSW interconnector has been identified by AEMO as one of the immediate priorities that would deliver positive net market benefits as soon as it can be built.

The Project is an integral part of the delivery of the 2018 and 2020 ISPs prepared by AEMO to address the need to meet the national and regional energy reliability and security challenges posed by the transitioning energy sector.

Should the Project not proceed the following consequences could be expected nationally, for the State and the local region:

Table 2-4: Consequences and economic implications of not proceeding with the Project

Area of impact	Consequences and / or economic implications of not proceeding
National	• National policies and targets for emissions reduction may be undermined.
	• Net market benefits and flow-on downward pressure on electricity prices, facilitated by the interconnector, would not be realised.
	• Other potentially more costly solutions will be required to support the NSW energy market once the coal-fired Liddell power station is due to be retired in 2022.
	• The ability of the NEM to transition from traditional energy sources to lower emission alternatives including renewable energy will be weakened.
	• Over 1,000 construction jobs and 950 operations jobs forecast to be generated by the Project would not be created.
	• Opening up of new REZs with access to major load centres, particularly in the Riverland, south-western NSW and north-western Victoria would be jeopardised and risk the stranding of renewable energy assets.
State / Region	• SA and NSW policies and targets for emissions reduction may be undermined.
	• SA would remain vulnerable to widespread outages as the result of extreme weather events coinciding with high energy demand and limited connectivity with the rest of the NEM.
	• The predicted reductions in the wholesale price of electricity in SA as soon as interconnection is established would not be realised.
	• Failure to realise wholesale price reductions could result in the State foregoing benefits to economic output of a contribution to Gross State Product of approximately $1.9 billion to $2.6 billion in present value
	• The reduction in gas consumption for South Australian power generation resulting from the operation of the interconnector and the consequent freeing up gas for other uses will be jeopardised.
	• The predicted 200 construction jobs and 250 ongoing jobs would not be created in SA.
	• New opportunities for regional businesses, landowners and Councils to participate in renewable energy projects and to build the REZs in regional SA would be lost as investors in new energy projects typically will not invest unless they are sure there will be enough transmission capacity to distribute and sell their energy.

In particular delivery of Project Energy Connect is critical for the ongoing secure operation of the power system. As noted in (DEM 2020) AEMO has declared that if Project EnergyConnect (together with new smart standards for rooftop solar) does not proceed "a moratorium on new rooftop solar installations and other expensive interventions will be required to be able to maintain power system security" (DEM 2020).

Should the Project not proceed, the above consequences would be compounded by an energy system which is less able to accommodate future energy usage patterns which will be vastly different to the past, and unable to provide the increased system security and reliability that is imminently required for the South Australian network and the NEM (AEMO 2018a, ElectraNet 2016, AEMO 2020d).

2.9. Conclusion

Project EnergyConnect has been developed in response to the need to improve the reliability, affordability and sustainability of electricity supply in SA and the NEM.

The NEM is currently undergoing a significant period of transition from a largely centralised fossil-fuel generation fleet to a more variable, dispersed energy mix characterised by increased penetration of renewable energy generation, storage technology, wide-scale behind the meter applications and emerging technologies. These changes, particularly the growing market share of intermittent renewable energy generation, makes it increasingly important to ensure the NEM has a reliable and secure energy system which can respond to market needs at all times.

Project EnergyConnect will enable efficient sharing of generation resources between regions in the NEM and encourage more efficient investment in low-cost generation sources, enabling overall demand and system reliability requirements to be met at lowest cost (AEMO 2020a). It will also contribute to the geographic and technical supply diversity across the NEM required to mitigate risks of supply interruption.

Project EnergyConnect will also deliver substantial economic and strategic benefits to SA, NSW, Victoria and the broader Australian energy market as soon as it is operational. Project EnergyConnect is supported by both the SA and NSW governments in relation to priorities for energy security, energy prices for households and business, and support for the development of renewable and low emission energy generation, particularly in regional areas. In particular the economic case for Project EnergyConnect has been supported and strengthened by the recently released NSW Energy Infrastructure Roadmap.

Reliability of supply to SA will be enhanced through connection into NSW energy supplies through access to diversified energy sources (i.e. less reliance on renewable sources) and reducing South Australia's vulnerability to extreme weather events and system disturbances. NSW supply security will also be supported through opening access to South Australian generated energy as the process of the retirement of the NSW coal fleet continues. A new interconnector from SA to NSW will allow renewable energy from SA to assist the transition to lower carbon emissions in meeting national and State carbon emission and renewable energy targets at lowest long run cost.

Project EnergyConnect will allow greater exports from existing and new high-quality renewable generation sources in SA and south-western NSW to enable supply requirements in NSW to be met at a lower cost. As a 'no regret ' actionable project, it will also assist in unlocking additional renewable generation resources in the Murray River, Riverland and South West NSW REZs, which have been identified by AEMO in the 2018 and 2020 ISPs and in the NSW Energy Infrastructure Roadmap as being priority REZ areas. Project Energy Connect will assist NEM transition to lower emission alternatives, and aid the NSW and SA governments in achieving their goal to achieve net zero emissions by 2050.

It will facilitate the delivery of significant net market benefits and creation of downward pressure on wholesale prices which will flow on to electricity prices paid by customers.

Construction of the interconnector will generate in excess of 1,000 regional jobs in SA and NSW, with approximately 950 ongoing jobs to be created during operation of the interconnector.

In summary, there is strong justification for Project EnergyConnect on the basis of energy market needs, technical requirements, network security, economics and environmental outcomes.