



NSW Transmission Infrastructure Strategy

**Supporting a modern
energy system**



November 2018

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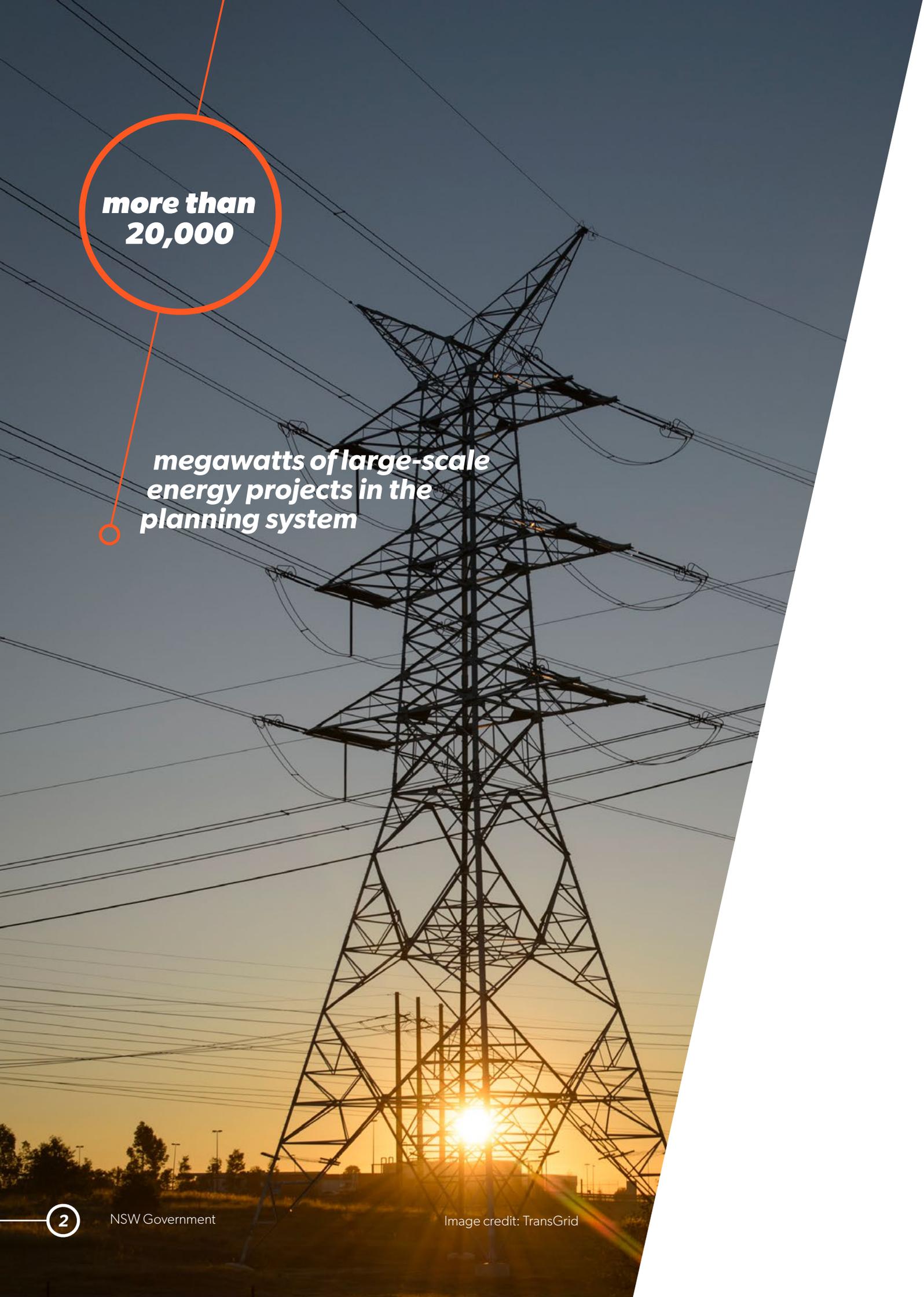
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**more than
20,000**

***megawatts of large-scale
energy projects in the
planning system***

Minister's Foreword



The Hon Don Harwin MLC Minister for Energy and Utilities

The challenge for our electricity grid is to connect the range of technologies that will drive our energy future.

In October 2018 more than 20,000 megawatts of large-scale projects were progressing through the planning system, representing more than \$27 billion in potential investment, mostly in regional NSW. These projects include wind, solar, bioenergy, gas, coal plant upgrades and pumped hydro.

However, for every 20 projects looking to connect to the grid only one can. Companies simply will not invest if they can't connect.

That's why the NSW Government is taking early action to encourage investment in the new energy infrastructure needed to unlock more secure, affordable and clean energy for our households and businesses.

The NSW Government will support early development of four priority projects by TransGrid to bring forward important early planning and feasibility work.

These projects will unlock existing energy supply from Queensland, Victoria, South Australia and the Snowy region. This work will ensure NSW can access least-cost energy when it is needed and help boost regional development through significant investment and jobs growth in regional NSW.

This approach is consistent with the Australian Energy Market Operator's Integrated System Plan – a blueprint for the transition of the energy system over the next 20 years.

The Government will also progress work in three key energy zones in regional NSW that will become a focus for investment and jobs in modern energy generation, in the New England, Central West, and South West NSW regions. We will ensure regulatory frameworks are fit for purpose and support efficient and timely investment in the zones.

The Strategy is underpinned by several important principles:

- o **Lower energy bills** for NSW households and businesses
- o **A technology neutral approach** to new energy generation projects
- o **Private-sector led investment** in transmission and generation
- o **Regional economic growth** and increased **job opportunities**
- o Ongoing **secure and reliable energy** to power the NSW economy

With this Strategy, NSW can move beyond planning to implementation. The Strategy is one part of a portfolio of NSW Government programs and policies that will help ensure NSW households and businesses will reap the benefits of a stable and affordable energy system so our state can continue to thrive.



NSW's vision for a modern energy system

NSW is undergoing an energy sector transformation not seen for several decades, which will change how we generate and use energy.

Between the 1940s and 1980s, NSW was at the heart of a generational shift which transformed the energy sector into the system we all benefit from today. As our population expanded rapidly, new power stations were built, the Snowy Hydro Scheme was developed and high voltage power lines – known as the transmission network – were constructed to bring this new energy to NSW's major energy demand centres.

Now, several generations later, we are in another energy transformation. Technology and innovation are changing how we generate and use energy. Households and businesses are playing an increasing role in helping to meet the state's changing energy needs with one in six NSW households owning their own rooftop solar system. While this is a great way for energy consumers to reduce the amount of energy they use from the grid, rooftop solar is only one part of the mix. We need large volumes of energy from a range of sources to power households, businesses, schools, industry, hospitals, infrastructure and the broader economy.

Regional NSW has abundant, cheap energy resources that provide huge opportunities for new energy projects to generate job growth, expand income streams for farming communities and boost local economies. The planned and efficient extension of the transmission network

into regional NSW is key to unlocking this new generation to supply the state with the most affordable energy into the future.

This NSW Transmission Infrastructure Strategy is the NSW Government's plan to unlock private sector investment in priority transmission infrastructure projects, which can deliver least-cost energy to customers to 2040 and beyond. The Strategy forms part of the government's broader plan to make energy more affordable, secure investment in new power stations and network infrastructure; and ensure new technologies deliver benefits for consumers.

Building on existing programs to reduce household and business energy bills and secure energy supplies, the Strategy aims to:

1. Boost our interconnection with Victoria, South Australia and Queensland, and unlock more power from the Snowy Hydro Scheme.
2. Increase NSW's energy capacity by prioritising Energy Zones in the Central-West, South West and New England regions of NSW, which will become a driving force to deliver affordable energy into the future.
3. Work with other states and regulators to streamline regulation and improve conditions for investment.

By increasing our transmission capacity and low-cost generation, we will support an orderly transition of the energy sector over the next two decades.

Embracing our energy future

NSW already has a substantial investment pipeline of new wind, solar, gas and generator upgrade projects either with or seeking planning approval, driving the energy transformation across the state.

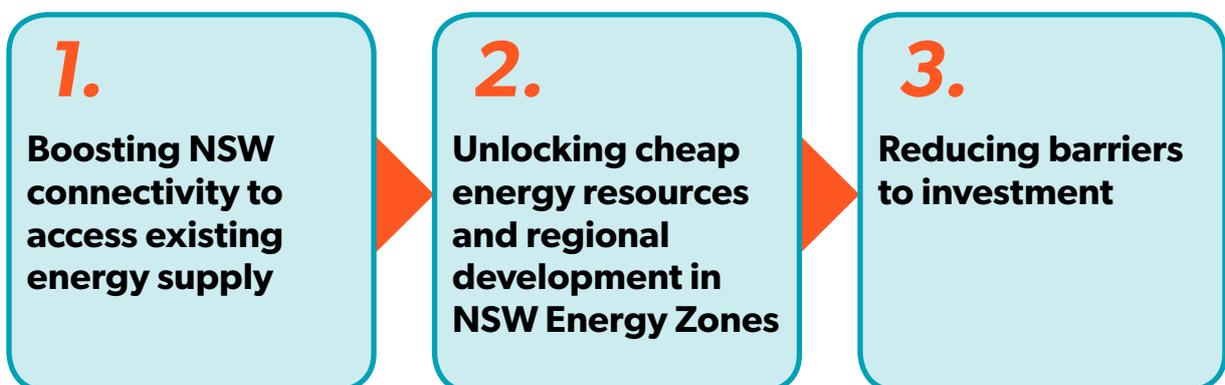
As traditional generators retire, these new projects will provide the cheapest available new energy to run our households, businesses, schools and essential services.

The existing network will continue to play an important role. However, it only has enough capacity to connect around one in 20 of these projects. Thinking strategically about how we update our transmission network is fundamental to NSW's energy future so that projects are connected efficiently, and the new energy is transported to customers who need it.

The Strategy provides increased certainty for communities and business about the direction of NSW energy policy. Before 2025, it will help increase access to existing 'firm' energy capacity

from neighbouring states and the Snowy region, to manage peak demand on our hottest days. A final decision from the Snowy Hydro Board on whether to proceed with Snowy 2.0 is expected in December 2018. The NSW Government's prioritisation of Snowy Hydro transmission upgrades is contingent on a favourable investment decision from the Board.

And to help meet our future energy needs the Strategy will help to facilitate new transmission that could support up to 17,700 MW of new electricity generation in Energy Zones by 2040. These Zones could leverage up to \$23 billion in private sector investment, support an average of up to 2,000 construction jobs each year and represents a huge boost for NSW regional communities.



Other benefits include improved energy reliability, security, timely project delivery, increased affordability and access to cheaper electricity. It is anticipated the Strategy will benefit energy bills up to 2040 in the order of \$2.4 billion across the state.

In addition to planning for our transmission infrastructure needs, the NSW Government is acting to reduce our state's energy demand

at critical times – such as on hot summer days, support energy efficiency and ensure NSW has enough on-demand supply to complement variable renewable generation. With these actions the Strategy forms part of a comprehensive government response to the transformation of our energy system that will help ensure the state has enough affordable energy to supply NSW households and businesses.

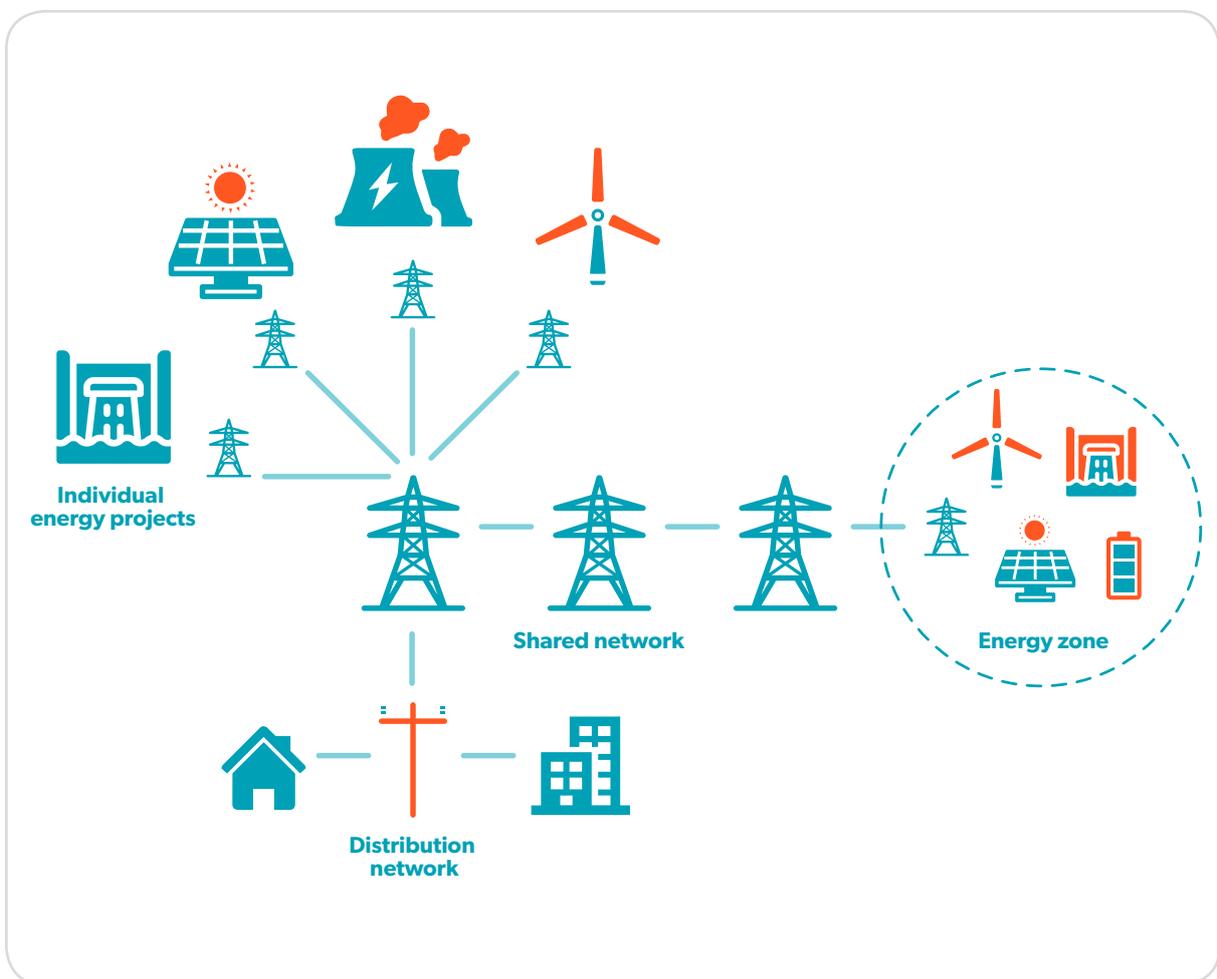
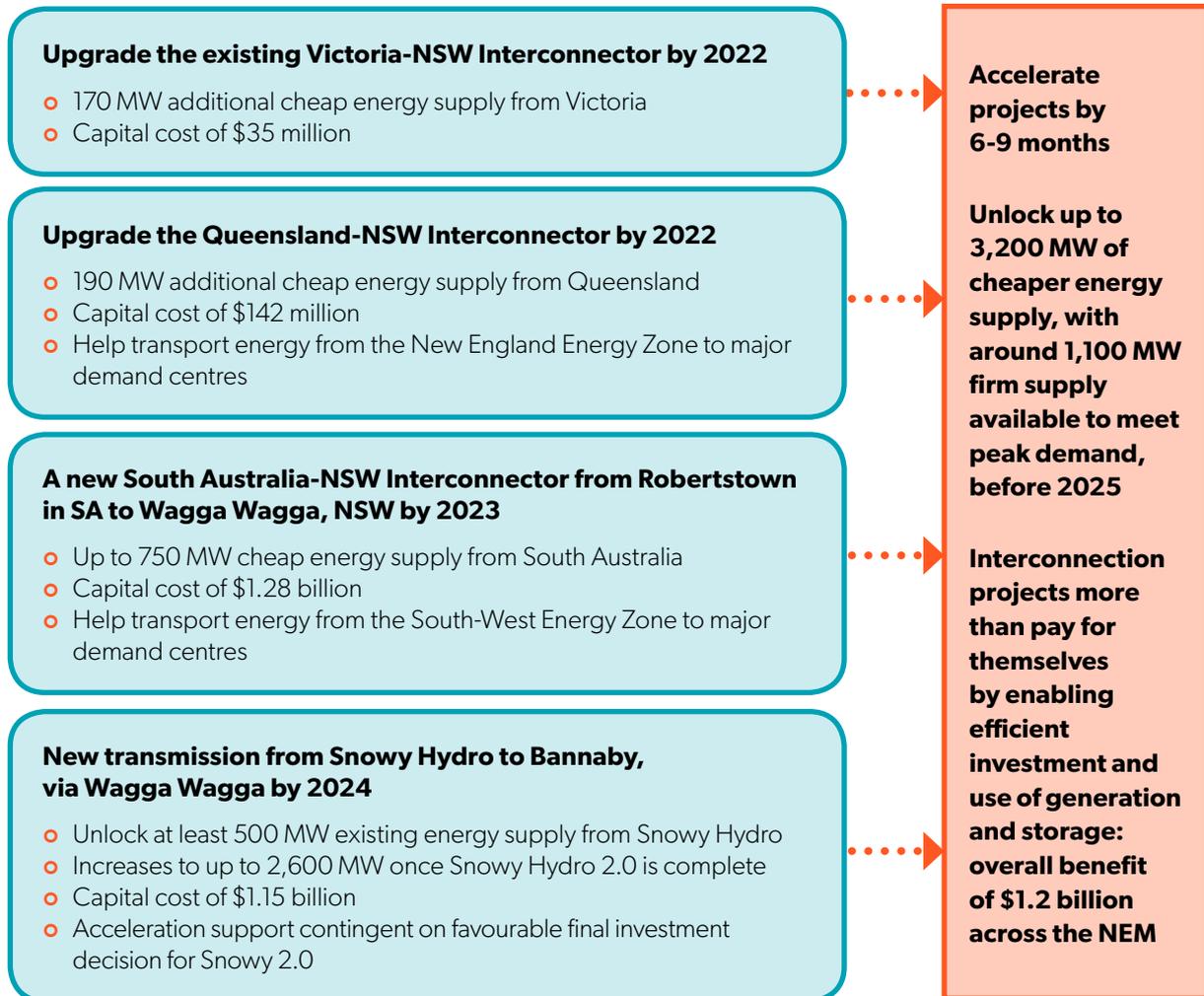


Figure 1: The NSW Transmission network. The NSW Government's Transmission Infrastructure Strategy will focus on prioritising Energy Zones, while bringing forward large-scale shared network upgrades.

1. Boosting NSW connectivity to access existing energy supply

The NSW Government will accelerate the development of four priority transmission projects to access existing cheap energy supply in other states and from the Snowy region:



The Australian Energy Market Operator (AEMO), in its July 2018 Integrated System Plan (ISP) identified that greater connection between states could deliver a net benefit across the National Electricity Market (NEM) of \$1.2 billion. This would be higher still if benefits such as greater competition, increased resilience, and a more flexible and adaptable system were included.

Interconnectors are large-scale transmission connections – high voltage poles and wires – with other states, that allow the cheapest energy to be sold and sent to where it is needed. This helps drive down retail bills for the average NSW household.

The four priority transmission projects identified by the NSW Government can be accelerated to meet energy needs prior to the retirement of our existing coal-fired power stations.



***\$1.2 billion
net benefit***

***from greater
interconnection***



These projects align closely with those identified in AEMO's ISP and were identified as the least-cost options to ensure ongoing energy security in NSW.

The NSW Government will provide a funding guarantee that will allow TransGrid to bring forward important preliminary planning work, including best placement of line routes, geo-technical studies and environmental, heritage and biodiversity assessments for the four priority transmission infrastructure projects. This will:

1. improve cost estimates used in regulatory approvals and reduce cost impacts on consumers, and
2. bring forward the final delivery of priority projects by up to nine months.

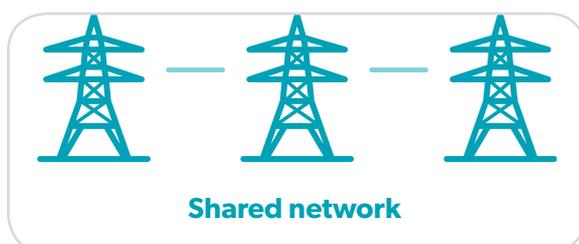


Figure 2: Interconnectors and large-scale transmission projects that transport energy long-distances between energy generation and population centres are part of the 'shared network'. In NSW, TransGrid manages and operates the shared network, and is responsible for maintaining security and reliability.

Enhancing our existing connections with Queensland and Victoria, and facilitating a new interconnection with South Australia, can deliver substantial economic, affordability and energy security benefits to energy users across the state. This is because these interconnectors can give NSW more flexibility to source cheap energy from other states when it is needed, such as on extremely hot summer days when demand for energy reaches its peak, and make us more resilient, by improving the reliability and stability of the network.

Also, new transmission network infrastructure around the Snowy Hydro Scheme will allow at least 500 MW of existing Snowy Hydro generation to supply Sydney during peak periods. This removes a constraint that currently prevents NSW's major population centres from accessing this established energy supply.

In relation to Snowy Hydro transmission, the funding guarantee is contingent on Snowy 2.0 proceeding.

2. Unlocking cheap energy resources and regional development in NSW Energy Zones

The NSW Government will also prioritise the three Energy Zones in the state's New England, Central-West and South-West regions. These three Energy Zones are areas with high energy potential where planned transmission infrastructure upgrades are able to connect multiple projects at lower cost.

Strategic infrastructure upgrades to unlock these priority Energy Zones will leverage massive private sector investment opportunities, boosting regional economies and building the state's resilience by ensuring there are enough new energy projects coming online to replace the retiring traditional power stations expected over the next two decades.

AEMO forecasts these Energy Zones will provide the bulk of the state's future energy supply, with up to 17,700 MW of new generation projects expected to come online. This could support an average of up to 2,000 construction jobs each year and inject up to \$23 billion in investment into regional NSW.

New regional infrastructure could support up to 17,700 MW of new energy projects, \$23 billion in regional investment and an average of 2,000 construction jobs each year.

The NSW Government is starting early to make sure this new energy is available when and where it is needed.

Up until now, new energy projects have typically been built alongside the existing network, but as the transmission network reaches capacity, Energy Zones will require large-scale transmission line extensions out into new regions of the state. This presents a coordination problem, as new energy projects typically will not invest unless they are sure there will be enough transmission capacity for them to sell their energy, while transmission companies will not invest in building new infrastructure unless they are assured there will be enough new generators willing to connect.

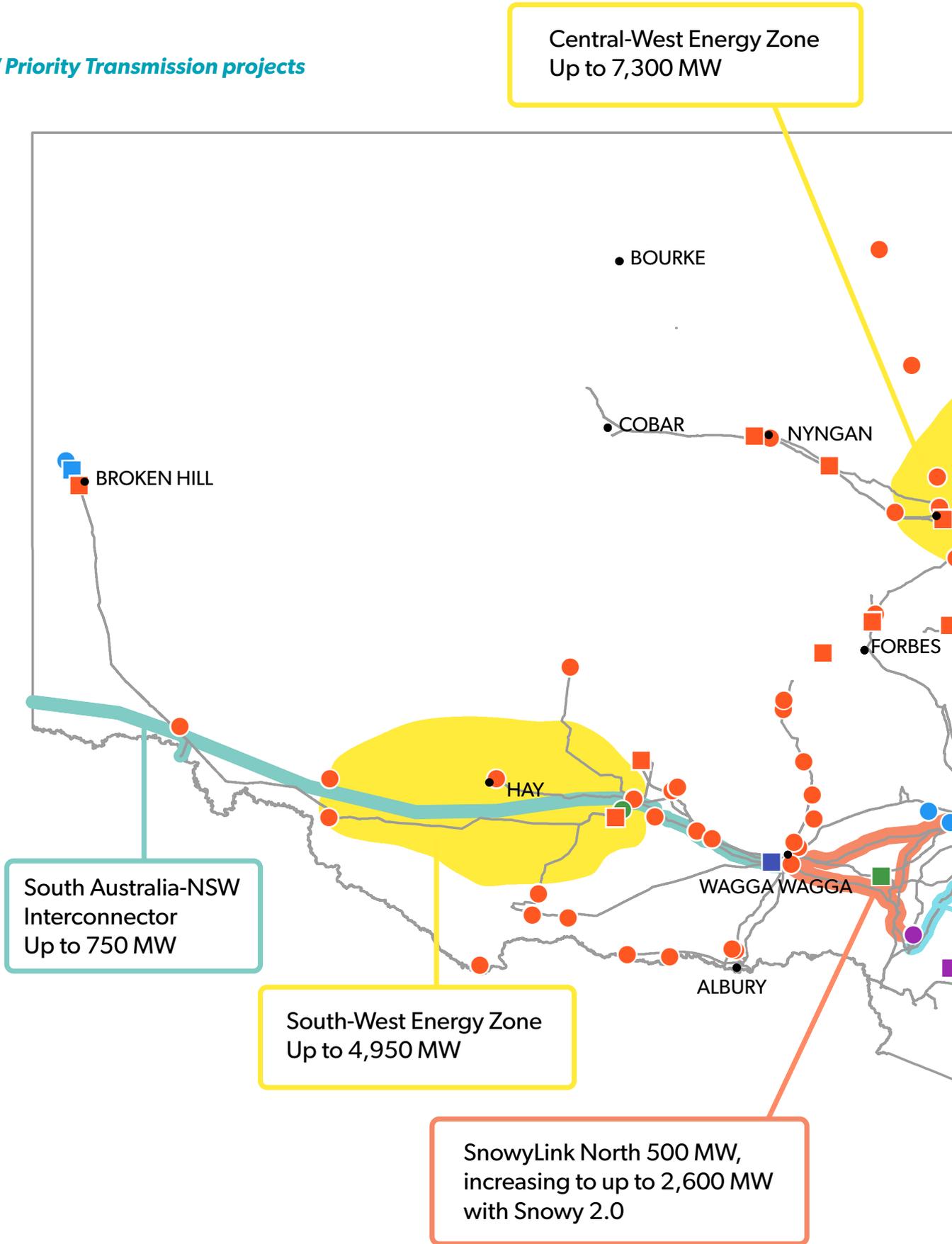
This challenge is compounded by the fact that transmission takes much longer to develop than energy generation. The NSW Government understands these challenges and will ensure that the State's planning and licensing frameworks, along with the NEM, support efficient and timely investment in Energy Zones. Future consideration will be given to undertaking early planning and technical design studies to further facilitate transmission investment to connect new projects in Energy Zones.

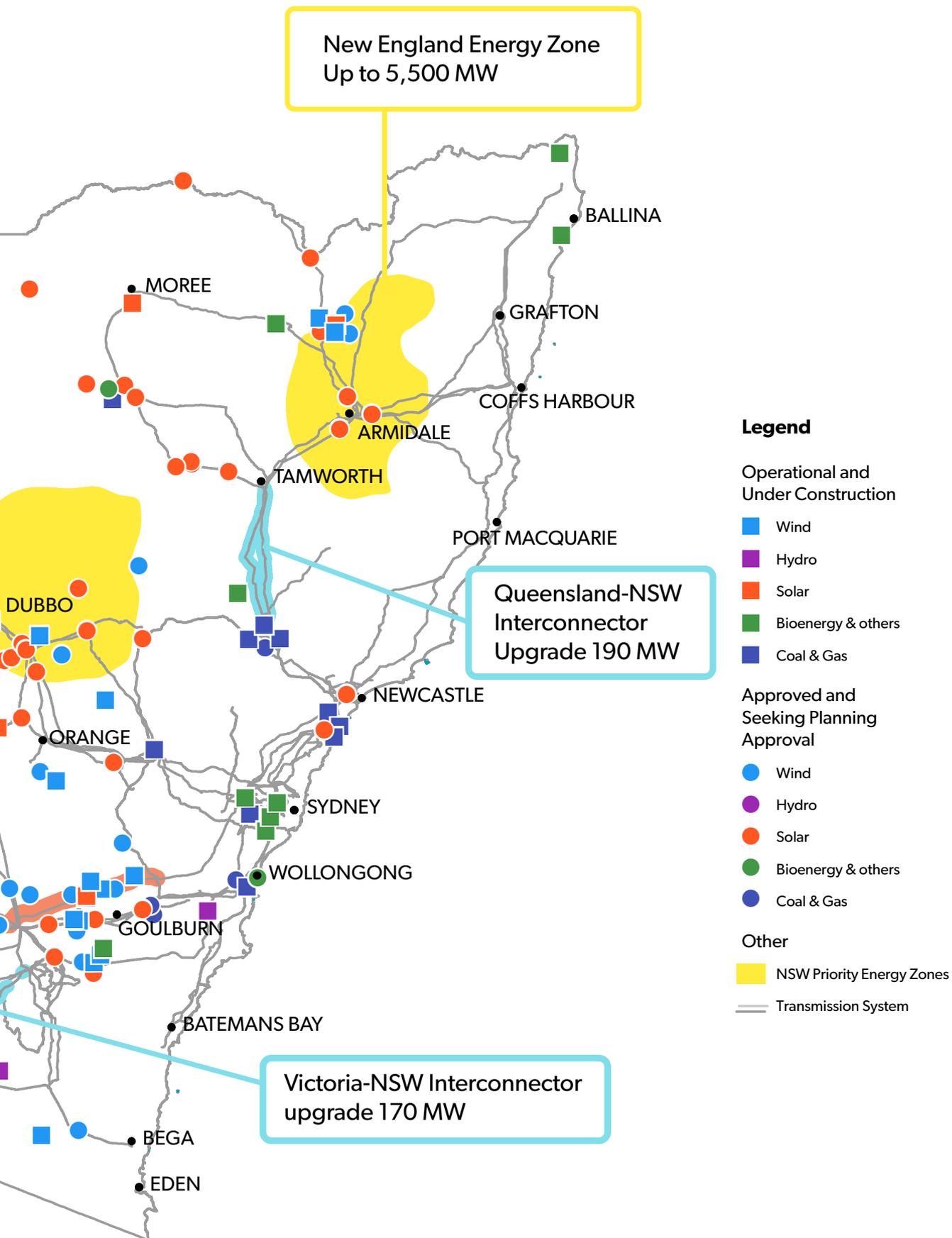
Unlocking the NSW Energy Zones will diversify the state's energy mix and expand our transmission capabilities, opening new parts of the NEM for energy generation in locations that can benefit from diverse weather patterns.



Figure 3: Energy Zones: areas of high energy resource potential where strategic transmission infrastructure upgrades can connect multiple projects at lower cost.

NSW Priority Transmission projects





3. Reducing barriers to investment

The guidelines for the Regulatory Investment Test application process were originally designed to facilitate incremental transmission upgrades, and were not intended for the scale of transmission projects currently required in jurisdictions such as NSW.

For regulated transmission infrastructure, there are separate planning and economic approvals required. This can be a key barrier to timely and efficient new generation and storage being able to connect to the network.

The current transmission development process can take six to seven years.

The time taken to complete the Regulatory Investment Test for Transmission (RIT-T) process can contribute to challenges in coordinating new transmission and generation, an issue which NSW has raised with the Council of Australian Governments (COAG) Energy Council and which is being investigated by the Australian Energy Market Commission (AEMC) and the Energy Security Board (ESB).

NSW will continue to take a leadership role through the COAG Energy Council on this issue to ensure existing processes remain fit-for-purpose as we transition to a modern energy system. We are also ensuring that NSW processes are efficient so that unnecessary time is not added to the approval process.



Two years for the RIT-T process

to ensure the project is justified, followed by regulatory approval as a contingent project by the AER.

Two years for planning development

and environmental approvals for transmission corridors and associated infrastructure, along with engineering and design.

Two years for construction

A period of testing

under a range of conditions before full capacity can be relied upon.

Existing transmission development process. The NSW Government will continue to take a leadership role at the COAG Energy Council to ensure this process remains fit-for-purpose.



NSW

Looking to the future

The Department of Planning and Environment is working with industry experts and energy stakeholders to accelerate the development of new interconnector projects, priority Energy Zones and those actions that have the greatest potential to improve cost-effective, private sector-led delivery of a reliable, secure energy supply for NSW households and businesses.

This Strategy is not only good for NSW but also supports the needs of the NEM. We look forward to working with our state partners, regulators, the private sector and communities to support its implementation.

The NSW Government is taking a flexible, responsive and innovative policy approach to the challenges of the energy transition. With this Transmission Infrastructure Strategy as a starting point, our vision is firmly set to the future.

To stay up to date on our progress you can go to
energy.nsw.gov.au





 planning.nsw.gov.au

