



ROADMAP FOR THE ENERGY TRANSITION

AEMO's 2024 Integrated System Plan

This document provides an overview of the 2024 Integrated System Plan, which is a roadmap for the transition of the National Electricity Market (NEM) to meet future energy needs and enable a net zero economy by 2050.

About AEMO

As Australia's independent system and market operator and system planner, the Australian Energy Market Operator's (AEMO's) purpose is to ensure secure, reliable, and affordable energy and enable the energy transition for the benefit of all Australians.

We do this by operating the electricity and gas systems and markets of today and planning the energy system of the future.

This includes the NEM, an interconnected power system that delivers electricity to around 23 million energy users across Queensland, New South Wales, Australian Capital Territory, Victoria, South Australia, and Tasmania.

For more information: www.aemo.com.au

About the ISP



Australia's National Electricity Rules require AEMO to produce a plan every two years for essential infrastructure that will meet future energy needs, known as the Integrated System Plan (ISP).



Developed in extensive consultation with consumer and community representatives, policy makers, regulators, industry bodies and other groups, it is informed by a broad variety of technical expertise, voices and views.

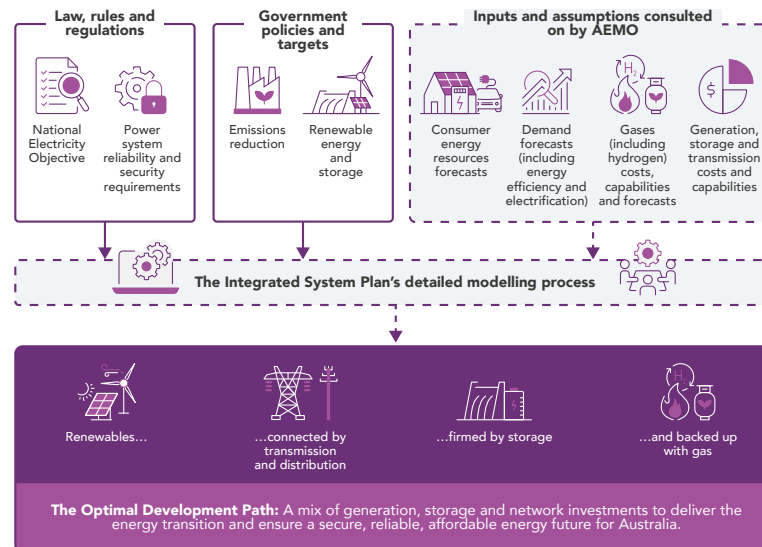


The ISP's optimal development path (ODP) sets out the needed generation, storage and network investments in the NEM to transition to net zero by 2050 through current policy settings and deliver significant net market benefits for consumers. This information supports governments and industry to plan and invest in infrastructure to meet current and future energy needs.



The ISP is designed to be responsive to economic, technical and policy changes, to ensure Australian homes and businesses continue to have access to reliable electricity at the lowest possible cost. The ISP does not model nuclear power as it is not permitted by Australia's current laws and rules.

The ISP at a glance



KEY Standards and policies | AEMO consultative process

Key takeaways from the 2024 ISP

- With coal-fired generation retiring, the 2024 ISP confirms that renewable energy, connected by transmission and distribution, firmed with storage and backed up by gas-powered generation, is the lowest-cost way to supply electricity to homes and businesses as Australia transitions to a net zero economy.
- The Optimal Development Path, which is the lowest-cost path to meet Federal and state government energy policies on emissions reductions, has an annualised capital cost of \$122 billion to 2050.
- The 2024 ISP includes updates to transmission projects from the 2022 ISP. Seven additional transmission projects have progressed to 'actionable' status since the 2022 ISP, allowing more coordinated and effective community consultation to commence earlier.
- Investment in transmission projects identified in the 2024 ISP will reduce costs for consumers. The transmission projects are expected to recoup their \$16 billion investment costs, save consumers a further \$18.5 billion in avoided costs, and deliver emissions reductions valued at \$3.3 billion.
- Many households and businesses are taking steps to shape their own energy futures by investing in solar, batteries and electric vehicles. If consumer batteries are coordinated effectively, they have the potential to help lower costs for all consumers by offsetting the need for an additional \$4.1 billion of grid-scale investment.



For more information

The 2024 ISP is [available online](#).

You can also find details on relevant consultation forums, presentations and webinars on [AEMO's website](#).

The energy transition is well underway

Australia's coal-fired generators are retiring. The shift to renewables is well underway, with renewables accounting for almost 40% of the total electricity delivered through the NEM in 2023.

All governments are supporting the transition to a net-zero economy, and work is underway by industry and governments to develop the new infrastructure required to transition the NEM power system.

The 2024 ISP confirms that renewable energy, connected by transmission and distribution, firmed with storage and backed up by gas-powered generation, is the lowest-cost way to supply electricity to homes and businesses as Australia transitions to a net-zero economy. The ISP's Optimal Development Path through the NEM's transition to a net-zero future has an annualised capital cost of \$122 billion to 2050.

Urgent new investment is required in renewable energy generation, transmission, and storage so that Australian homes and businesses can continue to receive a secure, reliable and affordable supply of electricity. Around 10,000 km of new transmission projects by 2050 will be required to connect new generation across the power system.

These transmission projects would reduce costs for consumers by delivering benefits that would recoup their \$16 billion investment costs, save consumers a further \$18.5 billion in avoided costs, and deliver emissions reductions valued at \$3.3 billion.

'Consumer energy resources' such as rooftop solar, batteries, electric vehicles will play a valuable role in the energy transition.

As the energy transition brings both opportunities and challenges, continuing to listen and responding to the voices, needs and concerns of consumers and local communities will be essential.

What this means for consumers

As Australia's power system transforms, the way that Australians think about, use and experience energy will transform too.

Contributing to energy reliability and lower emissions



Many households and businesses are already taking steps to shape their own energy futures by adopting innovative ways to reduce and manage their demand, practicing energy efficiency, and investing in consumer energy resources. As a growing and valuable part of our future energy system, these resources will provide more agency for consumers.



If consumer energy resources are coordinated effectively, they have the potential to support individual households and the power system while lowering costs for all consumers. AEMO's 2024 ISP forecasts that coordination of consumer batteries can offset the need for an additional \$4.1 billion in grid-scale storage investment, as well as help deliver more reliable and secure energy and contribute to lower emissions.

Supporting new infrastructure



As coal-fired generation continues to retire, the structure of our power system needs to change. For people in rural and regional areas being asked to host new infrastructure, this change can present challenges and uncertainty around what this means for their sense of place, culture and biodiversity, ways of living, livelihoods and more.



At the same time, and if managed well, these projects can offer new opportunities for regional development, economic diversification, local business and capacity building, employment and more. Delivering on these activities will require project developers to foster ongoing trust and acceptance through transparent and consistent engagement, address key community concerns, and ensure benefits are shared across communities.

Keeping costs as low as possible



AEMO understands that costs of living, including electricity prices, are a key concern for many families and businesses. In preparing the ISP, AEMO identifies the lowest-cost way to meet consumers' energy needs for secure, reliable and affordable energy as Australia transitions to a net-zero economy.



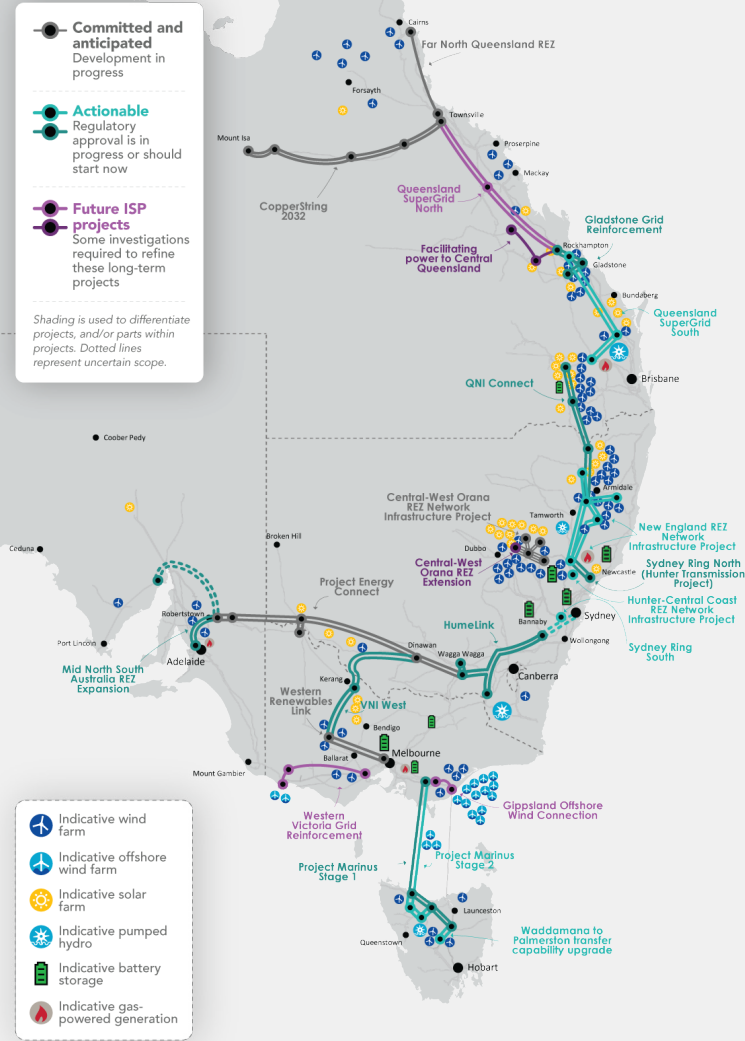
2024 Integrated System Plan (ISP)

AEMO has published the 2024 ISP, a roadmap for the transition of the National Electricity Market (NEM) to meet future energy needs and enable a net zero economy by 2050.

At a high level, the ISP presents the 'optimal development path' (ODP), which is the lowest-cost path to the NEM's energy future of net zero by 2050. The ODP sets out new grid-scale generation, firming, storage and transmission needed in the NEM, and has an annualised capital cost of \$122 billion to 2050.

Western Australia and the Northern Territory are not part of the NEM, and have their own independent power systems.

Network projects in the optimal development path



Consultation

AEMO's 2024 ISP takes into account feedback from a wide range of different groups and sources, including workshops, webinars, public forums, other engagements and submissions.



Inputs to the ISP include:

- Government policies on renewable energy and storage
- Emissions reduction policies and targets
- Requirements of the National Electricity Objective and Rules
- Demand forecasts
- Technology capabilities and costs
- Reliability and security needs
- Relevant sector forecasts (gas, hydrogen)
- Consumer energy resources

Net benefits

The ODP is the lowest-cost path through the NEM's transition to a net zero future.

It calls for around 10,000 km of new transmission projects by 2050 to connect new generation across the power system. These transmission projects would reduce costs for consumers by delivering benefits that would recoup their \$16 billion investment costs, save consumers a further \$18.5 billion in avoided costs, and deliver emissions reductions valued at \$3.3 billion.

Actionable projects

Seven transmission projects have been progressed since the 2022 ISP to 'actionable' status, allowing more coordinated and effective community consultation to commence earlier.

Work for both new and previously actionable projects should progress to deliver these projects to schedule.

- Hunter-Central Coast Renewable Energy Zone (REZ) Network Infrastructure project
- Sydney Ring South
- Gladstone Grid Reinforcement
- Mid North South Australia REZ Expansion
- Waddamana to Palmerston Transfer Capability Upgrade
- Queensland SuperGrid South
- Queensland-New South Wales Interconnector Connect (QNI Connect).

Key facts and figures ('Step Change' scenario)

