

## Introduction

Powerlink Queensland owns, develops, operates and maintains Queensland's high voltage electricity transmission network. The network extends from Cairns to the New South Wales (NSW) border and comprises 15,559 circuit kilometres (km) of lines and 154 substations, and provides electricity to more than five million Queenslanders and 241,000 businesses.

Powerlink connects large generators to end-use customers through the distribution networks owned by Energex and Ergon Energy (part of the Energy Queensland Group), and Essential Energy (in northern NSW), and provides electricity directly to large industrial customers such as rail companies, mines and mineral processing facilities.

## About the Transmission Annual Planning Report

Powerlink undertakes an annual planning review in accordance with the requirements of the National Electricity Rules (NER) and publishes the findings of this review in the Transmission Annual Planning Report (TAPR) and associated templates available in the [TAPR Portal](#).

Powerlink's TAPR remains central to our role in guiding the market in Queensland, providing customers, communities and other stakeholders with an overview of Powerlink's planning processes and decision making on future investment.

## Focusing on delivering benefits to Queenslanders through timely network investments

Powerlink's approach to long-term network planning continues to:

- ensure investment decisions deliver positive outcomes for customers
- focus on developing options that deliver safe, reliable and cost-effective transmission services
- undertake community, customer and stakeholder engagement to inform our decision making and planning for transmission and related developments
- emphasise an integrated, flexible and holistic analysis of future investment needs
- support diverse generation connections and technologies
- adapt to changes in customer behaviour and the economic outlook
- ensure compliance with legislation, regulations and operating standards.

## Network connections

Interest in new transmission network connections in Queensland continues to grow. Since 2017, Powerlink has completed the connection of 34 large-scale solar, wind farm and Battery Energy Storage System (BESS) projects in Queensland, adding 6,736 megawatts (MW) of generation capacity to the grid. A significant number of formal connection applications, totalling 42,368MW of new generation and storage capacity, have been received and are at varying stages of progress.

Storage is essential to smooth out variations in supply from variable renewable energy (VRE) generation. Prior to 2022, Wivenhoe Pumped Storage Hydro Power Station was the only transmission-connected energy storage in Queensland. Since then, seven grid-connected batteries have come online or are in commissioning. The Puncchs Creek Solar Farm in southern Queensland recently became the first committed solar generation project to incorporate battery storage to connect to the Powerlink network.

## Engaging with customers and communities

Powerlink is committed to effective engagement with customers, communities, First Nations Peoples and other stakeholders to share information on activities and use feedback to improve decision making.

Transmission infrastructure typically stays in-service for over 50 years and Powerlink acknowledges the potential impacts long-life assets may bring to those who live and work near our infrastructure. Powerlink is focused on building positive relationships and partnering with local communities to deliver benefits for the longer term. First developed in 2021, the Community Engagement Approach was refreshed in 2025 to continue driving best-practice engagement and generating lasting benefits for communities.

Powerlink hosts a Customer Panel that provides an interactive forum for stakeholders and customers to give input and feedback to Powerlink regarding decision making, processes and methodologies. The panel comprises members from a range of sectors including industry associations, community advocacy groups, directly connected customers and distribution representatives. It also provides an important channel for Powerlink to keep stakeholders informed about operational and strategic topics of relevance and, most importantly, provides an avenue for their insights on particular activities. The panel met in September 2024, and in April and July 2025, to consider key topics of interest. Members of the Customer Panel also offered their time to be part of Powerlink's new Revenue Proposal Reference Group, as well as an expert panel on the Gladstone Project Priority Transmission Investment (PTI).

## Energy and demand projections

Based on Powerlink's Central scenario forecast of future load, Queensland's:

- transmission delivered maximum demand is expected to have steady growth with an average annual increase of 2.2% per annum over the next 10 years, mainly due to industries beginning to electrify their operations and new anticipated loads
- transmission delivered minimum demand is expected to steadily decrease with an average annual decrease of 6.3% per annum over the next 10 years, mainly due to the continued installation of residential rooftop solar photovoltaic (PV) systems.

Compared to last year's TAPR, Powerlink forecasts a slower decline in minimum demand across the 10-year outlook period due to:

- the rising adoption of residential batteries introducing new charging loads during traditionally low-demand periods
- a more moderate projection of rooftop solar PV uptake and the decommissioning of old rooftop solar systems.

The adoption of rooftop solar PV and distribution-connected solar PV non-scheduled systems continues to reduce daytime electricity demand across the transmission network. Queensland set a new record for minimum transmission delivered demand of 2,240MW, at 11:30am on Sunday, 31 August 2025. Mild weather conditions, on a weekend, and strong contribution from rooftop solar PV contributed to this new record, which was 298MW lower than the previous record minimum set in October 2024.

Queensland also set a new maximum transmission delivered demand of 9,974MW at 6:00pm on Wednesday, 22 January 2025. This maximum demand was 545MW greater than the previous record set in January 2024.

Powerlink has not included specific data centre projects into the Central scenario demand forecast for Queensland at this time. Powerlink will continue to monitor developments and adjust future forecasts accordingly. Powerlink's forecast for electric vehicle uptake remains largely consistent with the 2024 TAPR values. Last year's projection estimated around 59,000 electric vehicles, while registrations as of January 2025 reached approximately 63,000. The future charging behaviour of electric vehicle owners is a key source of forecasting uncertainty. If charging is unmanaged, owners might charge during peak evening hours and add strain to the grid, whereas smart charging via time-of-use tariffs will move charging away from evening peaks.

## System security services

Queensland's power system has historically comprised of synchronous generation such as coal-fired power stations, gas turbines and hydro-electric plants. These large generators inherently provide various system security services, such as voltage regulation, inertia and system strength. The increased contribution of inverter-based generation sources, particularly solar and wind, can reduce the availability of system security services, prompting the need for new approaches to the planning and delivery of these services in the National Electricity Market (NEM).

The Australian Energy Market Operator (AEMO) has responsibility for the forecasting of power system security services. AEMO's annual system security reports assess the need for services across all regions of the NEM, and evaluate requirements for system strength, inertia and Network Support and Control Ancillary Services (NSCAS). Powerlink is required to procure services to meet the needs in its capacity as System Strength Service Provider, Inertia Service Provider, and Transmission Network Service Provider respectively.

Powerlink recognises that uncertainties in investing in system security services cannot be resolved through analysis alone, as they depend on factors that are either confidential to market participants or subject to future conditions that are inherently uncertain and evolving.

Powerlink's strategy to meet our responsibilities to plan for and make system security services available includes:

- pursuing a complementary mix of different technologies to address requirements
- timing the investment in solutions to anticipate withdrawal of generation, while preserving flexibility to invest in and procure further solutions over time
- working with the Queensland Government and Energy Queensland to explore ways to enhance Queensland's operational tools to maintain system security during periods of low operational demand.

Powerlink completed a Regulatory Investment Test for Transmission (RIT-T) in June 2025 to address system strength requirements for the short to medium term. Procurement of both network and non-network solutions to meet these needs has commenced. Powerlink has also entered into a System Strength Services Agreement with the owner of the Townsville Power Station in Northern Queensland to enable modifications to allow the facility to operate in synchronous condenser mode and provide system strength services.

## Future network investments

Powerlink's regulated capital expenditure program of work will continue to focus on risks arising from the condition and performance of existing aged assets, as well as emerging limitations in the capability of the network.

In addition to the RIT-T for system strength, Powerlink has completed or commenced consultation processes for regulated network investment since the 2024 TAPR, including:

- issuing a joint Project Specification Consultation Report (PSCR) with Ergon Energy to address network needs in the Kamerunga, Cairns and northern beaches area
- releasing PSCRs to address the risk of premature current transformer failures in Queensland, and to maintain reliability of supply and address condition risks at Ingham South
- finalising a RIT-T to maintain reliability of supply to our Mansfield site.

Powerlink also completed an assessment, through the PTI framework, for the Gladstone Project, which aims to provide sufficient power transfer capability to reliably supply the forecast electrical load in the Gladstone area, in anticipation of the potential retirement of Gladstone Power Station and to support the initial electrification of major industries in the Gladstone area. Powerlink continues to work closely with the Queensland Government on the next phase of the project, noting their recent Energy Roadmap recognised the project as a critical transmission project for the 2025 to 2030 period.

Powerlink is also actively engaging with AEMO on the draft 2026 Integrated System Plan, due for release in December 2025.

Local and global demand for resources essential for transmission projects continues to put upward pressure on costs and extend equipment delivery timeframes. To mitigate these pressures, Powerlink has:

- developed alternative supply options for critical equipment such as 275 kilovolt (kV) circuit breakers
- implemented alternative strategies to transmission line refits works to capture scale
- continued to refine transmission augmentations to drive value for customers.

Powerlink will continue to implement changes to the timing, scope and bundling of proposed line refit works, to maximise the potential for more cost-effective solutions as recommended in the Asset Reinvestment Review, concluded in June 2023.

Powerlink is continuing with the development and roll out of the Wide Area Monitoring Protection and Control (WAMPAC) platform to maximise the capability of the network and provide an additional layer of security and resilience to system disturbances and events. WAMPAC has been implemented for system protection services across the Central Queensland to South Queensland grid section to increase the resilience and security of the network under non-credible contingencies, and will soon be in-service to manage the impacts of outages on system strength in Far North and North Queensland.

Powerlink anticipates initiating a number of RIT-T consultations in the coming year. Proponents of non-network solutions are strongly encouraged to engage in our RIT-T processes to support the selection of prudent and efficient solutions to meet emerging needs. Powerlink is committed to genuine engagement with providers of non-network solutions and the implementation of these solutions where technically feasible and economic to:

- address inertia, system strength and NSCAS requirements
- address future network limitations or address the risks arising from ageing assets remaining in-service within the transmission network
- complement network developments as part of an integrated solution to deliver an overall network strategy
- provide demand management and load balancing.

### Network performance

Network capability and performance is central to ensuring the reliability and efficiency of the energy system, and for integrating new generation into the grid. Powerlink's transmission network performed strongly in 2024/25. Record maximum and minimum transmission delivered demand was recorded for the South West, Moreton, Bulli and Gold Coast zones. The Far North zone also became a net exporter of energy for the first time in 2024/25 due to continued increases in generation.

### Strategic projects

Powerlink's approach to investment planning and timing is driven on a principle of prudent investment and innovation to prepare Queensland's network for the opportunities and challenges ahead. This approach enables timely responses to market signals, supports generation growth and integrates a mix of firming assets such as batteries, gas powered generation and longer duration solutions like Pumped Hydro Energy Storage (PHES).

In line with the Energy Roadmap, Powerlink is implementing a staged development model that is prudent and efficient, providing flexibility to accommodate future load growth and generation patterns. This approach focuses on:

- targeted 275kV augmentations and asset rebuilds to relieve congestion and better utilise existing infrastructure
- rebuilding ageing assets with higher capacity solutions to provide flexibility for future load growth and generation patterns
- applying staged development principles to respond efficiently to market signals and integrate firming technologies such as PHES.

Powerlink is aware of several proposals for large mining, metal processing, and other industrial loads, including the electrification of existing operations. While these developments have not progressed sufficiently to be included in Powerlink's Central scenario forecast of future load, they collectively represent approximately 2,982MW across Northern, Central and Southern Queensland and may trigger network investment to maintain reliability of supply.

Powerlink is committed to early and meaningful engagement, and continues to enhance processes for ensuring appropriate community and landholder participation in corridor selection and easement acquisition processes. Over the coming months, Powerlink will continue to shape and refine its approach to identifying priority easement activities that are needed to support the timely and socially responsible delivery of future transmission projects.