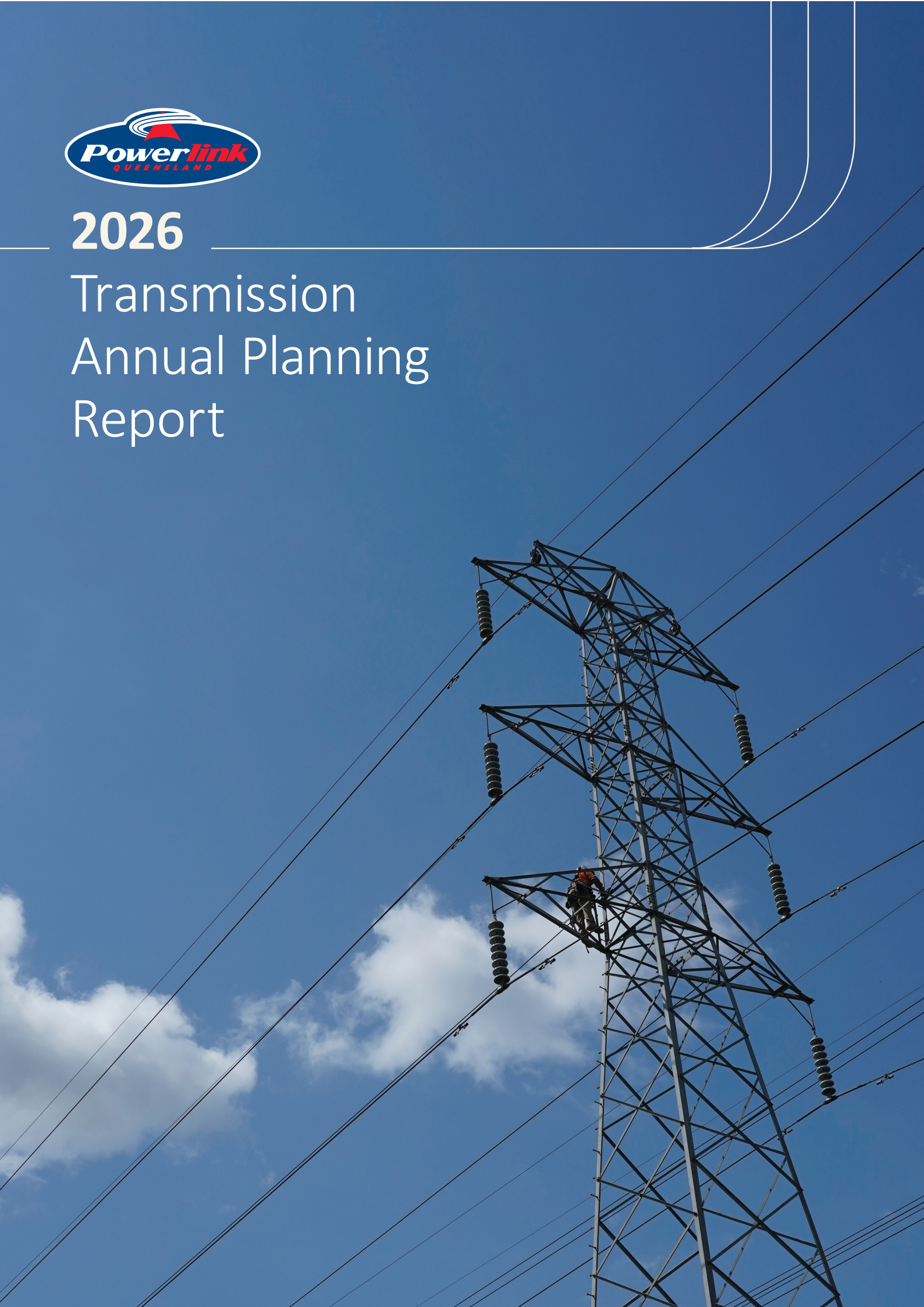
2026 Transmission Annual Planning Report





Acknowledgement of Country

Powerlink acknowledges the Traditional Owners and their custodianship of the lands and waters of Queensland and in particular, the lands on which we operate. We pay our respect to their Ancestors, Elders and knowledge holders and recognise their deep history and ongoing connection to Country.

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Foreword

Network planning has never been as complex and important as it is now. The widening of the gap between minimum and maximum demand, changes in the mix of energy generation and the delivery of system security services are just some of the challenges Powerlink continues to address as the energy system evolves.

Our Transmission Annual Planning Report (TAPR) connects the technical complexities of planning to the changing energy landscape, and is central to our commitment to provide safe, reliable and cost-effective electricity services to our customers. This year's TAPR outlines how we are updating our investment planning to enable the Queensland Energy Roadmap and our Revenue Proposal for the 2027-32 period, to align to the Australian Energy Market Operator's (AEMO) 2026 Integrated System Plan (ISP), and to deliver important programs of work.

Energy and Demand

Powerlink's 2026 forecasts continue to show a long-term increase in both electricity consumption and network demand, reflecting Queensland's growing economy and the continued electrification of homes, businesses and industry. These forecasts form an important foundation for Powerlink's forward planning and investment assessments and are used throughout the TAPR to evaluate future network performance, emerging challenges and potential development pathways for the transmission network.

Central Queensland

Central Queensland is essential to Queensland's energy and economic future, and the Gladstone Project will strengthen the region's electricity network ahead of the potential closure of the Gladstone Power Station in March 2029. The Gladstone Project has been declared a Priority Transmission Investment (PTI), as notified in the Queensland Government Gazette in August 2026. Following this declaration, Powerlink was issued PTI directions, facilitating the project's construction. Comprising two stages of work, Stage 1, construction of a new 275 kilovolt (kV) line from Calvale to Calliope River, is to be completed by March 2029. Stage 2 includes establishing a new Gladstone West Substation by June 2029 and construction of a new 275kV line from Bouldercombe to Gladstone West by August 2030.

We are also replacing the system security services provided by the Gladstone Power Station. In March we signed an agreement with Hitachi Energy to supply and install four synchronous condensers in Central Queensland by 2029 to provide system strength and maintain power system stability and inertia.

Actionable ISP projects

The 2026 ISP included two new actionable ISP projects for Queensland; Central to North Queensland Reinforcement (Stage 1), and Brisbane Area 275kV Reinforcement. These projects aim to increase transmission network capability and enable new generation to connect to the network. Project Assessment Draft Reports for both needs are due in June 2028, and we are assessing the costs and benefits of options to deliver projects to maximise value for customers.

Engagement

Powerlink is committed to effective early engagement with customers, communities, First Nations Peoples and other stakeholders to share information and use feedback received to improve decision-making. Maintaining and building social licence, and giving regional communities who host transmission infrastructure a voice, is fundamental to delivering safe, reliable and cost-effective electricity. More than 500 stakeholders attended Powerlink's annual Transmission Network Forum in November 2025, and over 200 people attended our second regional Transmission Network Forum in Gladstone in August 2026. These forums provide valuable opportunities for Powerlink to exchange insights with industry, government and community stakeholders to improve our planning of the network.

By strengthening and increasing the capacity of our transmission network, Powerlink is ensuring a resilient supply of electricity to deliver wider economic benefits, meet future industrial energy needs and attract new businesses to Queensland.

Powerlink is actively working with customers and stakeholders in response to new planning laws, introduced by the Crisafulli Government in 2025. The new requirements make solar and wind farms impact assessable, create a stronger role and decision-making for local government in the assessment process and strengthen social licence across renewable energy developments, ensuring communities affected by projects have a meaningful say.

TAPR Enhancements

Powerlink has made several enhancements to the TAPR Portal to improve the user experience and general navigation. Historical feeder flow data has been added to the portal, allowing the market to conduct more informed preliminary self-assessments of project concepts and potential network connections. Our future network investment opportunities are also visualised in region-based maps as a summary snapshot of key projects in the region.

Network connections

Powerlink has completed connection of 41 new generation and battery energy storage system (BESS) projects in Queensland, adding 9,242 megawatts (MW) of generation and storage capacity to the grid since 2017. A further 45,630MW of connection enquiries and applications for new generation and storage capacity have been received and are at varying stages of progress. We have also seen a significant increase in interest over the last six months to connect data centres to the Powerlink network.

Managing this scale of demand requires careful planning, streamlined processes, and ongoing engagement with proponents to ensure timely, cost-effective delivery of new connections that meet customer and market needs.

We are committed to transparent and efficient connection services and continue to work collaboratively with market participants and interested parties to better understand the potential for new generation and load connections. In July 2026, a Connections Guarantee was introduced for Powerlink, which focuses on our connection application performance for large-scale generation, storage and loads. The Connections Guarantee will enable greater transparency of the work Powerlink is doing to help customers connecting, or wanting to connect, to our network.

In addition to completing new connection assets, Powerlink supported 26 projects to reach a new or altered Generator Performance Standard agreement with AEMO in the last 12 months.

Looking Ahead

Powerlink's approach to asset management, 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.

We remain focused on building a resilient, future-ready transmission network that supports Queensland's energy future and delivers lasting value for our customers, communities and the state.

Dr Stewart Bell
Executive General Manager
Operations and Planning Division
Powerlink Queensland

Jacqueline Bridge
Executive General Manager
Network Investment Division
Powerlink Queensland

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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 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 and to NSW via interconnectors.

About the Transmission Annual Planning Report

Powerlink undertakes an annual planning review in accordance with 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 conducts an annual TAPR survey to seek insights from market participants and stakeholders about how the quality and presentation of information in the TAPR can be improved. In response to this year's survey, Powerlink has made a number of enhancements to the TAPR document and TAPR Portal, including:

- consolidated visuals and discussion of potential future investments, including strategic projects, by region
- one-page overviews of zone and grid performance on our website
- improved user experience and navigation on the TAPR Portal
- addition of historical feeder flow data in the TAPR Portal
- a new network capability and performance data workbook.

Queensland Energy Roadmap

Powerlink's role as Queensland's Transmission Network Service Provider is central to the implementation of the Queensland Government's Energy Roadmap released in October 2025. The Queensland Energy Roadmap provides clear direction for Powerlink's planning and investment decisions by focusing on the transmission network required to support future generation, energy storage, industrial growth and private sector investment. The Queensland Energy Roadmap is a foundational plan that informs our TAPR, with each of the Powerlink projects outlined in the Roadmap included in our 10-year investment plan.

Network connections

Since 2017, Powerlink has completed connection of 41 new generation and battery energy storage system (BESS) projects in Queensland, adding 9,242 megawatts (MW) of generation and storage capacity to the grid. During the 2025/26 TAPR reporting period, 3,506MW of semi-scheduled generation and storage capacity has been committed in Queensland.

A Connections Guarantee was introduced for Powerlink in July 2026, which focuses on connection application performance for large-scale generation, storage and loads. As Queensland's energy system continues to evolve, new generation, storage and load will need to be connected to ensure a safe, reliable and cost-effective supply of electricity.

As part of the Connections Guarantee, Powerlink will report against four key metrics:

- Response to Connection Enquiry: Powerlink will target 100% achievement for NER connection enquiry timeframes of 40 business days for Designated Network Asset (DNA) connections and 30 business days for non-DNA connections.
- Performance Standard Package Assessment: Powerlink will target a 75% response rate to performance standard packages provided by a proponent within 30 business days.
- Negotiated Access Standards Decision: Powerlink will assess all proposed negotiated access standards for a connection within 30 business days of receiving all required information.
- Connections Delivered On-Time: Powerlink will target a 90% rate for connections delivered on-time as per the executed agreement.

Powerlink will report performance against these targets on an annual basis. More information on the Connections Guarantee is on our website.

Energy and demand projections

Queensland's maximum transmission-delivered demand for 2025/26 was 9,462MW, on Thursday, 12 February 2026. This maximum demand occurred at 6.30pm and was 512MW lower than the record maximum delivered demand set in January 2025.

Powerlink's Central scenario forecasts an average annual increase in transmission-delivered maximum demand of 2.7% per annum over the next 10 years. The Central scenario forecast includes a modest amount of data centre load growth, while the High scenario incorporates a higher outlook on potential data centre developments based on early engagement with proponents. As project certainty increases, data centre load is expected to be progressively incorporated into future forecasts.

To support this emerging sector, Powerlink has prepared guidance (see Appendix B) on network and connection considerations to support prospective developers to make informed decisions during the early stages of project development. The guidance provides practical information on site selection, connection pathways and the technical and planning considerations associated with connecting large-scale data centre loads to Queensland's transmission network. It complements, but does not replace, the connection process prescribed under Chapter 5 of the NER.

Queensland's minimum transmission-delivered demand for 2026 was 2,077MW, on Saturday, 19 September 2026. This minimum demand occurred at 11:30am and was 162MW lower than the previous record minimum delivered demand set in August 2025. The previous decline in transmission-delivered minimum demand is expected to moderate over the next 10 years, with minimum demand forecast to grow at an average annual rate of 2.0%, primarily driven by new data centre consumption, and residential and transmission-connected BESS.

Powerlink's forecast for electric vehicle uptake has been revised upward in 2026 to reflect stronger than expected market growth. The future charging behaviour of electric vehicle owners remains 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 planning

Queensland's power system has historically comprised synchronous generation such as coal-fired power stations, gas turbines and hydro-electric plants. These large generators provide various system security services, such as voltage regulation, inertia and system strength, as an inherent characteristic of their energy dispatch, supporting stable and reliable power system operation.

The increased contribution of inverter-based resources (IBR), particularly solar and wind, can reduce the availability of system security services in the National Electricity Market (NEM), prompting the need for new approaches to the planning and delivery of these services.

Under the NER, Powerlink is the System Strength Service Provider and Inertia Service Provider for Queensland. Our strategy to discharge our responsibilities to plan for and make system security services available includes:

- pursuing a complementary mix of different technologies to address requirements, as outlined in Powerlink's System Strength Regulatory Investment Test for Transmission (RIT-T)
- timely and efficient investment in solutions to anticipate withdrawal of synchronous generation, while preserving flexibility to invest in or procure further solutions (including non-network solutions) over time
- working with the Australian Energy Market Operator (AEMO) and Energy Queensland (as owner of the Energex and Ergon Energy distribution networks) to explore ways to enhance Queensland's operational tools and investigate new technologies to maintain system security during periods of low operational demand.

Powerlink has progressed several activities to meet system strength and inertia requirements since publishing the 2025 TAPR:

- In addition to the existing agreement with Ratch Australia for the provision of system strength services at the Townsville Power Station, in December 2025 we finalised an agreement for system strength services from Pacific Hydro's synchronous condenser located at its Haughton Solar Farm Stage 1 site in Northern Queensland.
- In March 2026, we signed an agreement with Hitachi Energy to supply and install four synchronous condensers to deliver system strength in Central Queensland and maintain voltage stability and inertia. Two of the units will be installed at the Calliope River Substation, with one each at the Nebo and Stanwell substations.
- We will continue to assess the need for and monitor potential network and non-network solutions for future system strength requirements in Southern, Central and Northern Queensland.
- We are progressing studies to examine the technical feasibility and capability of grid-forming BESS to deliver minimum system strength.

Most IBR projects in Queensland are choosing to self-remediate their system strength impact. Powerlink continues to monitor the need for efficient level system strength services, using AEMO's 10-year forecast of IBR connections as a starting point. As indicated in the System Strength RIT-T, Powerlink will engage with industry at the appropriate time should a need to procure efficient level system strength services emerge.

Non-network solutions

Powerlink considers potential network, non-network and operational responses to identified needs, including combinations of these approaches. Where suitable, a non-network option can address all or part of an identified need, make more effective use of existing network capability, or influence the form, scale, timing or staging of network investment.

Through our annual planning review, Powerlink identifies emerging transmission network and power system needs across the 10-year outlook. The TAPR provides early visibility of where non-network capabilities may be relevant, including available information on the location, nature and indicative timing of potential or emerging needs and, where available, indicative service requirements. Supporting information is provided through the TAPR Templates, TAPR Portal and published consultation documents.

The regulatory consultation and assessment pathway for an identified need depends on the nature and timing of the need and the relevant regulatory or legislative framework. Depending on the circumstances, non-network options can be considered through processes including:

- a RIT-T
- an expression of interest or another applicable process for a power system security requirement
- the consultation and assessment arrangements for an actionable Integrated System Plan (ISP) project
- consultation and assessment arrangements applying under Queensland's Priority Transmission Investment (PTI) framework.

The TAPR identifies the indicative service requirement and potential non-network solution for all potential network investments over the 10-year outlook.

To support meaningful early market consideration, the following near-term voltage support and transformer reinvestment or augmentation needs are included in the TAPR:

- maintain voltage levels and transfer capability in North Queensland, refer to Section 6.7.4 (NQ-11)
- maintain power transfer capability and reliability of supply at Tully, refer to Section 6.5.4 (FNQ-03)
- maintain reliability of supply and transfer capability at South Pine, refer to Section 8.9.4 (MZ-06)
- maintain reliability of supply at Goodna, refer to Section 8.9.4 (MZ-03)
- address reliability of supply to the southern Gold Coast and Tweed area, refer to Section 8.10.4 (GCZ-02).

Interested parties can contact NetworkAssessments@powerlink.com.au to:

- discuss whether and how a capability may contribute to a potential or identified need, either as a standalone response, through aggregation or as part of an integrated response
- seek clarification or provide information on published needs, service capabilities, locations and development timeframes
- request inclusion on the Non-network Engagement Stakeholder Register to receive relevant updates, including notifications when RIT-T consultation reports are published.

Network development, programs and consultations

Since the release of last year's TAPR, we have completed or commenced several regulated investment consultation processes, with additional consultations planned over the coming year. Investment planning is also evolving to enable the Queensland Energy Roadmap, support Powerlink's 2027-32 Revenue Proposal, align with AEMO's 2026 ISP and to deliver a range of important programs of work.

The 2026 TAPR does not include any specific augmentations for the Brisbane 2032 Olympics. Powerlink is a member of the Games Energy Council and continues to work closely with the Queensland Government and Energy Queensland in preparation for the Olympics. There may be consequential impacts on the transmission network and Powerlink is engaging with load proponents seeking to connect to the transmission network to enable their connection in a timely manner.

Powerlink submitted our Revenue Proposal to the Australian Energy Regulator (AER) in January 2026. The investment outlook presented in the TAPR reflects the proposed capital expenditure program and Contingent Projects included in the Revenue Proposal and is current as of 31 August 2026. Any changes arising from the AER's Final Determination in April 2027 will be reflected in future planning assessments and subsequent TAPRs.

AEMO's 2026 ISP included two new actionable ISP projects for Queensland; Central to North Queensland Reinforcement (Stage 1), and Brisbane Area 275 kilovolt (kV) Reinforcement. These projects aim to increase transmission network capability and enable new generation to connect to the network. Project Assessment Draft Reports for both needs are due in June 2028. Through the RIT-Ts, Powerlink will assess AEMO's candidate developments alongside other credible network and non-network options to identify the option that maximises net market benefits.

The TAPR also includes details of our geographical line refit programs, and lines approaching the end of technical service life in the 10-year outlook period, and in the 10-20 year period.

Northern Region Development Outlook

The Northern Region remains a key focus area for future transmission investment, driven by asset renewal requirements, integration of the CopperString Project, industrial electrification, mining growth, and changing power flow patterns.

The Central Queensland to North Queensland (CQ-NQ) transmission backbone continues to play a critical role in supporting bulk power transfers between Central, North and Far North Queensland, with several future opportunities identified to maintain network reliability and support the efficient and economic operation of the NEM. Key investment opportunities in the next five years for the CQ-NQ backbone include:

- Ross to Chalumbin 275kV refit
- Reid River 275kV Network integration
- Central to North Queensland Reinforcement (Stage 1).

Central Region Development Outlook

The Central Region hosts Queensland's largest concentration of heavy industrial electricity demand and is expected to experience changing power transfer patterns associated with generation developments, industrial growth and major customer connections.

The Gladstone Project progressing under the PTI framework remains the defining near-term network investment in the region and is intended to establish the baseline network capability required to maintain reliable and secure supply following the potential closure of Gladstone Power Station in March 2029. The project comprises two stages of work:

- Stage 1: Calvale to Calliope River Reinforcement Project – involves construction of a new 275kV line from Calvale to Gladstone West to Calliope River and is to be completed by March 2029.
- Stage 2: Gladstone West Substation and Bouldercombe to Gladstone West transmission line – involves establishing a new Gladstone West Substation by June 2029 and construction of a new 275kV line from Bouldercombe to Gladstone West by August 2030.

The June 2025 PTI assessment included construction of a Gladstone West to Larcom Creek transmission line as part of the proposed Gladstone Project PTI scope. This line is no longer included in the PTI project scope. This change reflects the Gladstone Project's investment time horizons and updated demand forecasts which saw a reduction in demand projections for Larcom Creek Substation.

Construction of the line remains within Powerlink's future network investment plans and is one of the potential network solutions identified in Powerlink's proposed Gladstone Area Augmentation Contingent Project. The future investment would also be subject to additional planning, regulatory assessment and approval processes if the relevant trigger event(s) occur.

Further investment in the Central Region will depend on the scale, location and timing of new industrial loads, generation and storage developments.

Southern Region Development Outlook

The Southern Region contains Queensland's largest concentration of electricity demand and is one of the state's most significant generation, firming and storage development regions. Future transmission requirements will be shaped by population and demand growth, major customer connections, changing generation and storage patterns, power transfer requirements and the condition of existing network assets.

Two strategic intra-regional transmission corridors are central to the future development of the Southern Region network:

- the Central Queensland to South Queensland (CQ-SQ) corridor, supporting transfers between Central Queensland, Wide Bay, the Sunshine Coast, South West Queensland and South East Queensland.
- the South West Queensland to South East Queensland (SWQ-SEQ) corridor, which is expected to play an increasingly important role in transferring energy from generation, firming and storage developments in the Surat Basin, Darling Downs and Southern Downs to major load centres in South East Queensland and the broader NEM.

Key investment opportunities in the next five years include:

- Brisbane Area 275kV Reinforcement
- Wide Area Monitoring Protection and Control (WAMPAC) Tranche 2
- line refit works on the 275kV transmission line between Woolooga and South Pine substations
- the proposed South West Queensland Augmentation and Surat Basin Area Network Development Contingent Projects.

Across the three regions, the investment outlook reflects different combinations of asset condition, reliability, customer and economic development, changing power transfers and system security requirements. The timing and scope of many future investments will depend on how these needs develop, with Powerlink continuing to stage planning and investment decisions to maintain reliability while preserving flexibility.

Engagement

Powerlink is committed to effective early engagement with customers, communities, First Nations Peoples and other stakeholders to share information and use feedback to improve decision-making. Maintaining and building social licence and giving regional communities who host transmission infrastructure a voice is fundamental to delivering safe, reliable and cost-effective electricity. More than 500 stakeholders attended Powerlink's annual Transmission Network Forum in November 2025, and over 200 people attended our second regional Transmission Network Forum in Gladstone in August 2026. These forums provide valuable opportunities for Powerlink to exchange insights with industry, government and community stakeholders to improve our planning of the network.

By strengthening and increasing the capacity of our transmission network, Powerlink is ensuring a resilient supply of electricity to deliver wider economic benefits, meet future industrial energy needs and attract new businesses to Queensland.

Powerlink is actively working with customers and stakeholders in response to new planning laws, introduced by the Queensland Government in 2025. The new requirements make solar and wind farms impact assessable, create a stronger role and decision-making for local government in the assessment process and strengthen social licence across energy developments, ensuring communities affected by projects have a meaningful say.

Network capability and performance

The rapid growth of new generation, battery storage and hybrid developments continues to alter the location, timing and direction of electricity flows across the transmission network, while declining minimum demand is creating new operational and planning challenges. Powerlink continues to maximise network capability and maintain system security through advanced network monitoring and control schemes, real-time transmission line rating trials and initiatives to manage priority power system risks.

Maximum demand across Queensland's transmission zones remained broadly unchanged during 2025/26; however, seven of Powerlink's 11 zones recorded new minimum demand records, continuing the trend of declining daytime transmission-delivered demand.

The Queensland to New South Wales Interconnector (QNI) Minor project is complete, resulting in increased transfer capability in both northerly and southerly directions. Final testing activities are ongoing at these high transfer levels.

Network constraint performance in 2025/26 remained broadly consistent with historical levels. The Gladstone grid section experienced approximately 500 hours of constrained operation due to thermal limitations, while constrained operation in the Gold Coast and Tarong grid sections was primarily associated with maintenance activities.

Commissioned and Committed Network Developments

During 2025/26, Powerlink's delivery efforts remained predominantly directed towards connecting generation and reinvestment in transmission lines and substations across Powerlink's network.

Since publication of the 2025 TAPR, Powerlink has completed one network and 12 reinvestment projects, and seven connection projects have been completed including four BESS connections.

Introduction

1.1 Powerlink's role in Queensland's power supply
1.2 Purpose of the TAPR
1.3 Context of the TAPR
1.4 Powerlink's planning obligations and process
1.5 Queensland Energy Roadmap
1.6 Network connections
1.7 Customer, stakeholder and community engagement

01

Powerlink's annual planning review and Transmission Annual Planning Report (TAPR) are central to ensuring the Queensland transmission network continues to meet the needs of customers and National Electricity Market (NEM) participants into the future.

Key highlights

- Powerlink Queensland owns, develops, operates and maintains the high voltage electricity transmission network in Queensland, which provides electricity to more than five million Queenslanders and 241,000 businesses.
- The TAPR provides information about the Queensland transmission network, including key areas forecast to require investment in the 10-year outlook period.
- Powerlink has made a number of enhancements to the TAPR document and TAPR Portal this year.
- Powerlink's role as Queensland's Transmission Network Service Provider (TNSP) is central to the implementation of the Queensland Government's Energy Roadmap.
- A Connections Guarantee was introduced for Powerlink in July 2026, which focuses on connection application performance for large-scale generation, storage and loads.
- Powerlink is committed to effective, targeted engagement with customers, communities, First Nations Peoples and other stakeholders to share information on activities and use feedback received to improve decision-making.

1.1 Powerlink's role in Queensland's power supply

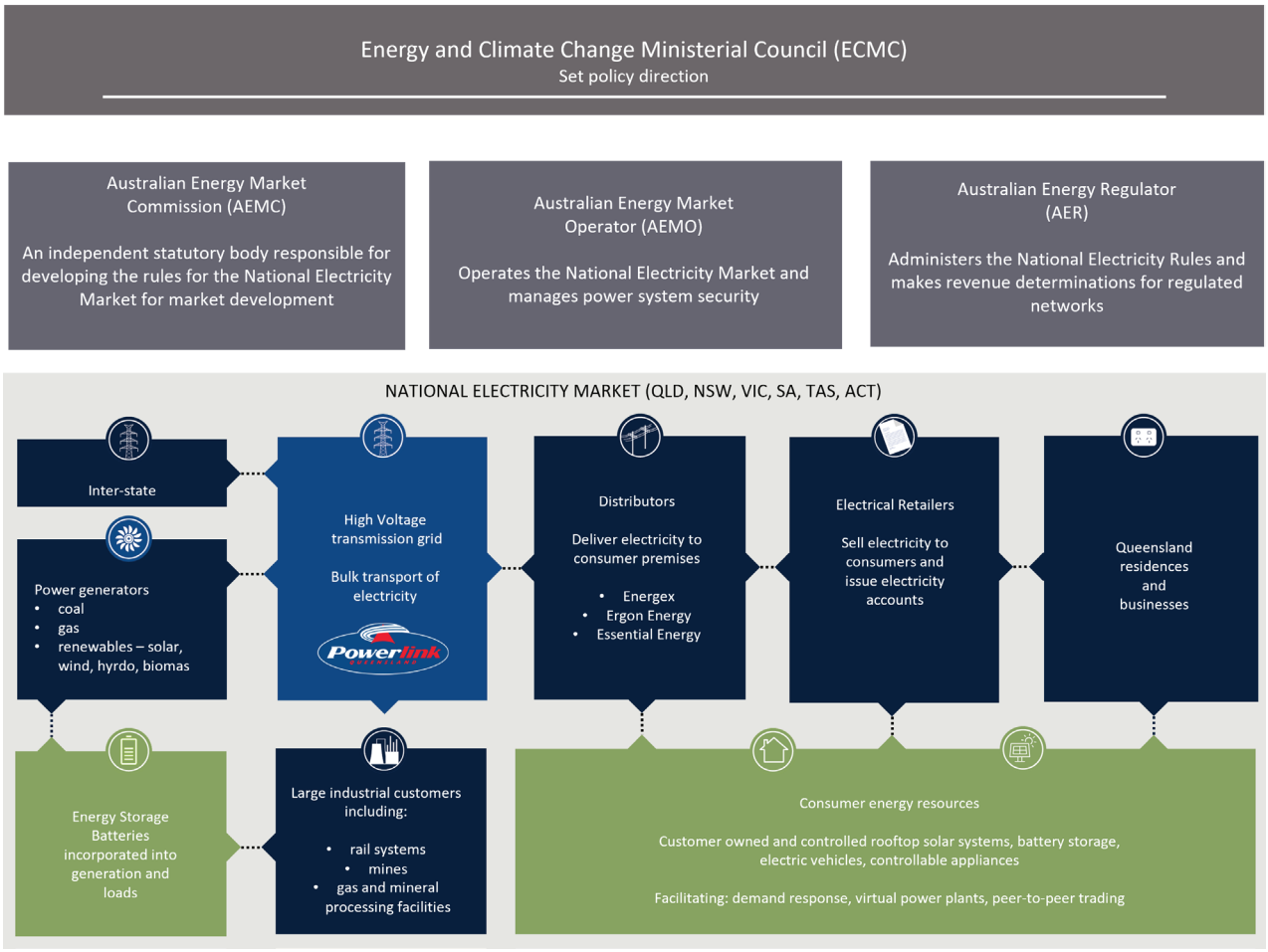
Powerlink owns, develops, operates and maintains Queensland's high voltage electricity transmission network.

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.

As Queensland's TNSP, we link to the NEM via the Queensland to NSW Interconnector (QNI). Powerlink's shared network is regulated by the Australian Energy Regulator (AER) under the National Electricity Law and the National Electricity Rules (NER). Powerlink is also the System Strength Service Provider and Inertia Service Provider for Queensland, with specific obligations defined in the NER.

Figure 1.1 Powerlink's role in Queensland's power supply



1.2 Purpose of the TAPR

The purpose of Powerlink's TAPR is to provide information about the Queensland transmission network to those interested or involved in the NEM. The TAPR also provides customers, communities and other stakeholders with an overview of Powerlink's planning processes and decision-making on future investment.

Readers should note this document and supporting TAPR Templates and TAPR Portal are not intended to be relied upon explicitly for the evaluation of customer investment decisions. Interested parties are encouraged to contact Powerlink directly for more detailed information.

Unless otherwise stated, the information published in the 2026 TAPR is current as at 30 September 2026.

1.2.1 TAPR enhancements

Powerlink conducts an annual TAPR survey to seek insights from market participants and stakeholders about how the quality and presentation of information in the TAPR can be improved. In response to this year's survey, Powerlink has made a number of enhancements to the TAPR document and TAPR Portal, including:

- consolidated visuals and discussion of potential future investments, including strategic projects, by region (chapters 6 to 8)
- one-page overviews of zone and grid performance on Powerlink's website
- a new network capability and performance data workbook
- improved user experience and navigation on the TAPR Portal
  - updated default settings so that key network layers are automatically displayed when the map opens, making it easier to access core planning information
  - enhanced project filtering and selections

  - improved map and legend clarity
  - improved consent options for users to opt out of TAPR specific surveys
  - updated side bar hyperlinks to access relevant planning and connection information
- addition of historical feeder flow data in the TAPR Portal allowing market participants to improve their preliminary self-assessments of project concepts and potential connections to our existing network.

A summary of this year's survey outcomes is detailed in Appendix L.

Feedback on the TAPR and TAPR Portal can be provided to Powerlink at any time via email to NetworkAssessments@powerlink.com.au.

1.3 Context of the TAPR

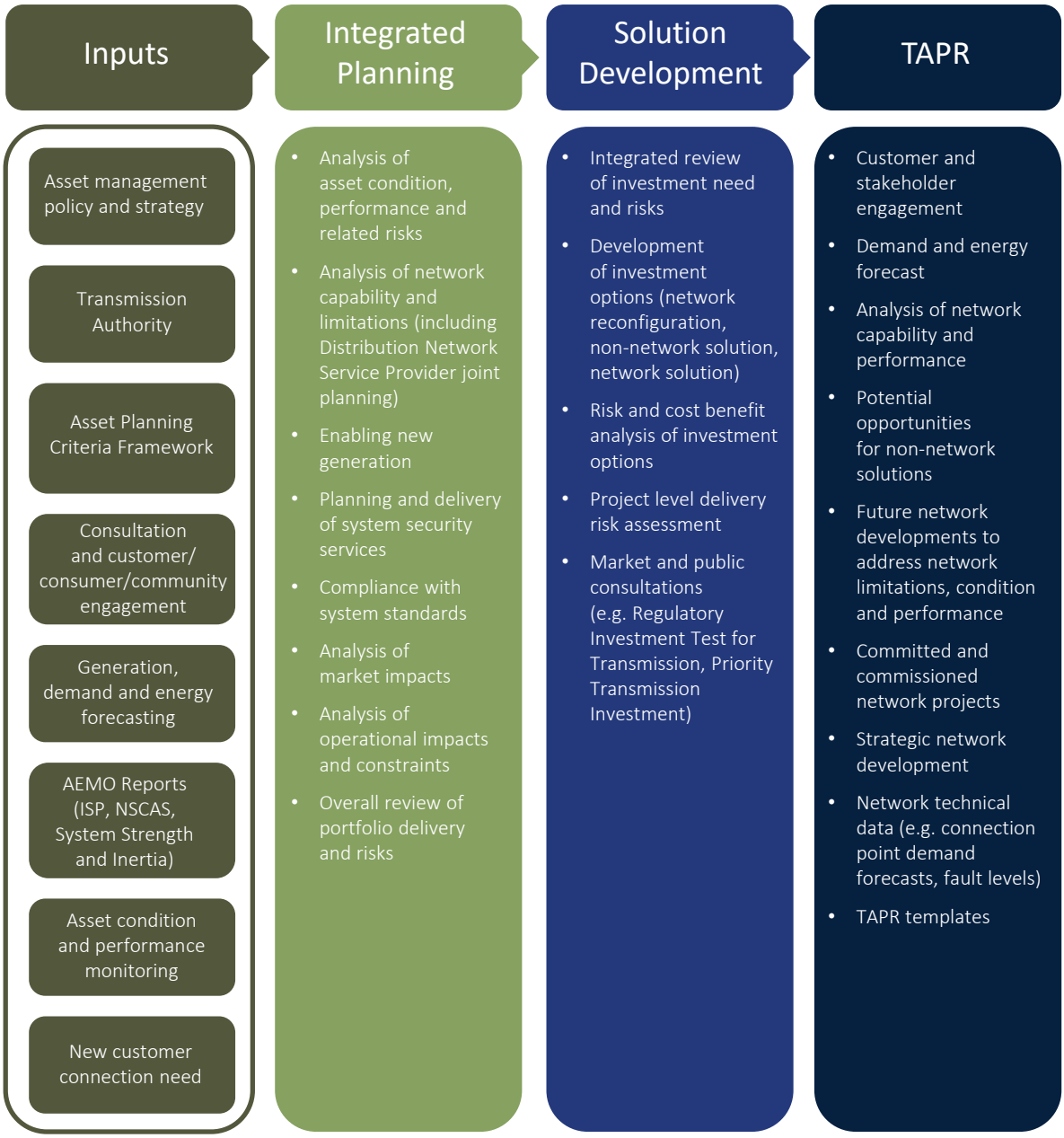
Powerlink undertakes an annual planning review in accordance with rule 5.12 of the NER and publishes the findings of this review in the TAPR and associated templates available in the TAPR Portal.

Powerlink also provides information from its annual planning reviews to the Australian Energy Market Operator (AEMO) to assist in the preparation of its Integrated System Plan (ISP). The ISP outlines an optimal path for generation, storage and network investments in the NEM to meet customer needs and government policies, at least cost, to 2050. The ISP identifies actionable and future projects requiring regulatory consultation, and informs market participants, investors, policy makers and customers about a range of potential future development opportunities across the NEM.

1.4 Powerlink's planning obligations and process

An overview of Powerlink's TAPR planning process is presented in Figure 1.2.

Figure 1.2 Overview of Powerlink's TAPR planning process



Detail on Powerlink's planning responsibilities, criteria and processes is available in Appendix A.

1.5 Queensland Energy Roadmap

Powerlink's role as Queensland's TNSP is central to the implementation of the Queensland Government's Energy Roadmap released in October 2025. The Queensland Energy Roadmap provides clear direction for Powerlink's planning and investment decisions by focusing on the transmission network required to support future generation, energy storage, industrial growth and private sector investment. It reinforces the importance of maintaining an affordable, reliable and sustainable electricity system while ensuring disciplined and efficient investment in network infrastructure.

The Queensland Energy Roadmap emphasises making better use of existing assets, rebuilding ageing infrastructure where appropriate, and targeted transmission augmentation to connect new generation and storage projects, supply existing and new loads and remove significant areas of congestion. It also reaffirms the importance of strategic transmission investments, including the Gladstone Project, while supporting streamlined delivery mechanisms through the Priority Transmission Investment (PTI) framework.

1.6 Network connections

Powerlink remains committed to transparent and efficient connection services and will continue to work with market participants and interested parties to understand the potential for new generation and load connections, and to identify opportunities and emerging limitations as they occur.

Figure 1.3 Overview of Powerlink's network connection process



1.6.1 Summary of connection projects

Table 1.1 provides an overview of the development of connection projects undertaken or being undertaken by Powerlink since 2017 to 30 September 2026.

Table 1.1 Summary of generation and storage connection projects

Status	Number of projects	Total megawatts (MW)
Total completed to date	41	9,242MW
Under construction	16	4,240MW
Current connection applications	115	45,630MW

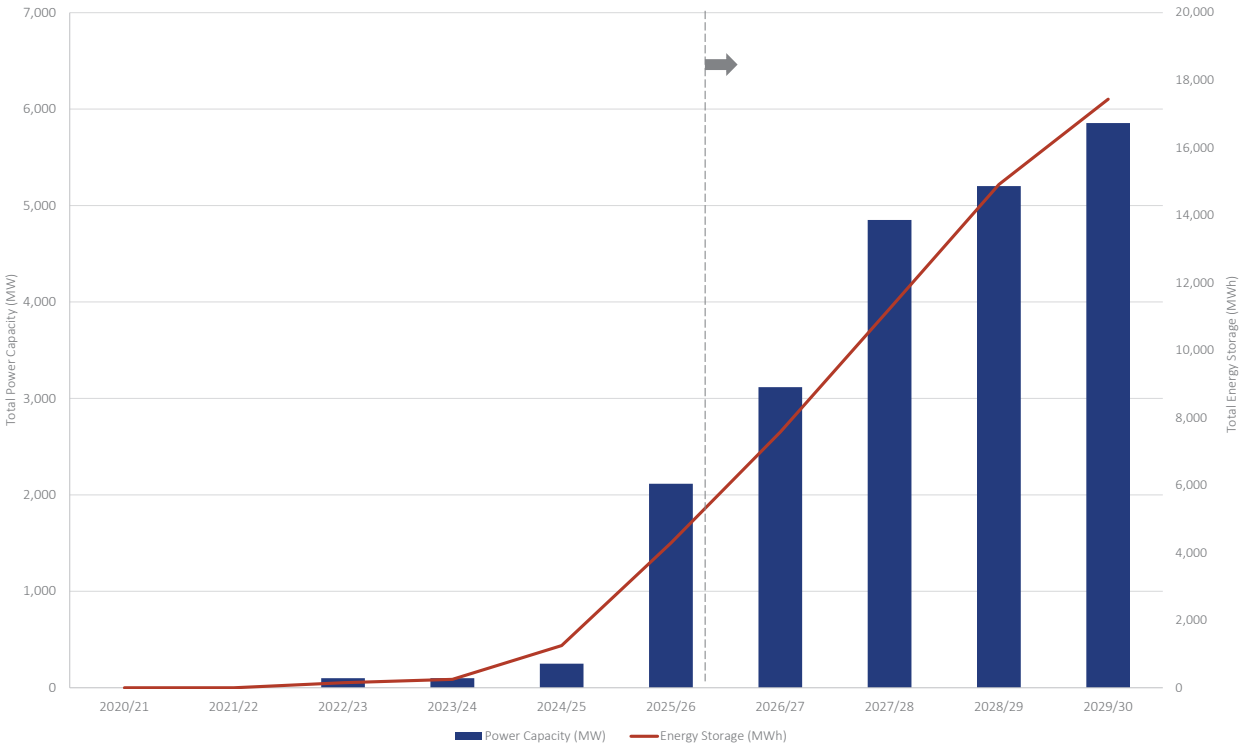
1.6.2 Status of connection projects

Since 2017, Powerlink has completed connection of 41 new generation and battery energy storage system (BESS) projects in Queensland, adding 9,242MW of generation and storage capacity to the grid. During the 2025/26 TAPR reporting period, 3,506MW of semi-scheduled generation and storage capacity has been committed in Queensland, comprising:

- Stanwell BESS
- Tangkam BESS
- Teebar BESS
- Yabulu BESS
- Supernode BESS Stage 3
- Smoky Creek Solar Power Station
- Lower Wonga Hybrid
- Guthrie's Gap Solar Power Station
- Gawara Baya
- Majors Creek Solar Power Station
- Ganymirra Solar Power Station
- Fraser Coast Solar Park
- Ulinda Park BESS
- Broadsound Energy Park.

Figure 1.4 shows the rapid growth in BESS development in Queensland, with both power capacity and energy storage increasing substantially from 2025/26. Based on existing and under-construction projects, total BESS power capacity is expected to increase from approximately 2,100MW in 2025/26 to around 5,900MW by 2029/30, while total energy storage is expected to grow from approximately 4,300 megawatt hours (MWh) to around 18,000MWh. This includes batteries installed as part of hybrid generation and storage facilities.

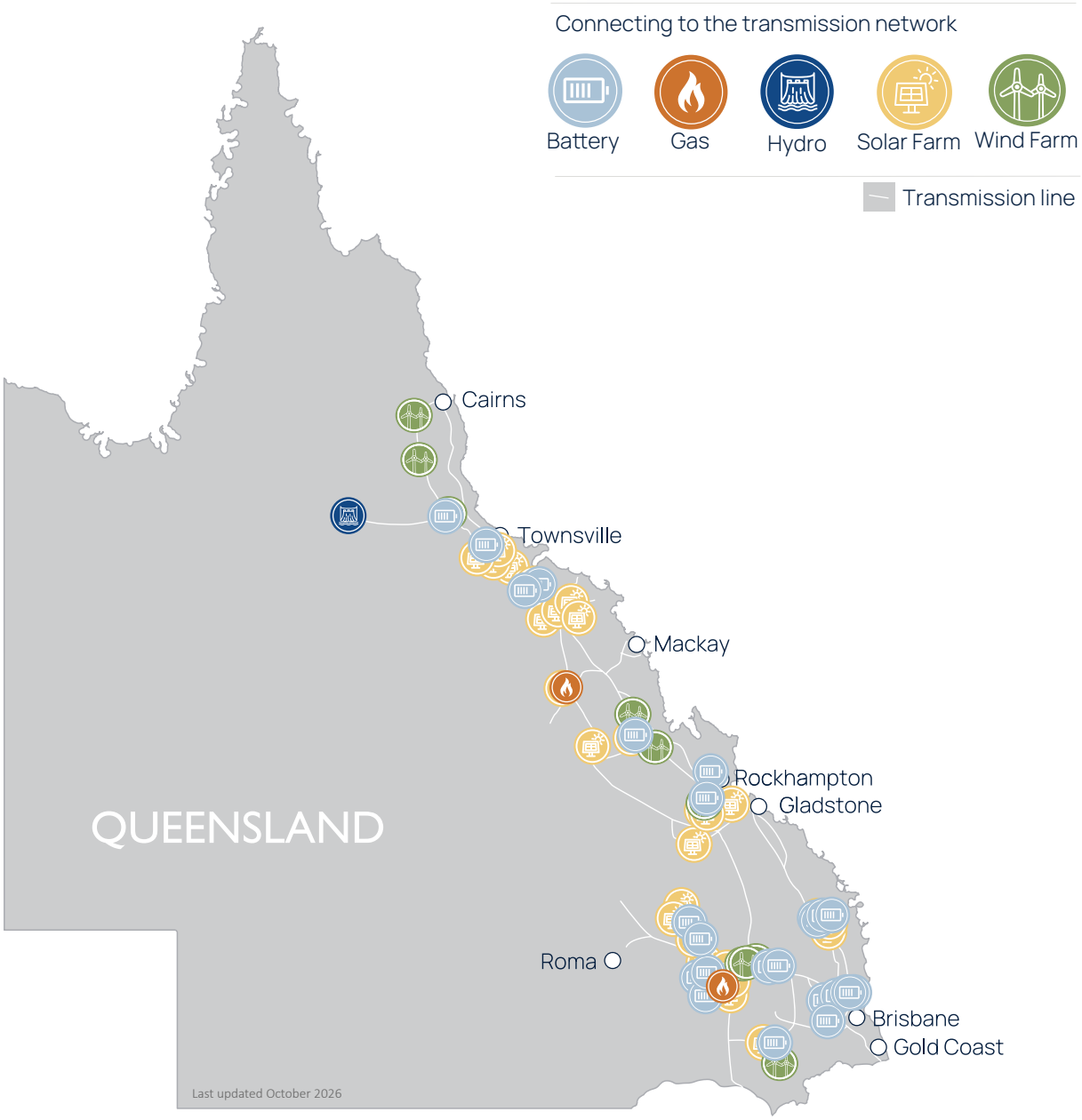
Figure 1.4 Battery energy storage system development trajectory



Approximately 2,049MW of embedded semi-scheduled generation projects exist or are committed to Energy Queensland's network. In addition to the large-scale generation development projects, rooftop solar photovoltaic (PV) in Queensland exceeded 8,066MW in June 2026 (see Clean Energy Regulator website).

Figure 1.5 shows the location and type of generation and storage connected, committed and under construction across Powerlink's network since 2017.

Figure 1.5 Generation and storage connected, committed and under construction since 2017



1.6.3 Connecting to our network

Participants wishing to connect to the Queensland transmission network include new and existing generators, storage, major loads and other Network Service Providers (NSPs). New connections or alterations to existing connections require Powerlink and the connecting party to negotiate a Connection and Access Agreement (CAA), an Offer to Connect (for new connections), and the specification and compliance of the generator or load to the required technical standards. The process of agreeing to technical standards also involves AEMO. The services provided can be prescribed for Distribution NSPs (regulated), negotiated or non-regulated services in accordance with the definitions in the NER or the framework for provision of such services.

1.6.4 Connections Guarantee

A Connections Guarantee was introduced for Powerlink in July 2026, which focuses on connection application performance for large-scale generation, storage and loads. As Queensland's energy system continues to evolve, new generation, storage and load will need to be connected to ensure a safe, reliable and cost-effective supply of electricity.

As part of the Connections Guarantee, Powerlink will report against four key metrics:

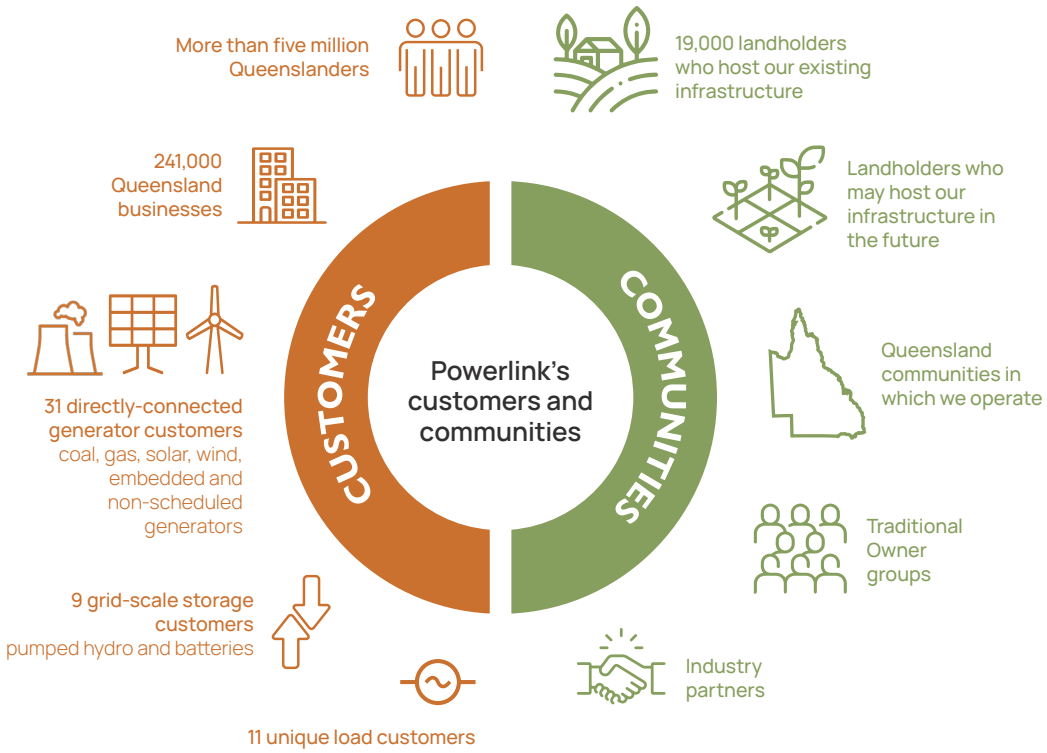
- Response to Connection Enquiry: Powerlink will target 100% achievement for NER connection enquiry timeframes of 40 business days for Designated Network Asset (DNA) connections and 30 business days for non-DNA connections.
- Performance Standard Package Assessment: Powerlink will target a 75% response rate to performance standard packages provided by a proponent within 30 business days.
- Negotiated Access Standards Decision: Powerlink will assess all proposed negotiated access standards for a connection within 30 business days of receiving all required information.
- Connections Delivered On-Time: Powerlink will target a 90% rate for connections delivered on-time as per the executed agreement.

Powerlink will report its performance against these targets on an annual basis. More information on the Connections Guarantee is on our website.

1.7 Customer, stakeholder and community engagement

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

Figure 1.6 Powerlink's customers and communities



Powerlink's engagement with providers of non-network solutions is discussed in Chapter 4.

Engagement Approach

Powerlink's engagement activities are undertaken in accordance with our Community Engagement Approach, which sets out the principles, objectives and outcomes Powerlink seeks to achieve in our interactions with stakeholders and the broader communities in which we operate.

Engaging with communities is essential to providing transmission services that are safe, reliable and cost-effective. Transmission infrastructure typically stays in-service for over 50 years and Powerlink is focused on engaging early and often to build positive relationships and partner with local communities that deliver benefits for the longer-term.

Since publication of the 2025 TAPR, to ensure transparency and that customers remain up to date with the most recent developments, Powerlink has provided email, LinkedIn and web-based regulatory process updates to interested stakeholders including for our major investment program in Central Queensland.

Transmission Network Forum

In November 2025, more than 500 stakeholders attended (in person and virtually) Powerlink's annual Transmission Network Forum. The forum provided updates on the state of the network, discussion on Queensland's future power system and a technical session on the 2025 TAPR.

As part of the discussion, an interactive session invited attendees to contribute ideas on how Powerlink can continue to strengthen engagement to improve decision-making and better meet industry, community and stakeholder needs. Powerlink is taking actions to improve information provision in response to these insights and will continue to work to improve over time. The live stream recordings, presentations, a summary of insights from the interactive session, questions and answers are available on Powerlink's website.

In August 2026, over 200 people attended Powerlink's second regional Transmission Network Forum, held in Gladstone. With a strong focus on Powerlink's major Gladstone reinforcement project, local procurement, skills and community benefits, the forum brought together government, industry, community and Powerlink representatives.

Customer Panel

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 meets three times a year and comprises members from a range of sectors including industry associations, consumer and community advocacy groups, directly connected customers and distribution representatives. It also provides an important channel for Powerlink to keep stakeholders informed about relevant operational and strategic topics.

Network investment engagement

Powerlink recognises the importance of transparency for stakeholders and customers, particularly when undertaking transmission network planning and engaging in public consultation processes, such as the Regulatory Investment Test for Transmission (RIT-T) or a PTI. Powerlink is guided by the AER's Better Resets Handbook as the benchmark when undertaking public consultations on regulated network investments.

Revenue Proposal engagement

Powerlink has undertaken extensive engagement to inform development of our 2027-32 Revenue Proposal. Engagement formally commenced in 2024, with customers and stakeholders involved early in shaping the engagement approach.

A co-design workshop brought together representatives from Powerlink's Customer Panel, the AER, the AER Consumer Challenge Panel, and Powerlink's Board and Executive to identify and prioritise the topics that would form the focus of engagement. Powerlink subsequently established the Revenue Proposal Reference Group (RPRG), drawing from a sub-set of the Customer Panel members, to provide ongoing customer input and feedback throughout development of the proposal and revised proposal.

The RPRG continues to meet regularly to consider key topics including expenditure forecasts, customer outcomes, major investments, risk and deliverability. Following submission of the Revenue Proposal in January 2026, the RPRG provided a formal submission to the AER's public consultation highlighting areas of support, areas where members held differing views, and observations on the engagement process.

As part of its assessment of the Revenue Proposal, the AER hosted a public forum in April 2026 to provide customers and stakeholders with an opportunity to hear directly from both the AER and Powerlink, ask questions and discuss key elements of the proposal. Discussion included forecast expenditure, proposed investments, customer price impacts and how customer feedback had informed the proposal.

The AER released its Draft Determination on 30 September 2026. Powerlink will now work on submitting a Revised Revenue Proposal in December 2026 before the AER's Final Determination in April 2027. The Revised Revenue Proposal will provide an opportunity to respond to the Draft Determination and update aspects of the proposal where appropriate to ensure we continue to meet regulatory requirements and obligations. Powerlink will continue to focus on delivering a proposal that enables us to meet our regulatory obligations and appropriately balances affordability with providing safe and reliable transmission services for Queenslanders.

Customer commitment – disclosure and accountability

Powerlink is committed to customer governance and accountability processes to support building trust and customer centricity, and improve actionability of customer insights to drive value for Queenslanders.

Our public reporting and disclosure aims to improve transparency of customer outcomes and involves engagement with our Customer Panel, reflecting customer and community priorities in what we measure and the publication of an annual disclosure statement highlighting customer performance outcomes and priorities. Our latest report is on our website.

Energy and Demand Projections

2.1 Demand and energy forecasting
2.2 Powerlink forecast tool
2.3 Forecasting assumptions and key drivers
2.4 Forecast highlights
2.5 Maximum delivered demand
2.6 Annual delivered energy
2.7 Minimum delivered demand
2.8 Demand and energy forecast
2.9 Zone forecasts
2.10 Summer and winter maximum and annual minimum daily profiles
2.11 Annual load duration curves

02

Queensland's electricity demand is being reshaped by the rapid uptake of consumer energy resources (CER) and emerging electrification, driving record low minimum demand and continued growth in maximum demand and energy consumption. Powerlink's central scenario forecasts an average increase in demand of 2.7% per annum over the next 10 years, including a modest amount of data centre load growth.

Key highlights

- Queensland's maximum transmission-delivered demand for 2025/26 was 9,462 megawatts (MW), on Thursday, 12 February 2026. This maximum demand occurred at 6.30pm and was 512MW lower than the record maximum delivered demand set in January 2025.
- Queensland's minimum transmission-delivered demand for 2026 was 2,077MW, on Saturday, 19 September 2026. This minimum demand occurred at 11:30am and was 162MW lower than the previous record minimum delivered demand set in August 2025.
- Expected maximum demand growth has increased since the 2025 Transmission Annual Planning Report (TAPR), primarily driven by higher forecast uptake of data centre connections.
- Residential and transmission-connected battery energy storage systems (BESS) uptake is helping stabilise minimum demand in the near-term and moderating increases in underlying demand.
- While Powerlink's electric vehicle forecast uptake has been revised upwards compared to the 2025 TAPR, 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.
- Powerlink's Central scenario forecast includes a modest amount of data centre load growth, while the High scenario incorporates a higher outlook on potential data centre developments based on early engagement with proponents. As project certainty increases, data centre load is expected to be progressively incorporated into future forecasts.
- Transmission-delivered maximum demand is expected to have steady growth with an average annual increase of 2.7% per annum over the next 10 years. This increase is mainly due to load growth within the distribution network and data centre connections.
- The previous decline in transmission-delivered minimum demand is expected to moderate over the next 10 years, with minimum demand forecast to grow at an average annual rate of 2.0%, primarily driven by new data centre consumption.

2.1 Demand and energy forecasting

Accurate demand and energy forecasting is a critical input for Powerlink to deliver safe, reliable and cost-effective transmission services. These forecasts underpin critical decisions on infrastructure investments and grid stability. However, the evolving energy landscape introduces significant uncertainties that challenge the accuracy of the forecast. Uncertainties are driven by:

- variable load growth due to dynamic economic factors impacting industrial expansions in mining and manufacturing
- the pace of electrification, particularly in transport and industrial processes
- adoption of electric vehicles and uncertainties around charging behaviours
- uptake of behind the meter energy storage
- emergence or otherwise of large data centre load
- global commodity prices and policy shifts.

Adding to these challenges is the impact of Queensland's variable weather, which significantly influences electricity demand, particularly through air conditioning loads during extreme heatwaves or prolonged wet seasons. Climate projections also suggest increasing frequency and intensity of such events, disrupting historical weather-normalisation models and amplifying demand fluctuations.

These factors underscore the critical need for scenario-based and probabilistic forecasting methods that Powerlink has incorporated into the forecasting process.

2.2 Powerlink forecast tool

Powerlink has developed a transmission-delivered demand and energy forecast tool that enables the creation of High, Central and Low demand scenarios at both a regional and sub-regional level. Powerlink's Central scenario represents the most probable demand outlook based on current evidence and forecast assumptions. It is broadly consistent with the Australian Energy Market Operator's (AEMO) Step Change scenario, with several key inputs derived from that scenario. The High and Low scenarios provide a range of plausible future demand outcomes. The High scenario assumes a faster uptake of demand-driving developments and technologies, while the Low scenario assumes a slower rate of uptake and a correspondingly lower demand outlook. The tool provides detailed forecasts for individual TAPR zones across the transmission network, allowing future load growth, including new demand and electrification impacts, to be assessed with greater granularity. Forecasts are informed by a range of data sources and inputs, as outlined in Appendix E.

The Powerlink forecast process individually models a range of building blocks that impact electricity demand:

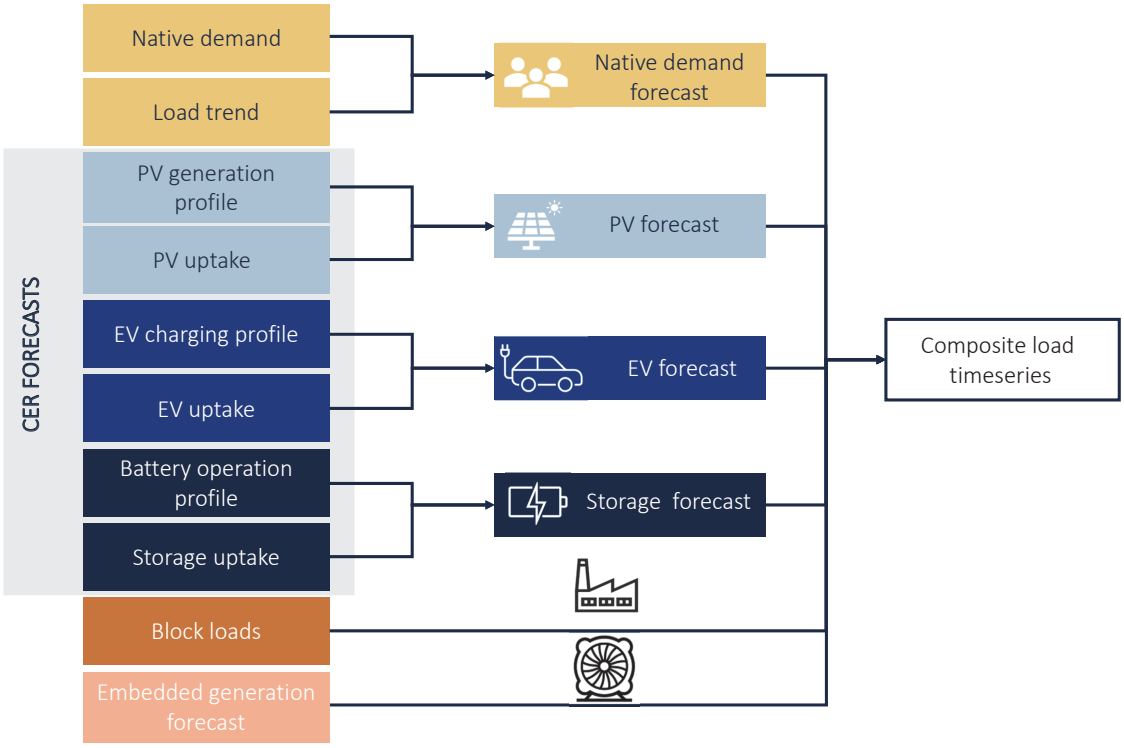
- native demand
- solar PV
- electric vehicles
- residential batteries
- block loads
- embedded generation.

Powerlink endeavours to use the best available data sources. The forecast tool incorporates the latest assumptions for macroeconomic factors and evolving trends in energy consumption and technology adoption, with sources including:

- Data from Energy Queensland and Powerlink customers
- Australian Bureau of Statistics (ABS) energy account
- Queensland Government
- AEMO
- Deloitte Access Economics economic forecasts
- CSIRO GenCost reports.

Figure 2.1 presents a schematic of the individual building blocks that make up the aggregate demand forecast. Independent sub-models are derived for the different CER technologies, native demand trends, block loads and embedded generation. Composite load traces are constructed from the output of each sub-model.

Figure 2.1 Powerlink's forecasting components



2.3 Forecasting assumptions and key drivers

2.3.1 Energy Queensland consultation

Energy Queensland provided summer and winter maximum demand forecasts for both the Energex and Ergon Energy distribution networks, over a 10-year outlook period. Powerlink produced transmission connection supply point forecasts that incorporate a variety of Energy Queensland's inputs. Powerlink's connection supply point forecasts are presented in Appendix E.

Powerlink proactively engages with customers to understand their future load requirements. Early customer engagement supports more efficient network planning and enables transmission network services to be developed in ways that align with customer needs and deliver the greatest value.

Both Powerlink and Energy Queensland jointly conduct the Queensland Household Energy Survey (QHES) to improve understanding of consumer behaviours and intentions. More than 4,000 participants completed the survey in 2026.

The Queensland Government is accelerating the roll-out of smart meters across the state, with full deployment targeted by 2030. Reflecting this transition, the 2026 QHES marked the first year in which a greater proportion of customers received monthly bills (47%) than quarterly bills (44%).

The survey also highlighted a continued shift away from flat-rate tariffs towards time-of-use and demand-based tariffs, a trend enabled by the increasing penetration of smart meters. By providing customers with greater visibility of their energy consumption and exposing them to price signals that vary by time and demand, smart meters are expected to encourage behavioural changes that smooth consumption patterns and place downward pressure on maximum demand over time.

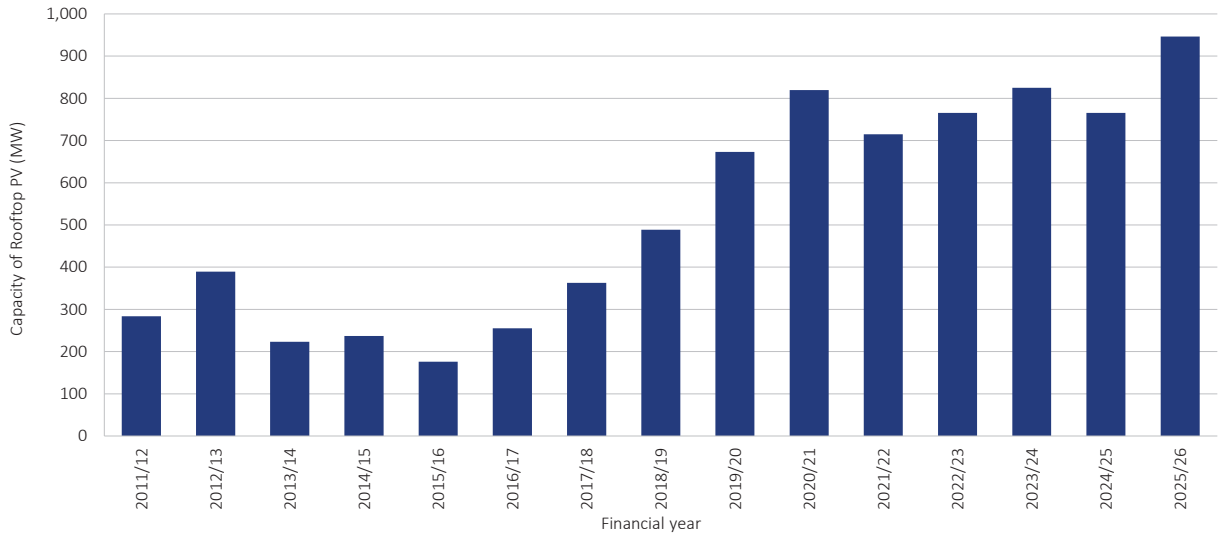
2.3.2 Consumer energy resources

Powerlink works with Energy Queensland to develop forecasts for CER. Energy Queensland maintains a register of the number, capacity and location of rooftop solar PV, electric vehicle and residential battery installations, providing insights into historical uptake trends. These inputs are combined with AEMO assumptions and forecasts relating to technology adoption, customer behaviour and policy settings to model future uptake and develop CER projections for use in Powerlink's demand forecasting and network planning processes.

2.3.3 Rooftop solar PV

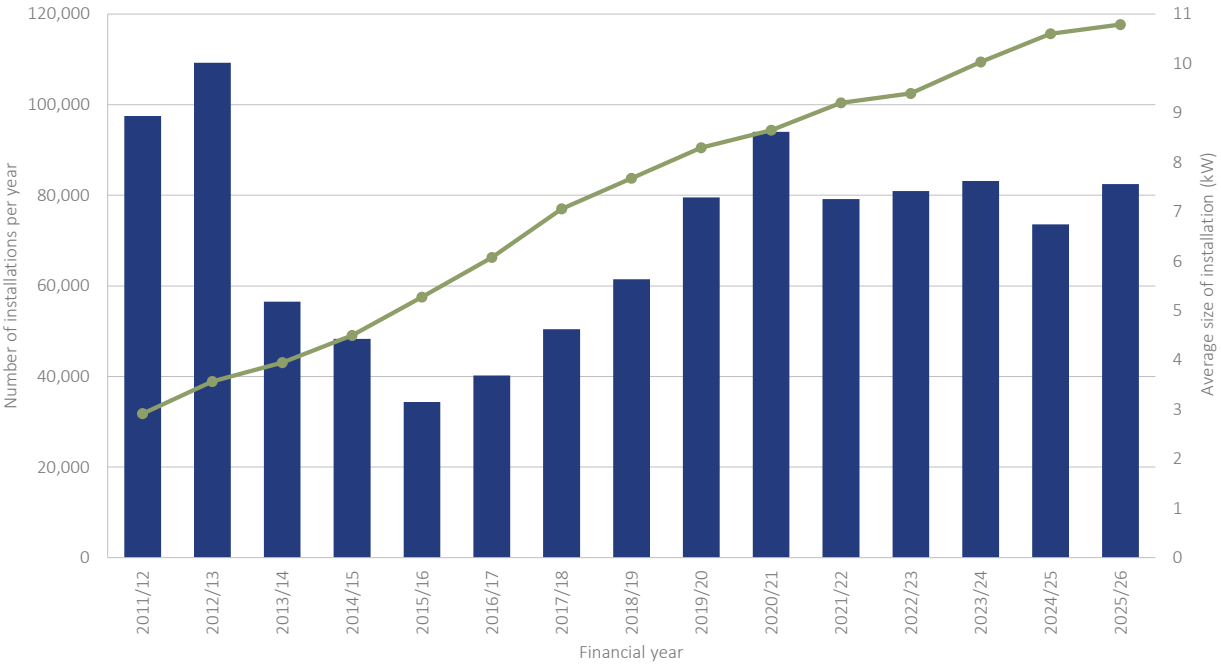
Rooftop solar PV installations have continued to grow at a steady rate with a further 946MW being installed over the 12 months to 30 June 2026. This growth is expected to continue, with the 2026 QHES indicating that around 30% of respondents intend to install new rooftop solar PV systems or upgrade existing systems within the next three years. An increase in system upgrades is anticipated ahead of the expiry of the 44 cent per kilowatt hour feed-in-tariff on 1 July 2028, as customers seek to maximise the value of their solar investments. The forecast does not incorporate the recently announced expansion of the Small-Scale Renewable Energy Scheme (SRES) to support solar PV systems up to 1MW. This policy is expected to accelerate the deployment of larger rooftop solar PV systems, with its impact to be reflected in the 2027 TAPR forecast.

Figure 2.2 Net increase in installed rooftop solar PV panel capacity in Queensland



Notes:
(1) Source: Clean Energy Regulator, Small-scale Installation Postcode Data.
(2) Registrations generally lag installations and hence data for FY2026 may be slightly understated.

Figure 2.3 Annual installation rates and average sizes for Queensland rooftop solar PV panel capacity

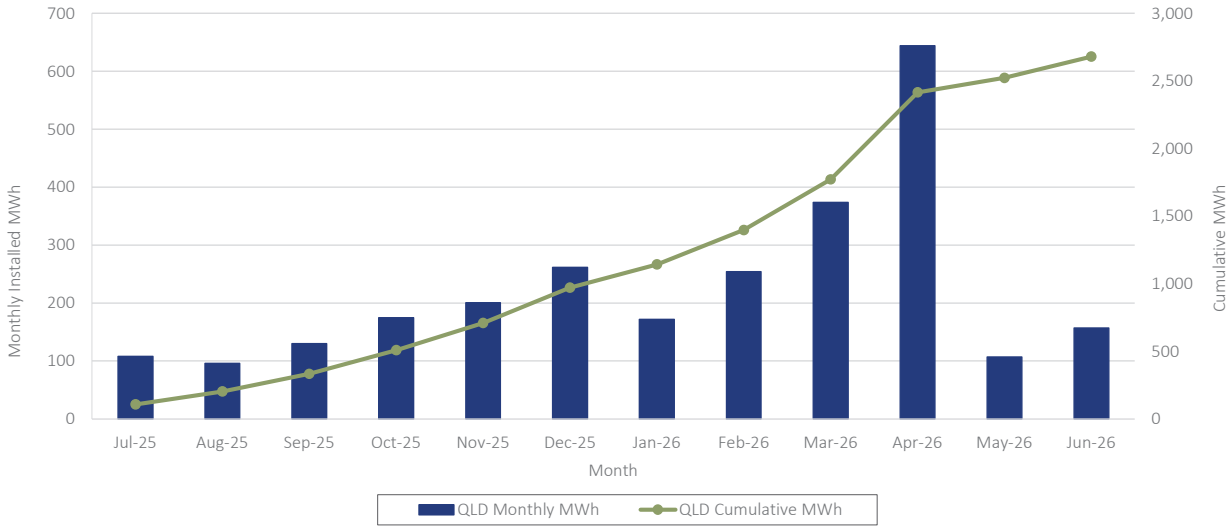


Notes:
(1) Source: Clean Energy Regulator, Small-scale Installation Postcode Data.
(2) Registrations generally lag installations and hence data for FY2026 may be slightly understated.

2.3.4 Residential batteries

Residential battery installations have increased significantly over the past 12 months, exceeding earlier expectations following the introduction of government incentives. As a result, higher adoption rates have been incorporated into the forecasts, leading to increased battery uptake across all scenarios, as shown in figures 2.4 and 2.5. While changes to the Cheaper Home Battery Program in May temporarily reduced the uptake of larger battery systems, these trends were not known when the forecast assumptions were finalised. Over the longer-term, residential battery adoption is expected to continue growing, supported by government policy, declining technology costs and increasing customer interest in energy self-sufficiency. The growth in residential batteries is expected to further flatten the load profile, helping to ease both maximum and minimum demands. The 2026 QHES highlights the strength of this trend, with 35% of surveyed households with rooftop solar PV reported they have a household battery, up from 21% in 2025. A further 17% indicated they intended to purchase a battery within the next three years. Among households that have or intend to purchase a battery, 52% cited storing excess solar energy for use in peak periods as the primary motivation, while 37% of participants expressed a high interest in community batteries.

Figure 2.4 Queensland monthly residential battery installations



Notes:
(1) Source: Clean Energy Regulator, Small-scale Installation Postcode Data.
(2) 2025 residential battery data is only available from 1 July 2025, when residential batteries became eligible under the Small-scale Renewable Energy Scheme.

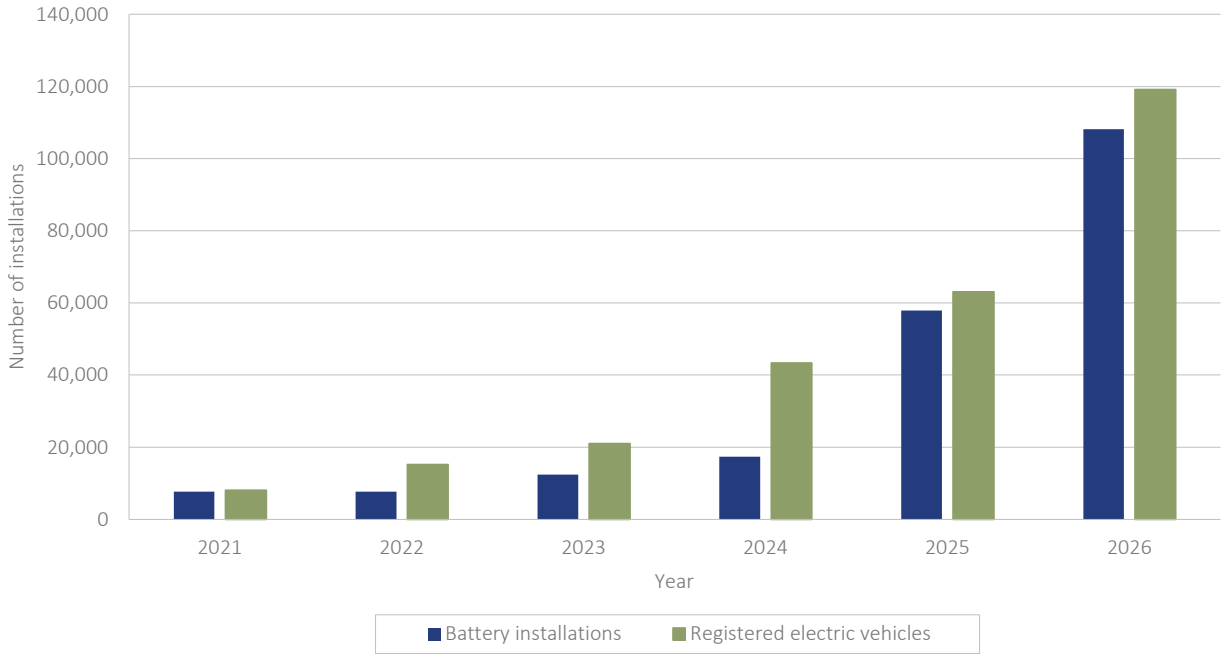
2.3.5 Electric vehicles

The forecast for electric vehicle uptake has been revised upward in 2026 to reflect stronger than expected market growth. The 2025 TAPR forecast anticipated that 93,000 electric vehicles would be registered by 2026; however, actual registrations reached approximately 119,000, resulting in an uplift in the electric vehicle forecast across the outlook period.

A key uncertainty in assessing the future forecast and network impacts of electric vehicles is charging behaviour. Unmanaged charging has the potential to increase demand during peak evening hours and add strain to the grid, whereas smart charging solutions, supported by time-of-use tariffs and incentives from electricity retailers, are increasingly shifting charging to off-peak times and reducing pressure on the network.

Consumer interest in electric vehicles continues to strengthen. The 2026 QHES found that 67% of households who do not own an electric vehicle or plug-in hybrid would consider purchasing one in the next three years, up from 58% in 2025. This growing interest is consistent with the strong recent growth in electric vehicle sales and supports continued expansion of the electric vehicle fleet over the forecast period.

Figure 2.5 Queensland residential battery uptake and number of registered electric vehicles



Notes:
(1) Source (residential battery uptake): Clean Energy Regulator, Small-scale Installation Postcode Data.
(2) Source (registered electric vehicles): Queensland Government, Electric Vehicle Snapshot.

2.3.6 Data centres

Queensland offers opportunities for data centre development through its combination of existing and emerging generation, a well-developed transmission network and locations with access to multiple transmission pathways. This aligns with the Queensland Government's support for responsible data centre investment that supports local employment, delivers benefits to host communities and contributes to Queensland's economy.

Interest in data centre developments in Queensland has increased significantly over the past six months, driven by growing global demand for digital infrastructure and the availability of development opportunities in Queensland. As a result, Powerlink has experienced a substantial increase in engagement with data centre developers.

While the maturity and timing of individual developments remain uncertain, emerging data centre loads are becoming an increasingly important consideration in Queensland's long-term demand outlook.

The 2026 Central scenario includes a modest contribution from data centre developments, while the High scenario reflects a stronger growth outlook informed by early engagement with prospective developers. The Low scenario, by comparison, does not include any data centre load growth. The associated data centre demand and energy assumptions adopted in the Central and High scenarios are shown in Figure 2.6 and Figure 2.7. As project certainty increases, further data centre load is expected to be progressively incorporated into future forecasts. While data centre demand is expected to contribute to peak demand, emerging policy, regulatory and connection frameworks may increasingly encourage or require large loads to provide demand flexibility, including reducing or shifting consumption during periods of system stress, network constraints or limited supply availability. During daytime periods, data centre demand may reduce the curtailment of excess solar PV generation and help increase demand at minimum system load times.

The extent to which future data centre demand can be supplied will therefore depend not only on the scale and location of proposed developments, but also on their operating characteristics. Data centres that can provide some level of demand flexibility, including the ability to reduce, shift or temporarily curtail load during defined network conditions, may enable more efficient utilisation of existing network infrastructure and reduce or defer the need for network augmentation. As connection frameworks continue to evolve, demand flexibility may become an increasingly important consideration in facilitating the connection of large-scale loads and improving access to available network capacity.

To support this emerging sector, Powerlink has prepared guidance (see Appendix B) on network and connection considerations to support prospective developers to make informed decisions during the early stages of project development. The guide provides practical information on site selection, connection pathways and the technical and planning considerations associated with connecting large-scale data centre loads to Queensland's transmission network. It complements, but does not replace, the connection process prescribed under Chapter 5 of the National Electricity Rules.

The guidance outlines how the location, scale, timing and operating characteristics of a proposed data centre can influence its connection requirements. Key considerations include proximity to existing and future generation, the capability and configuration of the transmission network, the proposed connection point, reliability requirements and the potential need for network augmentation. Proponents are encouraged to provide detailed and realistic forecasts of demand and energy consumption, daily load profiles, development staging and commissioning timeframes. This information will enable Powerlink to assess the proposed connection across a range of operating conditions and identify potential network constraints, augmentation requirements or alternative connection arrangements.

Early engagement with Powerlink, supported by experienced technical advisers, can help developers better understand potential connection opportunities, network capability considerations, connection pathways and project-specific requirements before committing to detailed project designs. Prospective developers are encouraged to contact Powerlink's Connections and Development Team via Powerlink's website.

Figure 2.6 Queensland data centre Central and High scenario demand forecast

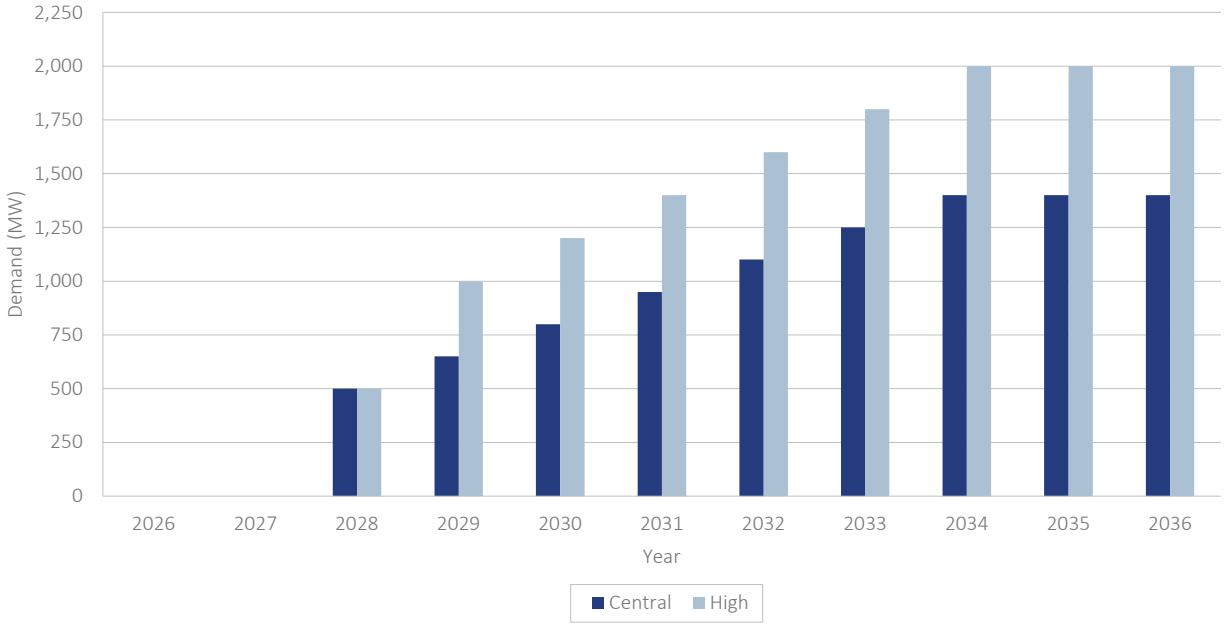
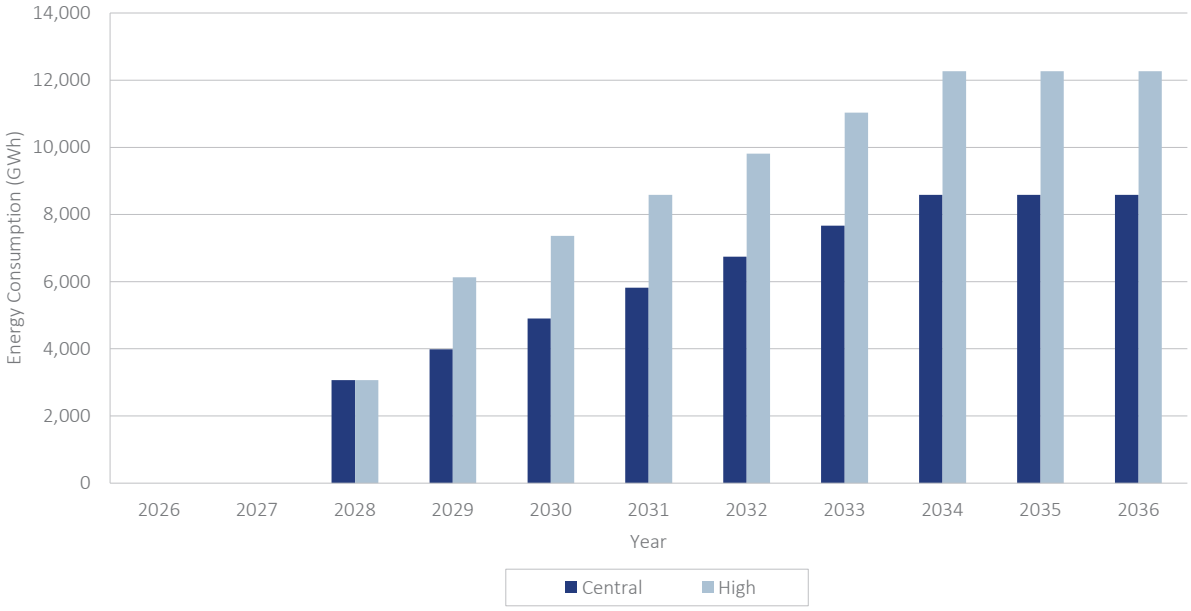


Figure 2.7 Queensland data centre Central and High scenario annual energy consumption forecast



2.3.7 Hydrogen

Hydrogen load forecasts remain highly uncertain and have been excluded from the Central scenario forecast. Following the significant reduction in forecast hydrogen-related demand in the 2025 TAPR, there has been limited evidence over the past year to support the inclusion of material hydrogen loads within the Central scenario planning horizon.

While a couple of proponents continue to investigate hydrogen production opportunities in Queensland, most projects remain at an early stage of development and are subject to considerable uncertainty regarding economics, technology costs, market demand, policy settings and final investment decisions. As a result, hydrogen-related electricity demand is currently treated as a potential future source of load growth rather than a committed forecast load.

This cautious outlook is consistent with broader industry trends, with hydrogen project development continuing to progress more slowly than initially anticipated both in Australia and internationally. Powerlink will continue to monitor project developments and incorporate hydrogen-related loads into future forecasts as projects mature and achieve greater certainty.

2.3.8 Electrification of load

In 2023/24, approximately 24% of final energy consumption in Queensland was from electricity and this electrical energy was predominantly supplied from the interconnected power system[1]. The remaining energy consumption was largely met through the direct combustion of fossil fuels across sectors including transport, agriculture, mining and manufacturing. While electrification remains a potential source of long-term growth in electricity demand, expectations for near-term uptake have moderated. The most material opportunities for large-scale electrification are currently associated with industrial processes and mining operations, where decarbonisation pathways continue to be assessed. However, significant uncertainty remains regarding the timing, scale and location of these developments. Powerlink's Central scenario includes electrification projects where there is sufficient evidence of progress and commitment, with manufacturing electrification currently representing the primary source of forecast electrification demand.

Growth in grid-supplied electricity resulting from electrification may be partially offset by improvements in energy efficiency. Electric technologies are generally more efficient than fossil fuel alternatives, meaning that converting a process from fossil fuels to electricity does not typically translate to a one-for-one increase in energy consumption. In addition, behind-the-meter generation can reduce the amount of energy supplied through the network.

The geospatial distribution of these effects is not expected to be uniform. Some areas may experience substantial increases in demand for grid-supplied electricity driven by industrial development or electrification initiatives, while other areas may experience lower demand growth due to energy efficiency improvements and increasing levels of CER.

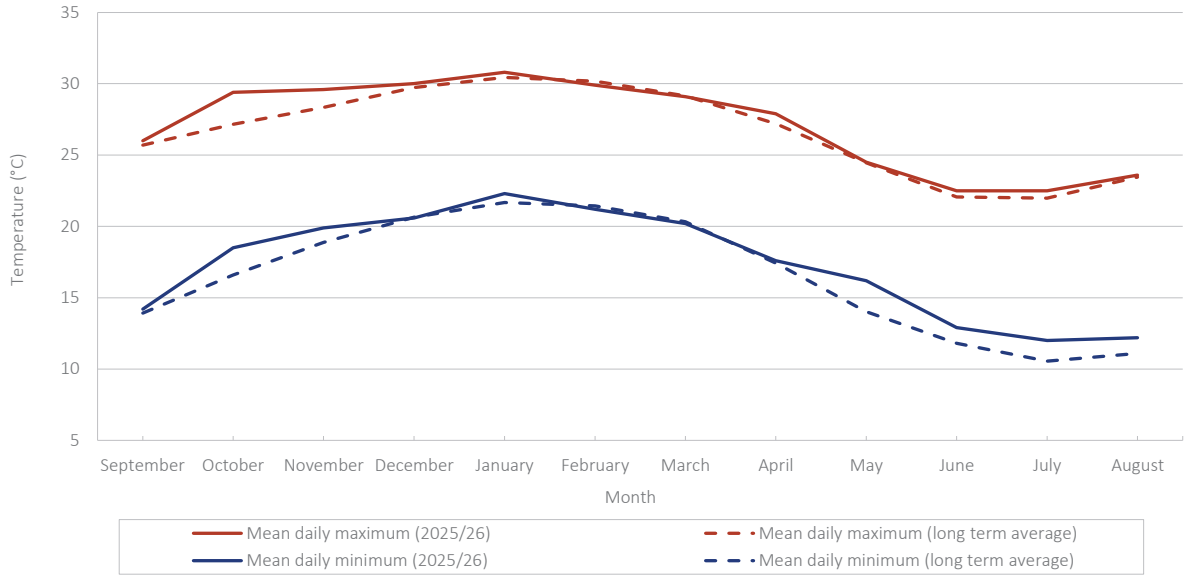
[1] At the time of writing, the ABS indicated the next energy account release would be 29 October 2026.

Powerlink continues to work closely with customers, industry and AEMO to improve our understanding of emerging technologies, industrial development and electrification opportunities so these impacts can be appropriately considered in future demand forecasts and transmission network planning processes.

2.3.9 Weather

Queensland's demand is highly sensitive to the sub-tropical climate and temperature variations, with heatwaves amplifying peak loads. Figure 2.8 shows observed mean temperatures for Brisbane during September 2025 to August 2026 compared with long-term averages. The comparison reveals a very average summer in south east Queensland and the winter minimum temperatures in July and August were also warmer than the long-term average.

Figure 2.8 Brisbane temperature ranges over September 2025 to August 2026



Notes:
(1) Long-term average based on years 2000 to 2024/25.
(2) Source: Bureau of Meteorology, Monthly Mean Maximum Temperature (Brisbane).

2.3.10 Transmission connected customers

Powerlink obtained summer, shoulder and winter maximum demand forecasts from customers that connect directly to the Powerlink transmission network. No new large loads have connected in the past 12 months.

There are several proposals under development for new data centre, mining, metal processing, other industrial loads and for the electrification of existing loads. These potential large loads total approximately 1,466MW. The likely distribution of these loads is shown in Table 2.1. The loads in Table 2.1 are not included in the Low and Central scenario forecasts.

Table 2.1 Potential large loads excluded from the Low and Central scenario forecasts

Zone	Description	Possible load
Northern Queensland	Manufacturing	166MW
Central Queensland	Hydrogen production Mining	460MW
Southern Queensland	Data Centre Manufacturing	840MW

2.4 Forecast highlights

Powerlink's demand forecasts for 2026 show steady growth in transmission-delivered summer maximum demand at an average rate of 2.7% per annum over the 10-year period.

The forecast increase is predominantly driven by distribution-connected load growth and anticipated data centre load growth on the transmission network, supplemented by additional demand associated with the electrification of industrial operations in the Gladstone zone.

Powerlink forecasts annual transmission-delivered minimum demand to increase over the 10-year outlook period. Minimum demand, or minimum system load, represents the lowest level of demand supplied by the transmission network at any point in time. While minimum demand has steadily declined over the past seven years, largely due to the increasing uptake of rooftop and distribution-connected solar PV, this trend is expected to reverse as anticipated large new loads, including data centres, connect to the network.

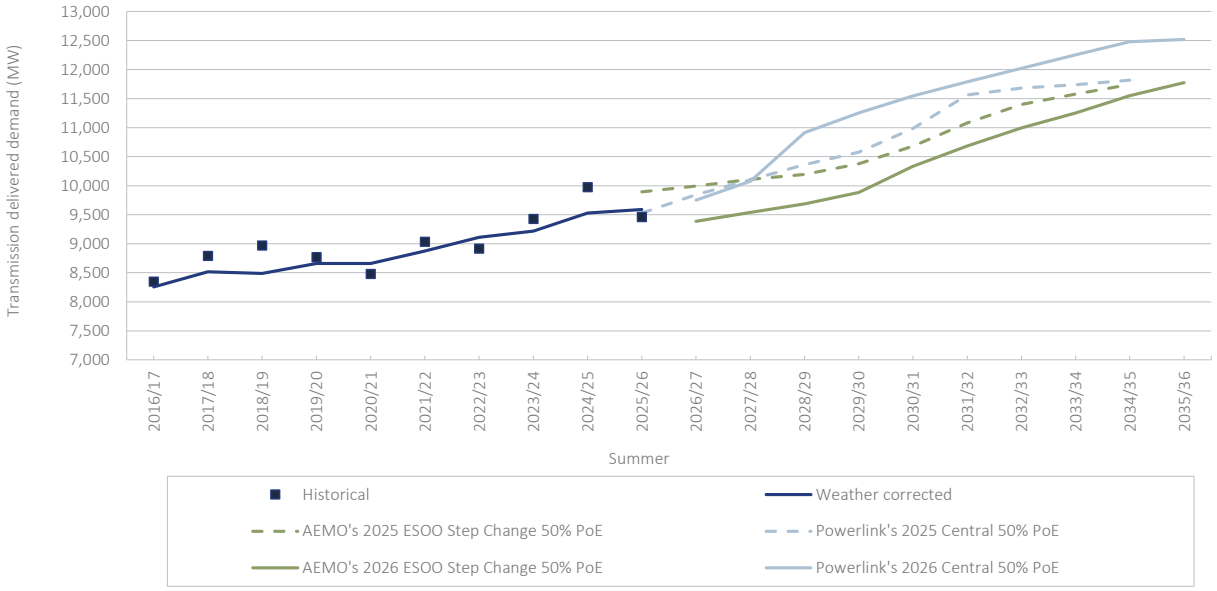
Queensland did not observe a new record maximum demand over the last 12 months but did observe a new record minimum demand. Maximum demand did not peak this year due to the relatively milder 2025/26 summer temperatures. A new record minimum transmission-delivered demand of 2,077MW was recorded on Saturday, 19 September 2026, at 11.30am and was 162MW lower than the previous record set in August 2025.

2.5 Maximum delivered demand

The 2025/26 maximum transmission-delivered demand in Queensland occurred at 6.30pm on Thursday, 12 February 2026, when 9,462MW was delivered from the transmission grid (refer to Figure 2.13 for load measurement definitions). Operational as-generated peak demand was recorded at the same time, reaching 10,385MW. After weather correction, the 2025/26 summer maximum transmission-delivered demand was 9,591MW, 0.65% higher than Powerlink's 2025 forecast for 2025/26.

Figure 2.9 shows a comparison of AEMO's 2025 and 2026 Electricity Statement of Opportunities (ESOO) delivered summer maximum demand forecasts based on the step change scenario with Powerlink's 2025 and 2026 Central scenario, all with 50% Probability of Exceedance (PoE). The increase in Powerlink's forecast maximum demand primarily results from the inclusion of anticipated data centre load.

Figure 2.9 Comparison of AEMO's 2025 and 2026 ESOO Step Change scenario forecast with Powerlink's 2025 and 2026 Central scenario 50% PoE transmission-delivered demand forecast



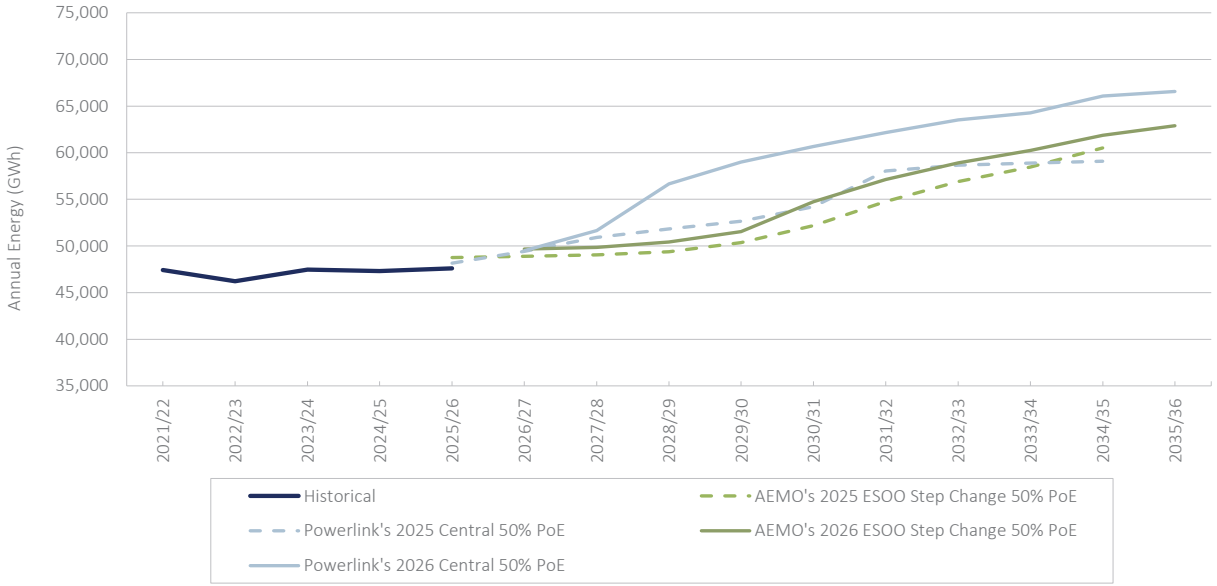
Note:

(1) AEMO's 2025 and 2026 ESOO (Electricity Forecasting Data Portal) forecast has been converted from operational sent out to transmission-delivered for the purposes of comparison. Refer to Figure 2.13 for further details.

2.6 Annual delivered energy

Powerlink's energy forecast has increased compared to last year's outlook. Over the forecast period, energy consumption is expected to be higher, primarily due to the inclusion of anticipated data centre demand. Figure 2.10 compares AEMO's 2025 and 2026 ESOO energy forecasts under the step change scenario with Powerlink's 2025 and 2026 Central scenario forecasts. The higher growth observed in Powerlink's forecast is largely attributable to anticipated data centre load. While this load is not currently reflected in AEMO's forecast, AEMO's outlook includes significant electrification-related demand growth. Powerlink considers that some of the electrification assumptions underpinning AEMO's forecast have moderated since those forecasts were developed. As a result, both AEMO and Powerlink project growth in energy consumption, although the primary drivers of that growth differ between the two forecasts.

Figure 2.10 Comparison of AEMO's 2025 and 2026 ESOO Step Change scenario forecast with Powerlink's 2025 and 2026 Central scenario 50% PoE delivered energy forecast



Note:
(1) AEMO's 2025 and 2026 ESOO (Electricity Forecasting Data Portal) forecast has been converted from operational sent out to transmission-delivered for the purposes of comparison. Refer to Figure 2.13 for further details.

2.7 Minimum delivered demand

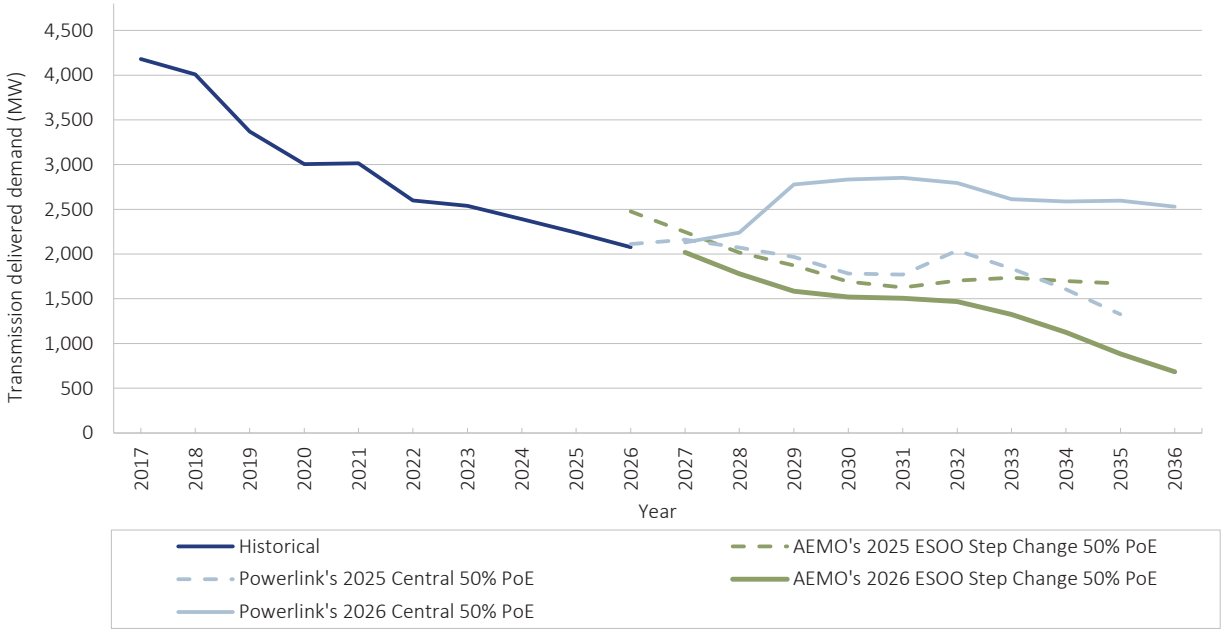
The 2026 Queensland minimum transmission-delivered demand occurred at 11:30am on Saturday, 19 September 2026, when only 2,077MW was delivered from the transmission grid (refer to Figure 2.13 for load measurement definitions).

At the time of minimum transmission-delivered demand, directly connected loads made up about 99% of the transmission-delivered demand with Distribution Network Service Provider (DNSP) customers making up the remainder. Mild weather conditions, during a weekend in combination with strong contribution from rooftop solar PV and Energy Queensland connected generation were contributors to this minimum demand.

Figure 2.11 shows a comparison of AEMO's 2025 and 2026 ESOO annual delivered minimum demand forecast based on AEMO's Step Change scenario with Powerlink's 2025 and 2026 Central scenario. Compared with last year's forecast, minimum demand is forecast to be higher in the near-term due to increased uptake of residential and distribution-connected batteries, which are expected to increase charging load during daytime minimum demand periods. Anticipated data centre demand is also expected to provide a significant source of baseload consumption during minimum demand periods, further increasing transmission-delivered minimum demand. The variance between Powerlink's and AEMO's 2026 forecasts is largely attributable to Powerlink's inclusion of anticipated data centre demand, which has not been incorporated into AEMO's forecast.

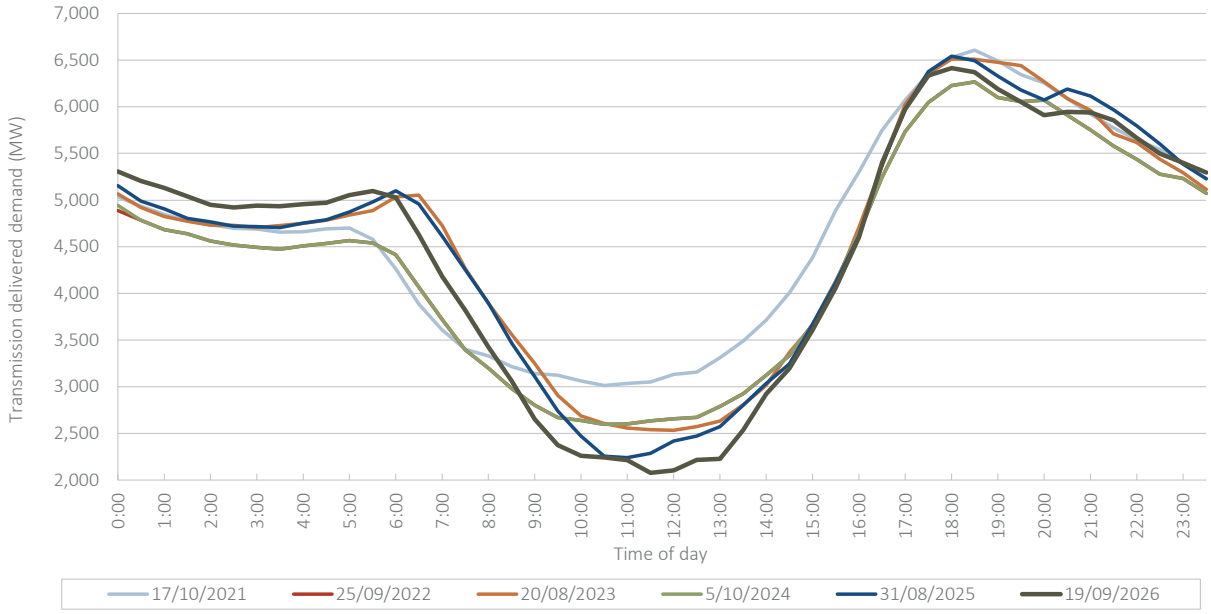
The forecast does not include the recently announced expansion of the SRES to support solar PV systems up to 1MW. This measure is expected to accelerate the installation of larger rooftop PV systems and further reduce minimum demand outcomes.

Figure 2.11 Comparison of AEMO's 2025 and 2026 ESOO Step Change scenario minimum delivered demand forecast with Powerlink's 2025 and 2026 Central scenario



Note:
(1) AEMO's 2025 and 2026 ESOO (Electricity Forecasting Data Portal) forecast has been converted from operational sent out to transmission-delivered for the purposes of comparison. Refer to Figure 2.13 for further details.

Figure 2.12 Transmission-delivered minimum demand for the Queensland region



Note:
(1) 2026 trace based on preliminary metering data up to 22 September 2026.

Minimum demand has continued to decline since 2016, driven by the ongoing growth of rooftop solar and grid-connected solar PV. In contrast, maximum daily demand has continued to rise in line with underlying load growth, as the contribution of solar PV diminishes in the late afternoon and early evening. This has resulted in an increasing spread between minimum and maximum demand levels.

Meeting these higher peak demand periods requires greater support from large-scale generation and the transmission network, as they occur at a time when solar PV output is limited. The recent acceleration in residential and transmission-connected battery energy storage systems (BESS) uptake will start to ease minimum demand conditions through increased daytime battery charging. However, the previous decline in transmission-delivered demand is expected to moderate over the next 10 years, with minimum demand forecast to grow at an average annual rate of 2.0%, primarily driven by new data centre demand.

2.8 Demand and energy forecast

As part of the TAPR, Powerlink prepares and reports on the High, Central and Low forecast scenarios to reflect different development pathways. Demand forecasts are also prepared to account for yearly weather variations and are expressed as 10% PoE, 50% PoE and 90% PoE forecasts. They represent demand conditions that are expected to be exceeded once in 10 years, five times in 10 years and nine times in 10 years respectively.

The forecast average annual growth rates for the Queensland region over the next 10 years under High, Central and Low scenarios are shown in Table 2.2. These growth rates refer to transmission-delivered quantities as described in Section 2.8.1. Maximum demands continue to be expected in the summer period, while minimum demand, which historically occurred only in winter, may now occur during winter or shoulder periods. The summer and winter maximum demand growth rates are based on 50% PoE corrected values for 2025/26 and 2025 respectively.

Table 2.2 Average annual demand and energy growth rate over next 10 years

	High scenario	Central scenario	Low scenario
Delivered energy	5.4%	3.4%	0.4%
Delivered summer maximum demand (50% PoE)	4.3%	2.7%	0.2%
Delivered winter maximum demand (50% PoE)	4.6%	2.9%	0.3%

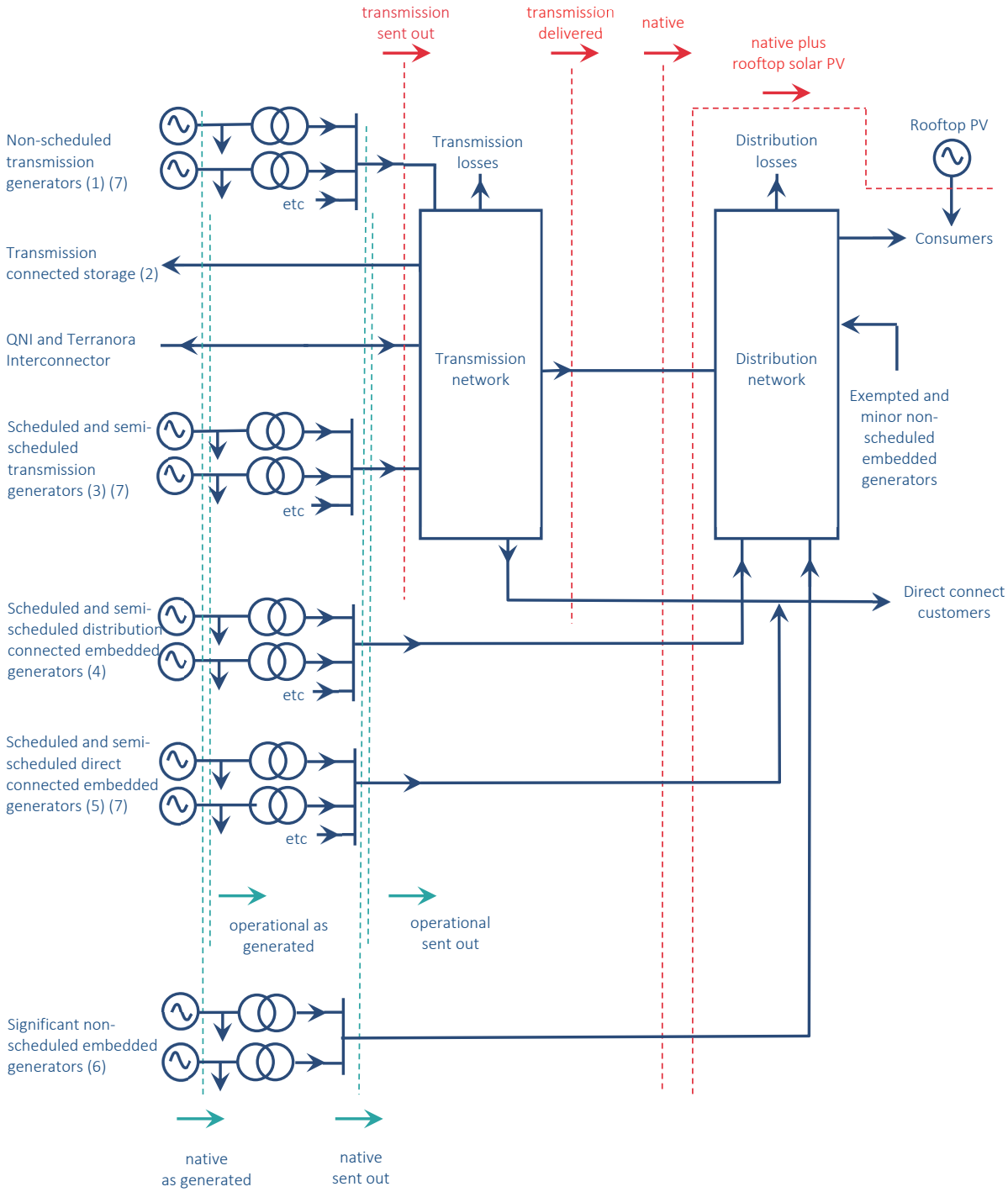
The forecast for minimum delivered demand is strongly correlated to the uptake of rooftop solar PV installations and embedded variable renewable energy (VRE) generation on the Energy Queensland network. The forecasts presented in this chapter assume these resources can operate without constraints and do not account for future market outcomes, operational directions or system security measures that may limit their output.

Tables showing historical and forecast demand data from Section 2.8 are available in the Energy and Demand Projections Data workbook on the Powerlink website.

2.8.1 Demand and energy terminology

Demand and energy values vary depending on where they are measured within the network, with different stakeholders measuring these quantities at different points to support their specific needs. Figure 2.13 shows the common demand and energy measurement definitions used throughout the network, and this terminology is applied consistently throughout the TAPR. Transmission-connected BESS are excluded from the demand forecast, as they are scheduled loads whose charging demand is determined by market outcomes rather than underlying electricity consumption. Consequently, this load is not considered a requirement that the transmission network must be planned to meet.

Figure 2.13 Load measurement definitions

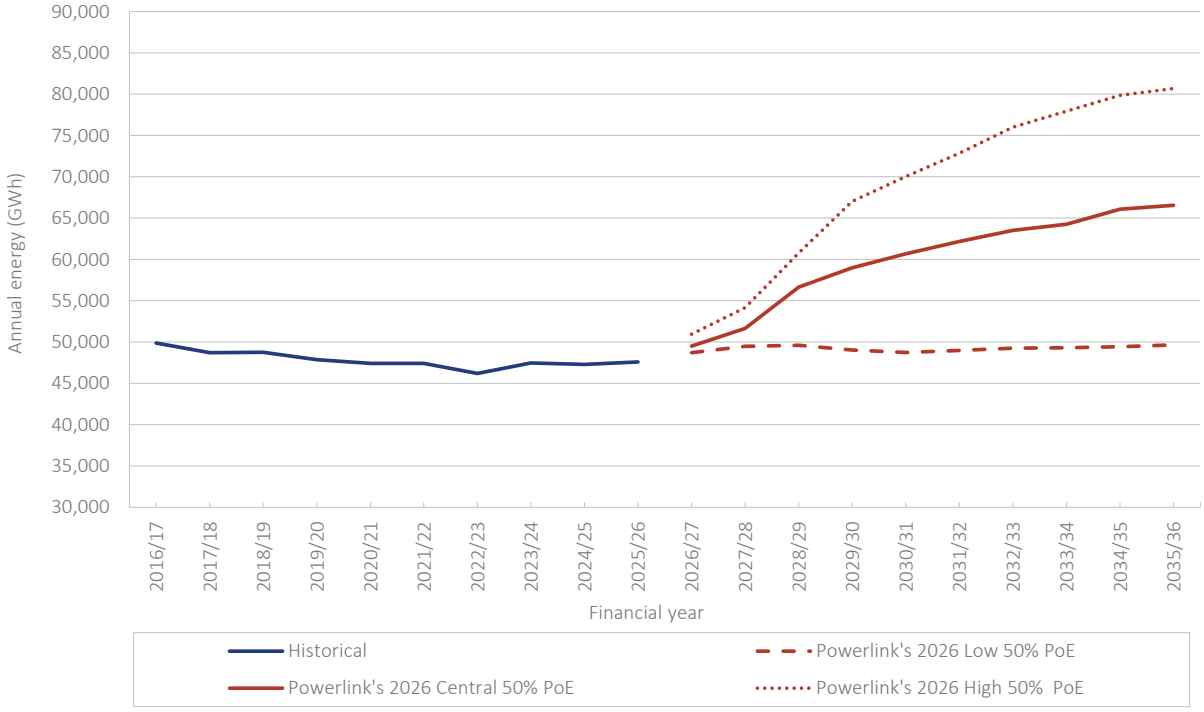


Notes:
(1) Includes Invicta and Koombooloomba.
(2) Including pump and transmission connected BESS loads.
(3) Includes Yarwun which is non-scheduled.
(4) For a full list of scheduled and semi-scheduled distribution connected generators refer to supplementary data workbook for Chapter 9.
(5) Sun Metals Solar Farm and Condamine.
(6) Lakeland Solar and Storage, Hughenden Solar Farm, Pioneer Mill, Moranbah North, Racecourse Mill, Barcaldine Solar Farm, Longreach Solar Farm, German Creek, Oaky Creek, Baking Board Solar Farm, Sunshine Coast Solar Farm and Rocky Point.
(7) For a full list of transmission network connected generators, transmission connected BESS and scheduled and semi-scheduled direct connected embedded generators and BESS, refer to supplementary data workbook for Chapter 9.

2.8.2 Energy forecast

Historical annual transmission-delivered energy, and forecast transmission-delivered energy for the High, Central and Low scenarios, are shown in Figure 2.14.

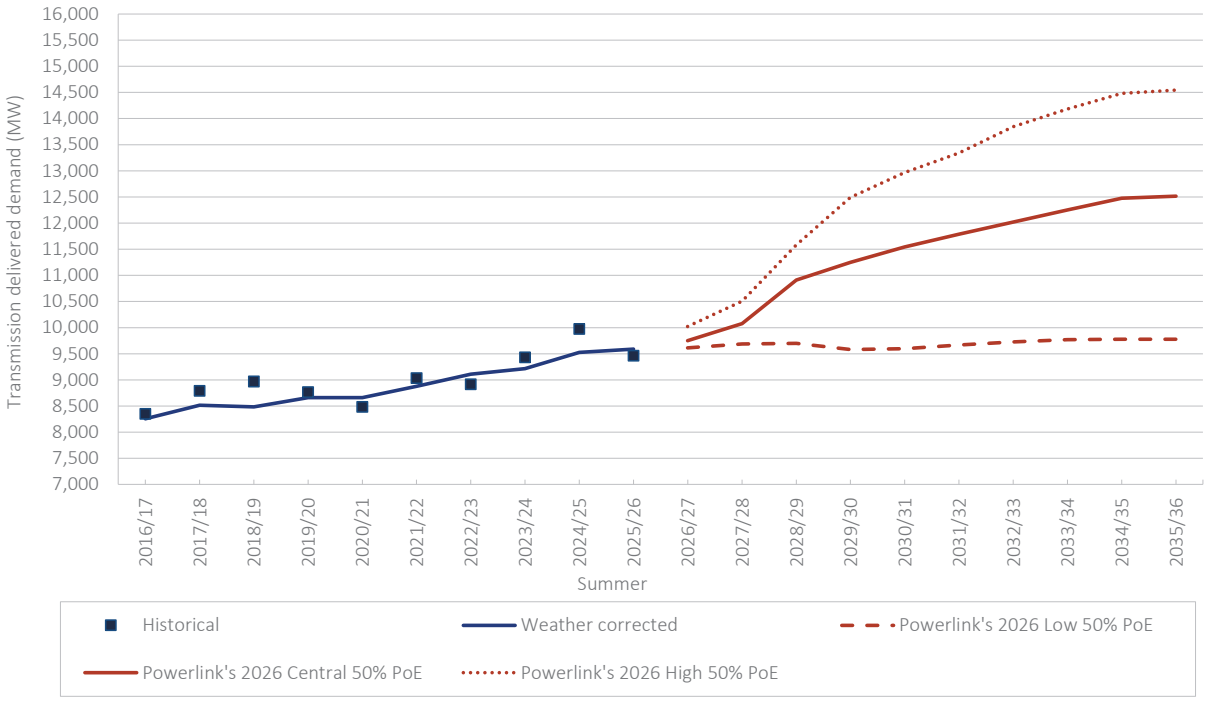
Figure 2.14 Historical and forecast transmission-delivered energy



2.8.3 Summer maximum demand forecast

Summer historical transmission-delivered maximum demands, and the forecast 50% PoE summer transmission-delivered maximum demands for the High, Central and Low scenarios, are shown in Figure 2.15.

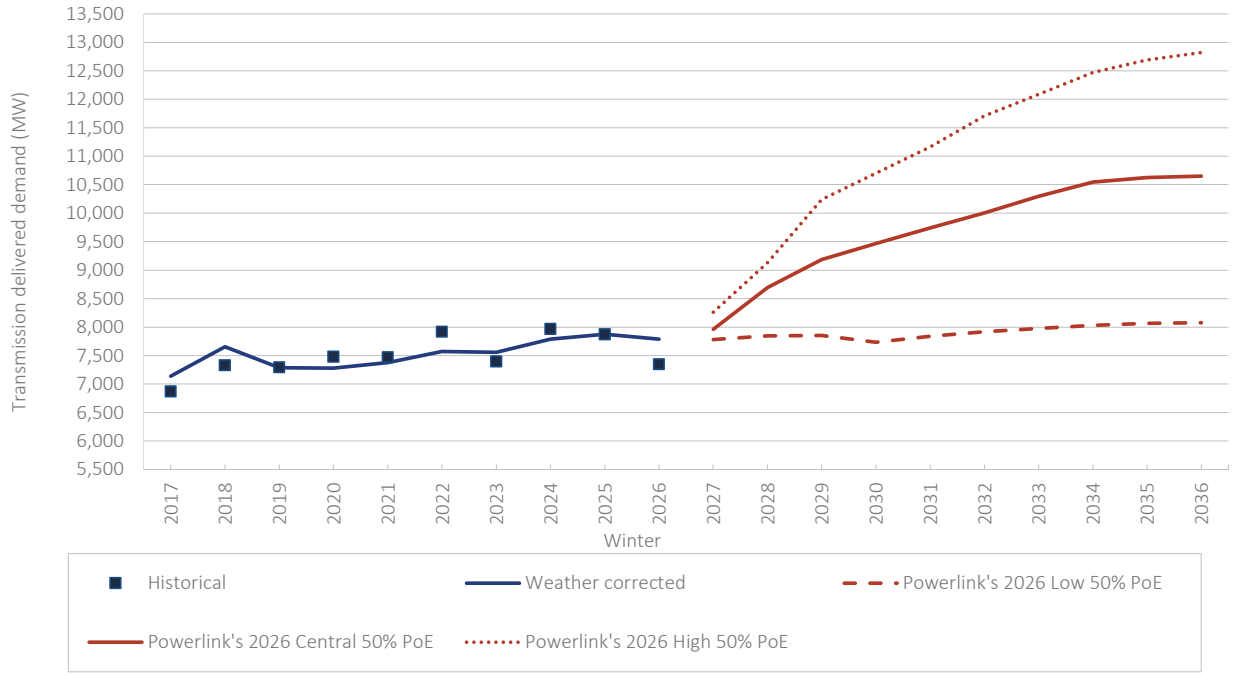
Figure 2.15 Historical and forecast transmission-delivered summer maximum demand



2.8.4 Winter maximum demand forecast

Winter historical transmission-delivered maximum demands, and the forecast 50% PoE winter transmission-delivered maximum demands for the High, Central and Low scenarios, are shown in Figure 2.16.

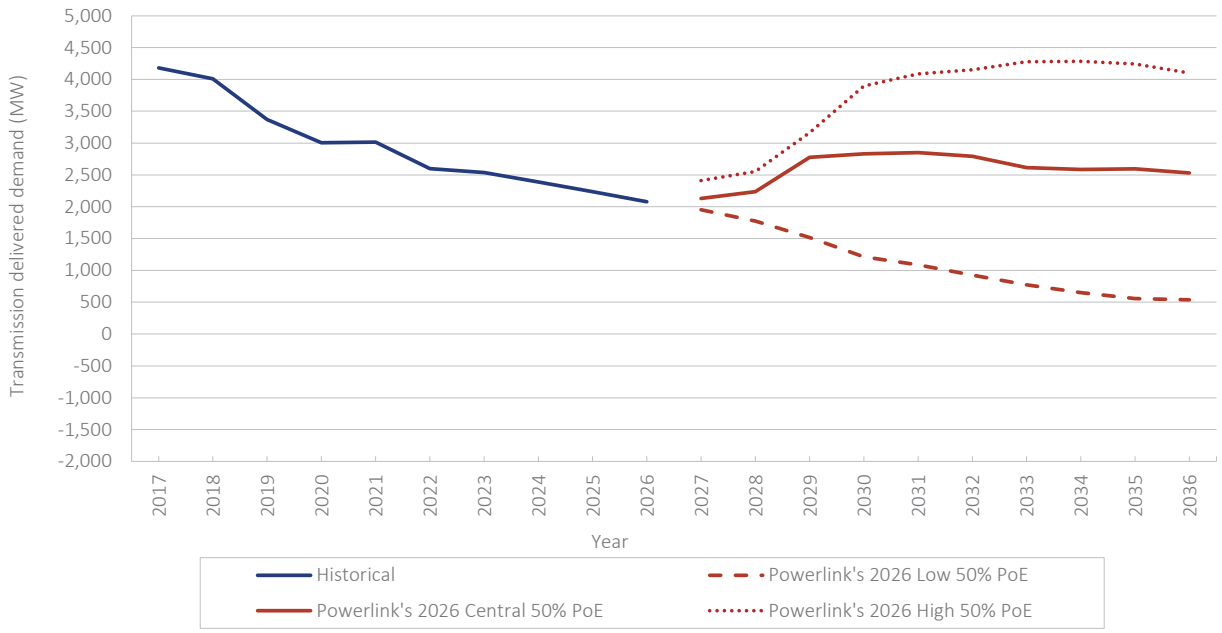
Figure 2.16 Historical and forecast transmission-delivered winter maximum demand



2.8.5 Minimum demand forecast

Historical transmission-delivered minimum demands, and the forecast 50% PoE annual transmission-delivered minimum demands for the High, Central and Low scenarios, are shown in Figure 2.17.

Figure 2.17 Historical and forecast transmission-delivered annual minimum demand



Note:
(1) The minimum demand forecast does not factor in any market intervention to prevent the grid from becoming insecure under the minimum system load conditions. Market interventions could include directing off embedded non-scheduled generators and directing on transmission-connected BESS and Pumped Hydro Energy Storage (PHES) systems to increase demand.

2.9 Zone forecasts

Powerlink's 2026 TAPR zone maximum demand forecasts have been on a coincident basis with the state peak demand. The 11 geographical zones are defined in Table H.1 and illustrated in Figure H.1 in Appendix H. Each zone experiences its own (non-coincident) maximum demand, which is greater than or equal to that shown in tables 2.4 to 2.9.

Table 2.3 presents the average ratio of each zone's maximum transmission-delivered demand to its transmission-delivered demand at the time of Queensland region maximum delivered demand. These values can be used to multiply demands in tables 2.6 and 2.8 to estimate each zone's individual maximum transmission-delivered demand, the time of which is not coincident with the time of Queensland region maximum transmission-delivered demand. The ratios are derived from historical demand patterns.

Table 2.3 Average ratios of zone maximum delivered demand to zone delivered demand at time of Queensland region maximum delivered demand

Zone	Winter	Summer
Far North	1.14	1.12
Ross	1.56	1.40
North	1.16	1.16
Central West	1.13	1.25
Gladstone	1.03	1.02
Wide Bay	1.03	1.19
Surat	1.26	1.27
Bulli	1.06	1.12
South West	1.05	1.23
Moreton	1.02	1.04
Gold Coast	1.07	1.10

Tables 2.4 and 2.5 show the historical and forecast transmission-delivered energy for the Central scenario for each of the 11 zones in the Queensland region.

Table 2.4 Annual historical transmission-delivered energy by zone (GWh)

Financial Year	Far North	Ross	North	Central West	Gladstone	Wide Bay	Surat	Bulli	South West	Moreton	Gold Coast	Total
2016/17	1,704	2,682	2,661	3,098	10,196	1,305	4,154	1,524	1,308	18,103	3,145	49,880
2017/18	1,657	2,645	2,650	3,027	9,362	1,238	4,383	1,497	1,315	17,873	3,092	48,739
2018/19	1,648	2,338	2,621	2,996	9,349	1,198	4,805	1,519	1,376	17,849	3,065	48,764
2019/20	1,594	2,466	2,495	2,859	9,303	1,031	5,025	1,580	1,141	17,395	2,971	47,860
2020/21	1,519	2,569	2,413	2,813	9,383	970	5,241	1,491	993	16,807	3,222	47,421
2021/22	1,598	2,418	2,755	2,776	9,124	904	5,420	1,395	990	17,101	2,924	47,405
2022/23	1,602	2,074	2,668	2,783	8,898	898	5,279	1,334	971	16,829	2,878	46,214
2023/24	1,566	2,286	2,548	2,866	9,368	951	5,376	1,481	991	17,093	2,948	47,474
2024/25	1,501	2,275	2,555	2,807	9,353	953	5,363	1,513	918	17,125	2,941	47,304
2025/26	1,452	2,466	2,746	2,848	9,496	773	5,365	1,512	978	17,028	2,928	47,592

Table 2.5 Annual forecast transmission-delivered energy by zone (GWh)

Financial Year	Far North	Ross	North	Central West	Gladstone	Wide Bay	Surat	Bulli	South West	Moreton	Gold Coast	Total
2026/27	1,569	1,993	2,700	3,006	9,405	459	5,350	1,376	953	19,125	3,564	49,502
2027/28	1,549	2,114	2,698	3,219	9,979	487	5,369	1,405	976	20,202	3,649	51,647
2028/29	1,528	2,115	2,710	3,387	10,766	498	5,400	4,410	993	21,060	3,798	56,664
2029/30	1,508	2,106	2,733	3,389	11,126	493	5,457	4,437	991	22,905	3,867	59,014
2030/31	1,484	2,091	2,705	3,385	11,219	482	5,396	4,414	985	24,594	3,912	60,667
2031/32	1,462	2,184	2,683	3,387	11,280	474	5,231	4,406	977	26,122	3,961	62,165
2032/33	1,446	2,178	2,665	3,367	11,230	474	5,060	4,371	976	27,732	4,014	63,512
2033/34	1,430	2,177	2,653	3,359	11,215	468	4,949	4,346	967	28,683	4,048	64,294
2034/35	1,423	2,173	2,635	3,357	11,211	468	4,885	4,333	969	30,524	4,103	66,082
2035/36	1,414	2,172	2,629	3,356	11,211	466	4,863	4,337	966	31,002	4,152	66,567

Tables 2.6 and 2.7 show the historical and forecast transmission-delivered summer maximum demand for each of the 11 zones in the Queensland region, based on the central scenario and average (50% PoE) summer weather.

Table 2.6 State historical summer maximum transmission-delivered demand by zone (MW)

Summer	Far North	Ross	North	Central West	Gladstone	Wide Bay	Surat	Bulli	South West	Moreton	Gold Coast	Total
2016/17	258	222	378	429	1,193	270	421	178	286	3,993	719	8,347
2017/18	304	376	413	463	1,102	278	504	183	301	4,147	718	8,789
2018/19	342	339	400	484	1,096	285	526	191	312	4,270	724	8,969
2019/20	286	325	391	368	1,080	263	610	191	267	4,276	709	8,766
2020/21	254	405	431	471	1,111	298	588	165	248	3,894	614	8,479
2021/22	363	441	473	518	1,103	269	594	174	253	4,146	697	9,031
2022/23	305	365	414	418	1,091	283	547	132	276	4,359	725	8,916
2023/24	294	321	423	372	1,098	214	608	177	270	4,907	742	9,429
2024/25	327	443	405	475	1,120	297	641	197	255	4,988	824	9,974
2025/26	348	520	446	484	1,143	334	608	180	285	4,344	768	9,462

Table 2.7 State forecast summer maximum transmission-delivered demand by zone (MW)

Summer	Far North	Ross	North	Central West	Gladstone	Wide Bay	Surat	Bulli	South West	Moreton	Gold Coast	Total
2026/27	356	600	581	553	1,131	249	640	185	299	4,425	733	9,752
2027/28	357	628	598	603	1,246	262	662	203	303	4,471	742	10,076
2028/29	364	608	607	608	1,314	256	675	688	296	4,719	777	10,912
2029/30	369	592	606	616	1,320	264	675	685	302	5,026	796	11,251
2030/31	366	596	612	607	1,301	252	658	670	302	5,355	824	11,542
2031/32	367	603	616	597	1,307	258	640	672	299	5,596	831	11,787
2032/33	373	633	624	597	1,320	262	648	681	290	5,767	825	12,020
2033/34	372	643	627	618	1,325	249	635	674	306	5,978	825	12,252
2034/35	382	620	638	611	1,326	257	613	674	303	6,222	831	12,476
2035/36	379	595	609	597	1,264	253	579	639	296	6,447	857	12,516

Tables 2.8 and 2.9 show the historical and forecast transmission-delivered winter maximum demand for each of the 11 zones in the Queensland region, based on the Central scenario and average (50% PoE) winter weather.

Table 2.8 State historical winter maximum transmission-delivered demand by zone (MW)

Winter	Far North	Ross	North	Central West	Gladstone	Wide Bay	Surat	Bulli	South West	Moreton	Gold Coast	Total
2017	241	368	366	377	1,074	216	513	187	248	2,797	483	6,870
2018	242	366	335	439	1,091	235	475	186	336	3,086	540	7,331
2019	234	284	362	419	1,037	239	615	195	293	3,078	540	7,296
2020	227	306	327	449	1,104	246	531	191	313	3,274	515	7,483
2021	204	296	334	383	1,075	250	592	179	339	3,275	545	7,472
2022	230	246	322	431	991	280	508	162	360	3,780	611	7,921
2023	217	237	352	418	1,069	252	606	167	321	3,225	537	7,399
2024	221	187	367	441	1,071	270	473	193	396	3,728	624	7,970
2025	233	329	416	457	1,059	247	673	192	324	3,392	555	7,876
2026	221	378	381	424	1,099	224	614	189	304	3,017	497	7,349

Table 2.9 State forecast winter maximum transmission-delivered demand by zone (MW)

Winter	Far North	Ross	North	Central West	Gladstone	Wide Bay	Surat	Bulli	South West	Moreton	Gold Coast	Total
2027	282	475	460	438	1,131	197	507	147	237	3,506	581	7,962
2028	304	534	509	513	1,246	223	563	173	258	3,803	631	8,757
2029	301	502	502	503	1,314	211	558	569	244	3,901	643	9,249
2030	305	490	501	509	1,320	218	558	567	250	4,155	659	9,531
2031	304	495	508	504	1,301	209	546	556	251	4,447	684	9,805
2032	307	504	515	499	1,307	216	536	562	250	4,679	695	10,069
2033	310	526	519	496	1,320	218	539	566	241	4,793	685	10,213
2034	306	529	515	508	1,325	205	522	554	252	4,915	678	10,308
2035	310	504	518	497	1,326	209	499	548	246	5,058	675	10,391
2036	308	484	496	486	1,264	206	471	520	241	5,244	697	10,416

2.10 Summer and winter maximum and annual minimum daily profiles

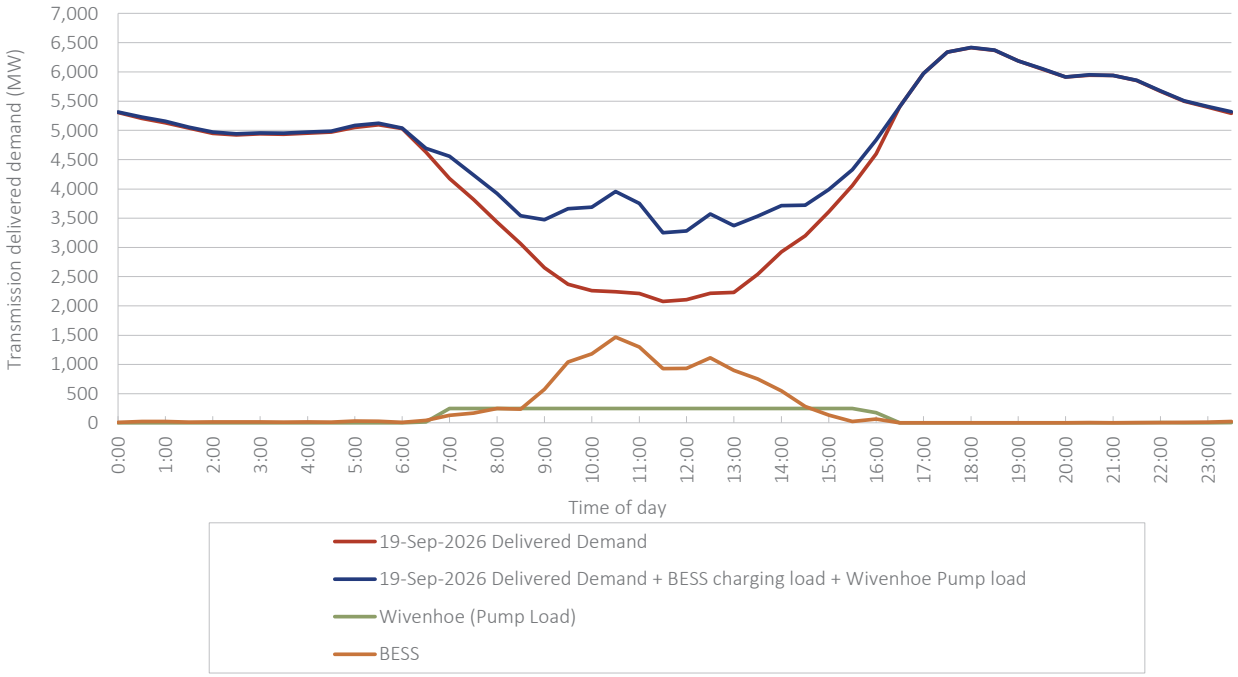
The daily load profiles (transmission-delivered) for the Queensland region on the days of summer 2025/26 and winter 2026 maximum demands are shown in Figure 2.18.

Figure 2.18 Daily load profile of summer 2025/26 and winter 2026 maximum transmission-delivered demand days



The 2026 annual minimum (transmission-delivered) daily load profile for the Queensland region delivered demand plus transmission-connected BESS charging load and Wivenhoe pump load is shown in Figure 2.19.

Figure 2.19 Daily load profile of the 2026 annual minimum transmission-delivered demand day and minimum delivered demand plus transmission-connected BESS charging load and Wivenhoe pump load



Notes:
(1) Based on preliminary meter data up to 22 September 2026.
(2) The transmission-delivered demand definition excludes the load from pumped hydro and transmission-connected BESS charging load. Adding the transmission-connected BESS and pumped hydro load to the minimum transmission-delivered demand demonstrates that there is extra load on the network that assists in avoiding insecure load levels.

2.11 Annual load duration curves

The annual historical load duration curves for the Queensland region transmission-delivered demand since 2021/22 are shown in Figure 2.20. The curves illustrate the widening gap between minimum and maximum demand levels on the network. While maximum demand has traditionally driven network planning considerations and asset utilisation, the rapid decline in minimum demand is creating new operational challenges that must also be managed. Figure 2.21 and Figure 2.22 provide a detailed view of the lowest and highest demand periods, respectively, which are the areas of greatest interest from a network planning perspective.

Figure 2.20 Historical transmission-delivered load duration curve

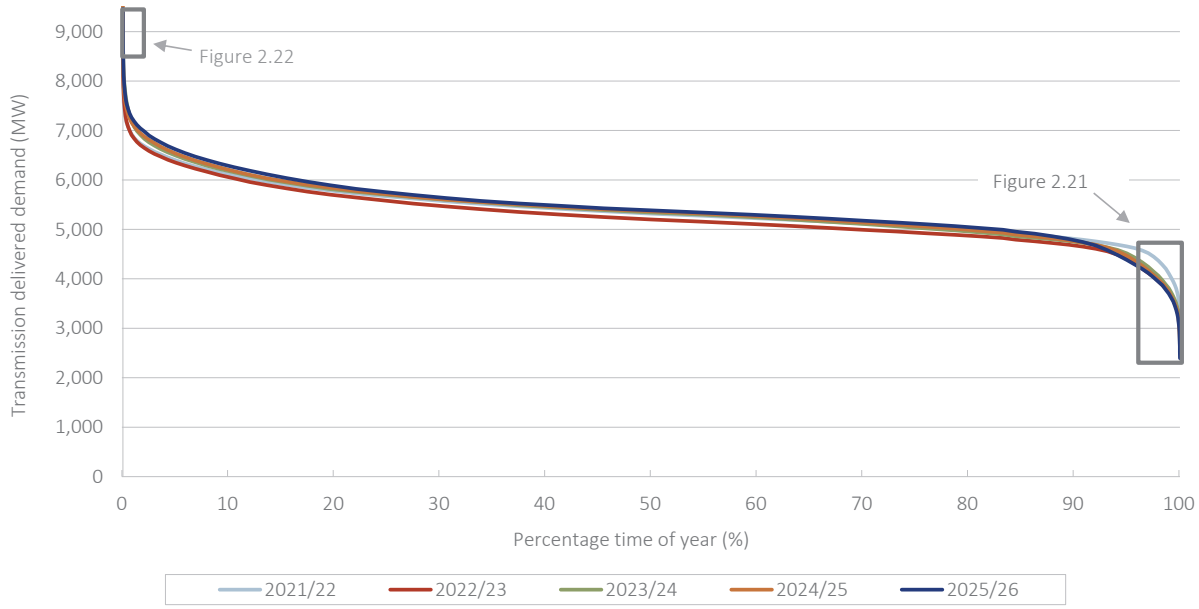


Figure 2.21 Historical transmission-delivered load duration curves (95-100%)

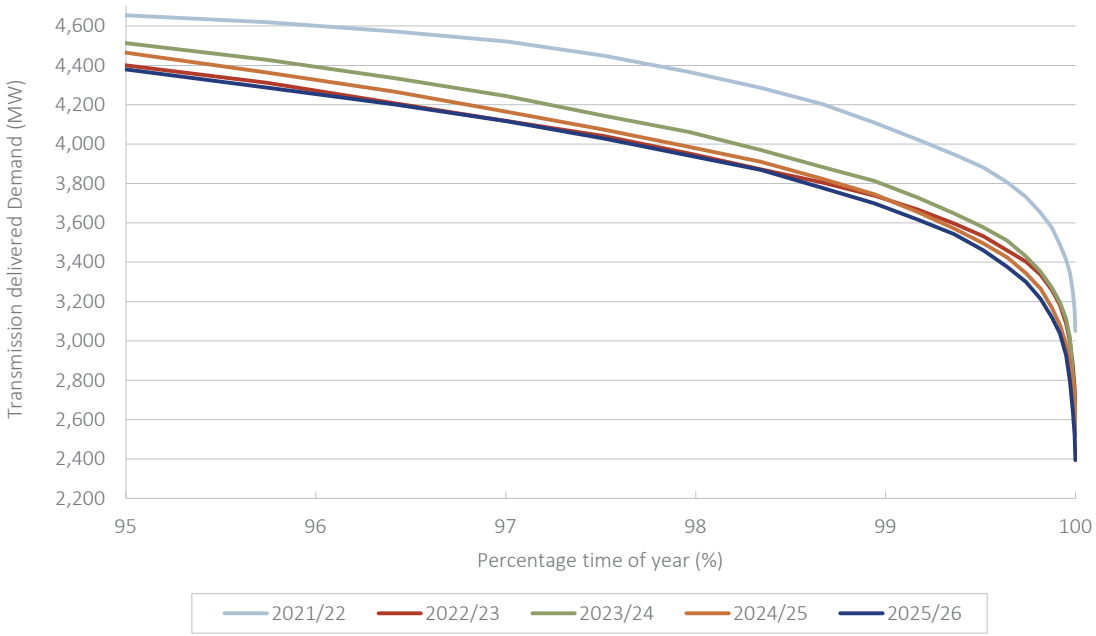
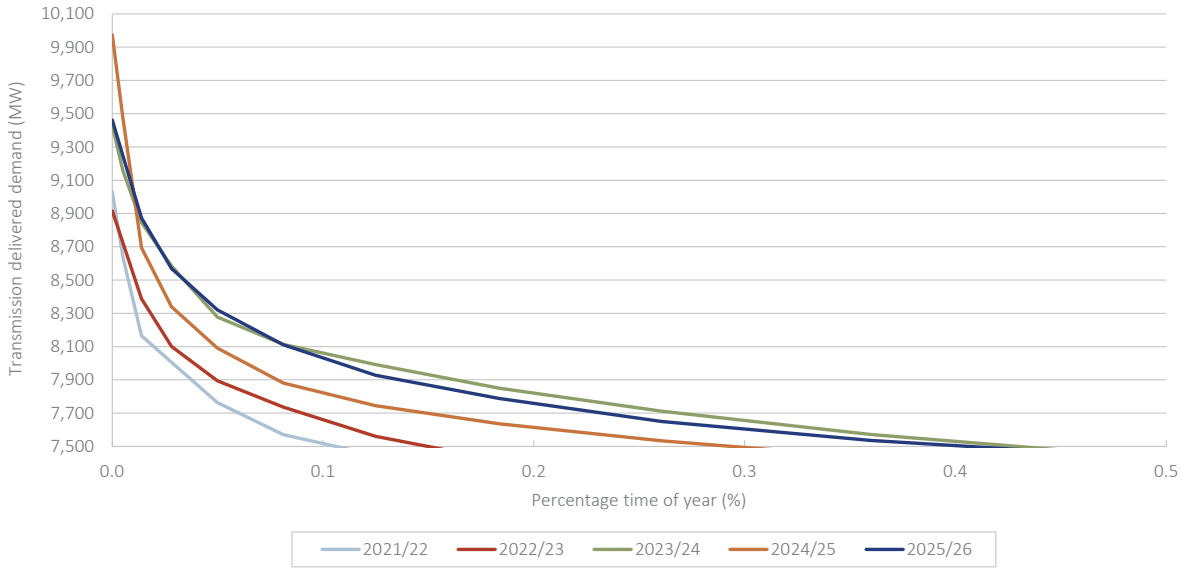


Figure 2.22 Historical transmission-delivered load duration curves (0-0.5%)



Power System Security Planning

3.1 System security services
3.2 System security framework
3.3 Activities to meet system strength and inertia requirements
3.4 Modelling to plan activities to meet System Strength Standard
3.5 Response to AEMO's 2025 Transition Plan for System Security
3.6 System strength locational factors

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The increased contribution of generation from inverter-based resources (IBR) is changing the way system security services such as system strength and inertia are planned for, delivered and managed. Powerlink is actively planning for and procuring system security services to support the stable operation of the power system in Queensland.

Key highlights

- System security services have traditionally been provided as an inherent characteristic of synchronous generation.
- The need for new approaches to system security services arises because most IBR do not inherently provide all these services.
- Powerlink is the System Strength Service Provider and Inertia Service Provider for Queensland, with specific obligations defined in the National Electricity Rules (NER).
- Powerlink is seeking to deliver system security services that support a safe, reliable and cost-effective power system for Queensland customers.

3.1 System security services

Queensland's power system has historically comprised synchronous generation such as coal-fired power stations, gas turbines and hydro-electric plants. These large generators provide various system security services, such as voltage regulation, inertia and system strength, as an inherent characteristic of their energy dispatch, supporting stable and reliable power system operation.

Table 3.1 outlines the range of system security services that are needed to operate the power system.

Table 3.1 System security services

Service	Description
System strength	The ability of the power system to maintain a stable and reliable voltage waveform when something disturbs it, such as a fault or sudden change in generation or load. There are two distinct forms of system strength (minimum and efficient) which support different system functions and are currently provided by different sources.
Minimum system strength	Sufficient three phase fault levels to maintain correct protection operation, power quality and stability of the power system. Presently, minimum system strength can only be provided by synchronous sources.
Efficient system strength	Required to support a stable voltage waveform for forecast IBR connections. In addition to synchronous sources, this form of system strength can also be provided by grid-forming Battery Energy Storage Systems (BESS) technology.
Voltage regulation	Sufficient dynamic voltage support to arrest any changes following contingencies.
Frequency control	Maintaining system frequency within acceptable range with ongoing natural variations in load and generation, and sudden step changes following contingencies.
Inertia	Limiting the potential rate of change of system frequency following contingencies.
Damping	Damping of power system oscillations so that any disturbance impacts decay at an acceptable rate.
Power quality	Control of phase unbalance, voltage harmonics, and flicker.
Reserves	Availability of generation reserves or demand side resources to restore system security within 30 minutes following contingencies.

The increased contribution of IBR generation sources, particularly solar and wind, can reduce the availability of system security services in the National Electricity Market (NEM), prompting the need for new approaches to the planning and delivery of these services.

Under the NER, Powerlink is the System Strength Service Provider and Inertia Service Provider for Queensland. Our strategy to discharge our responsibilities to plan for and make system security services available includes:

- pursuing a complementary mix of different technologies to address requirements, as outlined in Powerlink's System Strength Regulatory Investment Test for Transmission (RIT-T)
- timely and efficient investment in solutions to anticipate withdrawal of synchronous generation, while preserving flexibility to invest in or procure further solutions (including non-network solutions) over time
- working with the Australian Energy Market Operator (AEMO) and Energy Queensland (as owner of the Energex and Ergon Energy distribution networks) to explore ways to enhance Queensland's operational tools and investigate new technologies to maintain system security during periods of low operational demand.

3.2 System security framework

The regulatory framework under the NER for the planning, procurement and enablement of system security services has evolved significantly in recent years. Under the current framework:

- 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 must use reasonable endeavours to make system strength and inertia services available to AEMO.

In November 2025, AEMO submitted a proposal to the Australian Energy Market Commission (AEMC) to further amend arrangements. AEMO proposed changes to the NER to:

- allow it to declare forecast system strength and inertia deficits across the NEM to be NSCAS gaps that would require remediation action from System Strength and Inertia Service Providers
- extend the notice of closure period for existing generation plant from three and a half to five years
- extend timeframes for System Strength and Inertia Service Providers to comply with system security requirements from three to five years
- assess options for system security services under a new process, or a streamlined version of the RIT-T.

AEMO considers these changes would support the efficient and timely deployment of system security resources.

In January 2026, the Australian Energy Council and the Clean Energy Council submitted a related proposal to:

- provide greater clarity on annual planning obligations
- enhance accountability and transparency of system security services planning and procurement
- develop defined and consistent procurement processes across NEM jurisdictions with flexibility to progress and adapt with the market.

The AEMC has consolidated the two proposals, noting they are complementary and address different aspects of the system security planning and procurement framework. More information is available on the AEMC's website.

Powerlink will continue to engage with the AEMC, AEMO and industry stakeholders to enhance the framework for system security services through the rule change process.

3.3 Activities to meet system strength and inertia requirements

Powerlink has progressed several activities to meet system strength and inertia requirements since publishing the 2025 TAPR:

- In addition to the existing agreement with Ratch Australia for the provision of system strength services at the Townsville Power Station, in December 2025, Powerlink finalised an agreement for system strength services from Pacific Hydro's synchronous condenser located at their Haughton Solar Farm Stage 1 site in Northern Queensland.
- In March 2026, Powerlink signed an agreement with Hitachi Energy to supply and install four synchronous condensers to deliver system strength in Central Queensland and maintain voltage stability and inertia. Two of the units will be installed at the Calliope River Substation, with one each at the Nebo and Stanwell substations.
- Powerlink will continue to assess the need for and monitor potential network and non-network solutions for future system strength requirements in Southern, Central and Northern Queensland.
- Powerlink is progressing studies to examine the technical feasibility and capability of grid-forming BESS to deliver minimum system strength.

The four synchronous condensers are part of the preferred option in Powerlink's System Strength RIT-T, concluded in June 2025. The target dates for the first two synchronous condensers to become operational is early 2029 with the final two operational by the end of 2029. The total cost of the four units is being finalised. Indicative costs for non-network solutions were included in the RIT-T cost-benefit assessment. However, these costs did not influence the identification of the preferred option as they are treated as a revenue transfer between energy market participants under the RIT-T framework. Actual costs proposed by non-network proponents during or following the RIT-T process are commercially sensitive and therefore not disclosed by Powerlink.

Powerlink will work with AEMO and other relevant stakeholders to manage the operational risks associated with insufficient system strength, such as through outage scheduling.

3.4 Modelling to plan activities to meet system strength standard

Most proponents of grid-following IBR in Queensland are choosing to remediate their efficient system strength requirements through project-specific solutions, including grid-forming BESS. Accordingly, the following discussion focuses on Powerlink's planning and assessment of minimum system strength requirements.

Minimum system strength is provided by synchronous generators when they are operating. Historically this has been provided by coal-fired generation, but it can also be provided by pumped hydro, dedicated synchronous condensers, and generators operating in synchronous condensing mode (enabling them to continue providing system strength even when not operating as a generator, such as when spot prices are insufficient to warrant normal operation).

The number of coal-fired generating units in-service at any point in time in Queensland is a primary consideration for Powerlink's ability to meet system strength requirements. There are currently 22 coal-fired generating units in Queensland, of which eight are in Southern Queensland and 14 are in Central Queensland. The number of units operating in Central Queensland may reduce to eight from March 2029 given the formal notification of potential retirement of Gladstone Power Station (see AEMO Generation Information website). The number of units which are online at any point in time may also vary in response to changing demand profiles and market conditions.

The system strength contribution of each coal unit is effectively equivalent, and considered as one system strength service. Some other sources of system strength provide a fraction of a service, depending on their size, location and technical characteristics (e.g. Kareeya hydro generating units).

To provide sufficient system strength a minimum number of synchronous strength services must be online at all times. This includes four synchronous strength services in Southern Queensland, six services in Central Queensland and two services in Northern Queensland[1].

For the System Strength RIT-T, Powerlink adopted a probabilistic approach to assess the likelihood of maintaining adequate system strength across the grid. This analysis incorporated coal retirement projections and their impact on fault levels and stability, based on AEMO's 2024 Integrated System Plan (ISP) forecasts. The 2024 ISP forecast installed levels of coal-fired generation in Queensland decreasing from 8.13 gigawatts in 2025/26 to zero in 2034/35.

The Queensland Government's Energy Roadmap, released in October 2025, established a new plan for the Queensland energy system. In terms of coal-fired generation, the Queensland Energy Roadmap:

- outlined that coal-fired generation will continue to play an important role in balancing supply and demand and stabilising Queensland's energy system
- reset operating timeframes for state-owned coal assets to technical lives, with options to further extend if needed
- indicated that long-term coal operating decisions will be informed by whole-of-system decision-making criteria for state-owned coal assets, considering system need, asset integrity and economic viability.

These developments are a key input to Powerlink's Material Change in Circumstances (MCC) assessment for the System Strength RIT-T. Powerlink is reassessing system strength requirements using the updated 2026 ISP inputs and assumptions. This includes updated planning analysis that recognises how system strength requirements are expected to shift over time as coal-fired generation unit retirement dates change, together with updated market benefit analysis reflecting the consequential changes in generation dispatch, network limitations and the timing of system strength needs. At the time of TAPR publication, Powerlink's draft MCC assessment is undergoing a 30 business day public consultation period. More information is on our website.

While the Queensland Energy Roadmap may influence the timing and composition of longer-term system strength requirements, Powerlink's current assessment is that the near-term requirement for four new synchronous condensers in Central Queensland in 2029 remains unchanged. The draft MCC assessment further identifies the requirement for a fifth synchronous condenser or equivalent service in Central Queensland by January 2031.

The ordering of the four synchronous condensers does not pre-empt the outcome of our Contingent Project Application (CPA) to the Australian Energy Regulator (AER). The CPA remains the regulatory mechanism through which the AER will assess whether the investment is prudent and efficient and for cost recovery purposes. Rather, early ordering is for delivery risk management, reflecting the long lead times for synchronous condensers and to maintain a credible delivery pathway for the system strength requirements by 2029.

Powerlink's approach also preserves flexibility for non-network solutions to contribute where they become technically viable, commercially firm and deliverable within the required timeframe. This includes the potential future role of grid-forming BESS technology, synchronous service arrangements with existing or new generation plant, and other options such as gas-powered generators equipped with a synchronous condensing mode.

[1] Note there are no coal-fired generating units in northern Queensland, and northern Queensland has historically relied to an extent on system strength from central Queensland.

Powerlink considers that grid-forming BESS technology is continuing to mature and will likely play an important role in future system strength portfolios. It can already be used to provide efficient level system strength, and studies are ongoing to evaluate the extent to which grid-forming BESS can offset the requirement for minimum system strength.

Accordingly, Powerlink will seek to stage decisions to preserve optionality, while still allowing for the long lead times associated with any network solution that may ultimately be required. This approach gives market participants the maximum reasonable opportunity to develop and commit non-network alternatives, while ensuring Powerlink can continue to meet its system strength obligations safely, reliably and cost-effectively.

3.5 Response to AEMO's 2025 Transition Plan for System Security

AEMO's 2025 Transition Plan for System Security (the Transition Plan) noted:

- Queensland's energy system is progressing towards an increasing mix of renewables and storage backed by gas-powered generation.
- Queensland has the youngest coal fleet in the NEM with many Queensland coal stations not close to their end of life.
- Economic factors including inter-regional impacts determining the operational behaviour, availability, and long-term viability of Queensland's coal-fired generation means that it remains prudent to plan for system security ahead of publicly announced retirement dates.
- Minimum System Load (MSL) conditions are expected to become more prevalent, with MSL2 conditions forecast to occur in system normal conditions from Spring 2026[2]. New BESS will help reduce the likelihood of these conditions from Winter 2026. Powerlink acknowledges the uncertainty associated with forecasting near-term MSL conditions and supports AEMO's recommendation of continued development of operational measures to manage these risks.

The Transition Plan also set out AEMO's assessment of Queensland's system strength, inertia and NSCAS requirements, which are explained in the following sections.

3.5.1 Minimum level system strength requirements

AEMO retained the same fault level requirements at Queensland's (five) system strength nodes and identified system strength deficits at three nodes between 2027/28 and 2029/30.

Table 3.2 Queensland Fault Level Requirements and AEMO Identified Deficits

System strength node	Fault level requirement (MVA)	2025/26 Deficit (MVA)	2026/27 Deficit (MVA)	2027/28 Deficit (MVA)	2028/29 Deficit (MVA)	2029/30 Deficit (MVA)
Gin Gin 275kV	2,800	0	0	0	0	0
Greenbank 275kV	4,350	0	0	0	190	30
Lilyvale 132kV	1,400	0	0	24	35	0
Ross 275kV	1,350	0	0	0	0	0
Western Downs 275kV	4,000	0	0	82	287	0

Source: AEMO, *2025 Transition Plan for System Security, Appendix A2: Network Requirements*, December 2025, page 53.

Note:

(1) AEMO included nine synchronous condensers from Powerlink's System Strength RIT-T for the above fault level projections. Non-network contracts with synchronous generating units and grid-forming BESS were not included in the projections. AEMO also indicated that Powerlink was tendering for synchronous unit contracts for system strength, which were not included in this modelling, and which may address the deficits above the 99.87th percentile (used to forecast deficits) at the Greenbank, Lilyvale and Western Downs nodes.

These assessments are sensitive to assumptions regarding the future operation of the coal-fired generation fleet. Given the modest and temporary nature of the identified deficits, Powerlink has reviewed AEMO's results and is satisfied that no additional investment is required in the 2027/28 to 2029/30 period, beyond the network support contracts and synchronous condenser developments that Powerlink is already progressing. In reaching this position, Powerlink has applied the best available information but will continue to monitor developments to maintain demand reliability and system security.

[2] MSL2 is a low-demand operating state where the power system has limited ability to absorb further reductions in demand or increases in generation and is one credible contingency away from requiring operational intervention to maintain secure system operation.

A forecast fault level below AEMO's minimum requirement at a system strength node does not, by itself, require operational intervention. These fault level requirements are used for planning and assessment purposes. Operational measures would only be required where available system strength is insufficient to meet Powerlink's system normal or outage advice, as operationalised by AEMO. In these circumstances, AEMO may take action to maintain system security, including directing generating units or constraining IBR connected under the legacy system strength framework.

3.5.2 Efficient level system strength requirements

AEMO's latest forecast of IBR generation at the Gin Gin, Greenbank, Lilyvale, Ross and Western Downs nodes for the 10-year period from 2025/26 is shown in the 2025 Transition Plan[3]. AEMO noted that the forecast was primarily based on modelling undertaken for the Draft 2024 ISP.

All IBR connecting to Powerlink's network must undergo a Full Impact Assessment (FIA) or stability assessment using electromagnetic transient (EMT) models. This analysis is essential to identify any unstable interactions with other generators or voltage control equipment. This assessment follows AEMO's System Strength Impact Assessment Guidelines (SSIAG), which ensures any negative impacts on system strength are addressed as part of the connection application process. Further details on the assessment and modelling requirements are available in the SSIAG and AEMO's Power System Model Guidelines.

Powerlink focuses its effort on this detailed FIA assessment and does not prioritise the calculation of the Available Fault Level (AFL). Whilst AFL may be a useful indicator of system strength in certain cases, it is an indicative approximation and is only one part of the broader assessment required for a modern power system with increasing levels of IBR. AFL does not fully capture important dynamic system strength characteristics, including the ability to maintain and control voltage waveforms during steady state and post-disturbance conditions, transient and small-signal stability.

Recognising this is particularly important as new technologies, including grid-forming BESS, can provide system strength support that may not be fully reflected through traditional AFL measures. As a result, Powerlink prioritises the broader dynamic performance of the power system, ensuring that system operability, stability and resilience are appropriately assessed.

As stated, most IBR projects in Queensland are choosing to self-remediate their system strength impact, with the implication that Powerlink's procurement of efficient system strength is likely to be modest. Powerlink continues to monitor the need for efficient level system strength services, using AEMO's forecast as a starting point. As indicated in the System Strength RIT-T, Powerlink will engage with industry at the appropriate time should a need to procure efficient level services emerge.

3.5.3 Inertia requirements

AEMO updated the satisfactory and secure inertia levels for Queensland, as shown in Table 3.3.

Table 3.3 Queensland Inertia Requirements

Quantity	Value (2024)	Value (2025)
Satisfactory inertia level	12,000MWs	13,000MWs
Secure inertia level	13,700MWs	14,700MWs
Inertia sub-network allocation	10,500MWs	10,500MWs
Minimum regional interconnected inertia level	Not reported	10,500MWs
Likelihood of islanding	Likely	Likely

Sources: AEMO, *2024 Inertia Report*, December 2024, page 14; AEMO, *2025 Transition Plan for System Security, Appendix A2: Network Requirements*, December 2025, page 45.

Note:

(1) MWs denotes megawatt seconds.

[3] AEMO, *2025 Transition Plan for System Security, Appendix A2: Network Requirements*, December 2025, page 46.

AEMO stated that Queensland is considered likely to island during a significant weather event around the Queensland-New South Wales Interconnector (QNI) corridor, or during a planned outage of a line in the QNI corridor.

Powerlink is required to ensure sufficient supplies are available to meet Queensland's inertia sub-network allocation specified by AEMO under the NER from 2 December 2027. In the Transition Plan, Powerlink's binding inertia planning obligation from December 2027 is referenced to the Queensland inertia sub-network allocation (currently 10,500MWs). However, as Queensland is assessed by AEMO as having a likely islanding risk, Powerlink must also consider the secure inertia level (currently 14,700MWs) under Clause 5.20B.4 of the NER when demonstrating compliance with our Inertia Service Provider obligations.

Historically, inertia has been provided predominantly by synchronous generating units, including coal, gas and hydro generators. As the generation mix evolves, Powerlink is planning and procuring solutions to maintain adequate inertia levels and support ongoing power system security.

A key component of Powerlink's strategy is the deployment of synchronous condensers as part of the preferred option identified through the System Strength RIT-T. The synchronous condensers being procured are designed with flywheel technology to provide significant inertia in addition to their system strength and voltage support capabilities. The inertia contribution of these units (1,400MWs per unit) is comparable to, and in some cases greater than, that provided by existing coal-fired generating units on a unit-for-unit basis.

Powerlink's assessments indicate that the requirements for minimum system strength will continue to necessitate the operation of a minimum number of synchronous machines within Queensland. This includes a combination of existing synchronous generating units and the new synchronous condensers as they are commissioned. Because these synchronous machines inherently provide inertia while delivering the fault current and voltage waveform support required for minimum system strength, the minimum system strength portfolio also contributes materially to meeting Queensland's inertia requirements.

Powerlink's analysis shows that the minimum level of synchronous generation required to satisfy Queensland system strength requirements is also sufficient to maintain inertia above Queensland's inertia sub-network allocation of 10,500MWs throughout the assessment period to 2031. This assessment considers the inertia contribution from existing synchronous generating units together with the four synchronous condensers procured as part of Powerlink's system strength remediation activities. In addition, under Queensland islanded operating conditions, the preliminary assessment considered AEMO's assumed availability of 375MW of 1-second Frequency Control Ancillary Services (FCAS), together with the inertia contribution from 4,200MW of existing and committed grid-forming BESS. The results indicate that the combination of these services provides a level of frequency resilience consistent with the secure operating outcomes underpinning AEMO's secure inertia level assessment.

Accordingly, no additional inertia-specific remediation has been identified as required within the outlook period beyond the system strength solutions already committed or under implementation. Should future assessments identify emerging inertia requirements due to lower-than-expected availability of synchronous generation, procuring inertia from existing grid-forming BESS or fast frequency response services from existing BESS, is expected to provide cost-effective remediation options compared to procuring additional levels of physical inertia (from synchronous plant) to maintain secure frequency performance.

Powerlink will continue to monitor inertia requirements, generation retirement schedules, the availability of fast frequency response services, and the availability of synthetic inertia. Should future assessments identify a shortfall, Powerlink will undertake additional procurement activities as necessary to maintain compliance with our system security obligations.

3.5.4 NSCAS assessment

The NSCAS assessment considers whether the transmission system can remain within thermal and voltage limits, maintain adequate reactive margins, limit rapid voltage changes from reactive plant switching, and return to a secure operating state following a credible contingency or protected event.

AEMO assessed these NSCAS needs over a five-year outlook period and declared no gaps within the Queensland region.

3.6 System strength locational factors

System strength locational factors are part of the formula for system strength charges. System strength locational factors and nodes are included in Appendix J and shown in the TAPR Portal.

Non-network solutions

4.1 The role of non-network solutions in transmission planning
4.2 How Powerlink identifies potential opportunities
4.3 How non-network options are formally considered
4.4 Where to find potential opportunities
4.5 Near-term needs highlighted for early market visibility
4.6 How to engage with Powerlink

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Non-network solutions form part of Powerlink's integrated approach to providing safe, reliable, secure and cost-effective transmission services for customers. Where suitable, non-network solutions can address all or part of an identified need, influence the form, scale, timing or staging of network investment, complement network development, provide network support or power system security services, and preserve flexibility as requirements evolve. This chapter helps interested parties understand Powerlink's approach, identify potentially relevant needs and opportunities across the TAPR, and how to engage with Powerlink.

Key highlights

- Powerlink considers potential network, non-network and operational responses to identified needs.
- Non-network solutions can address all or part of a need, improve the use of existing network capability, influence the timing or staging of investment, or contribute to broader system security requirements.
- The TAPR and supporting resources provide early, indicative information on potential needs and service requirements to help interested parties assess where a capability may be relevant.
- Powerlink welcomes early engagement to clarify published needs and indicative service requirements, and to discuss where a capability may be relevant.
- Where a formal consultation process applies, Powerlink considers and, where applicable, assesses non-network options under the relevant regulatory or legislative requirements. Published documents set out the relevant requirements, key dates and submission arrangements.
- Early engagement, including requests to join the Non-network Engagement Stakeholder Register, should be directed to NetworkAssessments@powerlink.com.au.

Chapter guide

Sections 4.1 to 4.3 explain the role of non-network solutions and the relevant planning, consultation and assessment pathways. Sections 4.4 and 4.5 explain where to find information on potential opportunities in the TAPR, and Section 4.6 explains how interested parties can engage with Powerlink.

4.1 The role of non-network solutions in transmission planning

Queensland's transmission system is being reshaped by growth in generation and energy storage, changing demand profiles, emerging large loads, evolving system security requirements and the progressive reinvestment in existing network assets in response to condition and performance risks. As the system evolves, non-network solutions can play an important role in addressing transmission network and system security needs.

To identify appropriate responses to identified needs, Powerlink considers network, non-network and operational approaches, including combinations of these approaches. Non-network solutions can be considered as standalone responses, as alternatives to network investment or as components of a broader response. Potential non-network options include demand management, energy storage and generation services, as well as capabilities that provide or support inertia, system strength, network support and control ancillary services, and voltage control.

Where suitable, a non-network option can address all or part of an identified need, make more effective use of existing network capability, or influence the form, scale, timing or staging of network investment. It may also complement network development and preserve flexibility as future requirements evolve. In these ways, non-network options may contribute to prudent and efficient outcomes for customers, either independently or as part of an integrated response.

Whether a potential non-network option is suitable will depend on the identified need and factors including location, service capability, availability, operating performance, delivery timing, proposed performance arrangements and commercial feasibility.

Non-network solutions in planning and practice

Powerlink's experience illustrates how non-network solutions can be used or assessed in response to identified transmission network and power system needs:

- Powerlink has entered into agreements for reactive power support in Southern Queensland and system strength services in Northern Queensland.
- Powerlink continues to engage with potential proponents on non-network solutions that may contribute to future system strength requirements across Queensland.
- The Gladstone Project Priority Transmission Investment (PTI) assessment considered network and non-network options as part of an integrated response to interrelated reliability, transfer capability and system security needs. Further information is provided in Section 7.3.2.

Emerging non-network opportunities

Powerlink continues to assess how emerging technologies, technical capabilities and delivery approaches may broaden the range of responses available for future transmission network and system security needs.

Powerlink's Unlocking Battery Potential, published in November 2025, provides information for battery energy storage system developers on technical capabilities and strategic siting to support more efficient network utilisation and lower total system costs. The guidance is intended to inform early project development but does not alter Powerlink's obligations under the National Electricity Market's (NEM) open-access framework.

4.2 How Powerlink identifies potential opportunities

Through our annual planning review, Powerlink identifies emerging transmission network and power system needs across the 10-year outlook. The TAPR and supporting resources provide early visibility of where non-network capabilities may be relevant, including available information on the location, nature and indicative timing of potential or emerging needs and, where available, indicative service requirements.

Early visibility supports preliminary market assessment and provides an opportunity for Powerlink to better understand potentially relevant market capability as planning develops.

This information does not pre-determine whether a need will be addressed through a network or non-network response. Some needs remain at an early stage, and their timing, assumptions and potential service requirements may change as planning and technical analysis progress. Table 4.1 outlines the indicative pathway from early visibility through formal consultation and assessment and, where applicable, delivery.

Further information on Powerlink's broader planning and network development approach is provided in chapters 1 and 5, and Appendix A.

Table 4.1 Indicative development and engagement pathway for potential non-network opportunities

Phase	Information provided by Powerlink	How interested parties can participate
Early planning and visibility	Planning information on potential network needs and system security requirements through the TAPR, regional development outlooks, TAPR Templates and TAPR Portal. Where practicable, this includes indicative non-network requirements.	Review published information, consider whether an existing or proposed capability may be relevant, contact Powerlink at NetworkAssessments@powerlink.com.au for an early discussion or to request inclusion on the Non-network Engagement Stakeholder Register.
Formal consultation and assessment	Further information on the identified need, timing, technical requirements and potential options through the applicable published planning, consultation or assessment process. This may include a Regulatory Investment Test for Transmission (RIT-T), an Expression of Interest (EOI) or another applicable process. Members of the Non-network Engagement Stakeholder Register may receive relevant updates, including notification of RIT-T consultation reports.	Review the published documents, seek clarification where needed and provide information or make a submission through the applicable process.
Procurement and delivery	Published assessment outcomes and, where applicable, information on subsequent procurement or delivery arrangements.	Participate in any subsequent procurement or delivery process in line with its published or notified requirements. Powerlink's Network Support Contracting Framework provides information on the contracting principles that may apply where a non-network service is procured.

Note: This table provides an indicative planning and engagement pathway and does not replace any process prescribed by the National Electricity Rules (NER). Inclusion of a need does not confirm that a feasible non-network solution exists or that a solution has been selected.

4.3 How non-network options are formally considered

The regulatory consultation and assessment pathway for an identified need depends on the nature and timing of the need and the relevant regulatory or legislative framework. Depending on the circumstances, non-network options can be considered through:

- a RIT-T
- an EOI or another applicable process for a power system security requirement
- the consultation and assessment arrangements for an actionable Integrated System Plan (ISP) project
- consultation and assessment arrangements applying under Queensland's PTI framework

The applicable requirements, submission arrangements and key dates are set out in the relevant published consultation or assessment documents.

4.3.1 RIT-T consultation

Where the RIT-T applies, Powerlink consults on the identified need and assesses credible network and non-network options. Under the NER, a credible option is an option, or group of options, that addresses the identified need, is commercially and technically feasible and can be implemented in sufficient time to meet the identified need. Information on current and completed RIT-T processes, including the applicable technical requirements and submission arrangements, is available on Powerlink's investment consultations page.

4.3.2 System security services

Power system security requirements may be addressed through network, non-network or integrated responses. Depending on the nature and timing of the requirement and the applicable NER provisions, Powerlink may undertake an EOI process, a RIT-T or another applicable consultation and assessment process. Current system security requirements and associated consultation processes are described in Chapter 3 with further information available on Powerlink's power system security consultations page.

4.3.3 Actionable Integrated System Plan projects

For an actionable ISP project, AEMO consults on potential non-network options in accordance with the NER and provides relevant submissions to the RIT-T proponent for consideration through the actionable ISP project RIT-T process. Information on Queensland's current actionable ISP projects and associated RIT-T processes is provided in Chapter 5.

4.4 Where to find potential opportunities

Potential non-network opportunities can arise in response to transmission network and system security needs identified across the TAPR and supporting planning resources. Interested parties should use these sources together to understand emerging service drivers, identify specific regional needs, monitor formal processes and assess the locational and technical relevance of an existing or proposed capability.

Where to find relevant information

Where to look	What it provides
Chapters 2, 3 and 9	Review demand and storage outlooks, system security requirements, network utilisation and constraints that provide context for emerging system needs and potential service drivers.
Chapter 5	Monitor completed, current and planned regulatory consultations and identify needs progressing through formal consultation or assessment.
Chapters 6, 7 and 8	Review potential regional network needs across the 10-year outlook and the nearer-term five-year investment profiles to assess their location, drivers, potential network response and, where available, indicative service requirements.
Appendix F	Summarises the broader pipeline of possible regional network investments over the 10-year outlook in one consolidated list.
TAPR Templates and Portal	Assess the preliminary locational and technical relevance of a capability using information provided through the TAPR Templates and TAPR Portal, including demand data, potential investment information, historical feeder flow data and geographic context. The TAPR Portal is available from Powerlink's Transmission Annual Planning Report webpage by selecting **Visit the TAPR Portal**.

In assessing whether an existing or proposed capability may be relevant, interested parties should consider the need's location and nature, indicative service requirements and timing, operating conditions, and current planning or consultation status. Further detail should be sought from the applicable regional profile, TAPR Template or published consultation document.

4.5 Near-term needs highlighted for early market visibility

Table 4.2 highlights selected near-term voltage support and transformer reinvestment or augmentation needs. The table summarises the potential network option, indicative service requirement, timing and current planning or consultation status to help interested parties assess whether a capability may be relevant.

Table 4.2 is not a complete list of potential non-network opportunities. Other transmission network and system security needs identified across the TAPR and supporting planning resources should also be considered where an existing or proposed capability may be relevant.

Table 4.2 Near-term network needs highlighted for early market visibility

Identified need	Potential network option	Indicative network option cost	Regional reference	Indicative service requirement and potential non-network contribution	Indicative need timing	Planning and consultation status
Manage voltage levels and transfer capability in North Queensland	Replacement of the Strathmore static VAr compensator (SVC) secondary systems, thyristor valves and cooling system	$24 million	North zone, Table 6.4 (NQ-11)	A minimum of 50MVAr and up to 100MVAr of capacitive voltage support, and a minimum of 80MVAr of inductive voltage support on a continuous basis.	December 2030	Formal consultation – RIT-T in progress
Maintain power-transfer capability and reliability of supply at Tully	Tully 132/22kV Transformer 2 replacement	$10 million	Far North zone, Table 6.2 (FNQ-03)	Up to 18MW and 275MWh per day to support the Tully 22kV network.	June 2029	Early TAPR visibility – formal consultation not commenced
Maintain reliability of supply and transfer capability at South Pine	South Pine 275/110kV Transformer 5 replacement	$16 million	Moreton zone, Table 8.5 (MZ-06)	Approximately 165MW and 1,350MWh per day under network contingency conditions.	December 2030	Early TAPR visibility – formal consultation not commenced
Maintain reliability of supply at Goodna	Goodna third 110/33kV transformer augmentation	$15 million	Moreton zone, Table 8.5 (MZ-03)	Approximately 75MW and 820MWh per day under network contingency conditions.	June 2030	Early TAPR visibility – formal consultation not commenced
Addressing reliability of supply to the southern Gold Coast and Tweed area	Mudgeeraba third 275/110kV transformer	$35 million	Gold Coast zone, Table 8.6 (GCZ-02)	Up to 180MW and 1,100MWh per day under network contingency conditions.	December 2032	Early TAPR visibility – formal consultation not commenced

Notes: This table supports early market consideration and is not a complete list or formal assessment. Inclusion does not confirm that a feasible non-network solution exists or will be progressed or selected. Costs relate to the most likely network option. Regional profiles, TAPR Templates and consultation documents take precedence.

4.6 How to engage with Powerlink

Powerlink welcomes early engagement where an existing or proposed capability may be relevant to a potential or identified need. Early engagement provides an opportunity to seek clarification on published needs and indicative service requirements, discuss whether a capability may be relevant and exchange information that may support Powerlink's ongoing planning. It is exploratory and does not replace any subsequent formal consultation, assessment or procurement process.

Engage with Powerlink on non-network opportunities

Interested parties can contact NetworkAssessments@powerlink.com.au to:

- discuss whether and how a capability may contribute to a potential or identified need, either as a standalone response, through aggregation or as part of an integrated response
- seek clarification or provide information on published needs, service capabilities, locations and development timeframes
- request inclusion on the Non-network Engagement Stakeholder Register to receive relevant updates, including notifications when RIT-T consultation reports are published

A fully developed proposal is not required for early engagement. Where available, high-level information about the capability, location, timing and development maturity may help support an initial discussion.

Formal submissions must be made through the applicable published process.

Where assessment identifies a non-network option for further progression, any subsequent procurement or contracting arrangements will depend on the identified need and the applicable process. Where Powerlink procures a non-network service from a third-party, a Network Support Agreement may be used to document the service, operating, performance and commercial arrangements. Powerlink's Network Support Contracting Framework provides further information on the contracting principles that may apply.

More information on non-network opportunities and Powerlink's approach to non-network solutions is available on Powerlink's website.

Network Development, Programs and Consultations

5.1 Introduction
5.2 Network development approach
5.3 Consultation update
5.4 Network wide investment programs
5.5 Investment and delivery factors
5.6 Lines approaching end of technical service life

05

Powerlink's forward planning seeks to proactively identify emerging network limitations and develop cost-effective solutions for consideration through the relevant regulatory consultation process. Since the release of last year's Transmission Annual Planning Report (TAPR), we have completed or commenced several regulated investment consultation processes, with additional consultations planned over the coming year. Investment planning is also evolving to enable implementation of the Queensland Government's Energy Roadmap, support the 2027-32 Revenue Proposal, align with the Australian Energy Market Operator's (AEMO) 2026 Integrated System Plan (ISP) and to deliver a range of important programs of work.

Key highlights

- Queensland's transmission delivered maximum demand is forecast to continue growing over the next 10 years, with load growth, changing generation and storage patterns, major customer developments and actionable ISP projects contributing to future network needs and potential network developments.
- Powerlink is actively planning for Queensland's future energy system, including continued changes in large-scale generation and energy storage, electrification, emerging large customer loads, evolving system security requirements and non-network solutions.
- Powerlink applies an integrated planning approach that considers asset condition and performance, network capacity and capability, future demand and generation, system security requirements and efficient market outcomes to identify prudent and efficient development pathways.
- The regulated capital expenditure program continues to focus on managing risks associated with ageing transmission assets while responding to emerging network limitations, changing power flows and broader network development requirements.
- Assets approaching the end of their technical service life are assessed through an integrated planning process that considers enduring need, future network capability requirements, alternative network configurations and non-network solutions. Potential outcomes may include refurbishment, replacement, augmentation, reconfiguration, retirement, or decommissioning.
- Maintaining system strength, inertia, voltage control, transfer capability and secure network operation remains a key network-wide focus as Queensland's generation mix continues to evolve.
- This chapter provides a network-wide perspective on future transmission development, while chapters 6 to 8 provide detailed information on emerging network limitations, needs, opportunities and potential investments across the Northern, Central and Southern regions.

5.1 Introduction

Powerlink is actively monitoring the changing outlook for the Queensland region of the National Electricity Market (NEM). The continued integration of new large-scale generation and energy storage facilities, changing demand patterns, electrification, emerging large customer loads, evolving system security requirements and non-network solutions are influencing how the transmission network is planned, developed and operated.

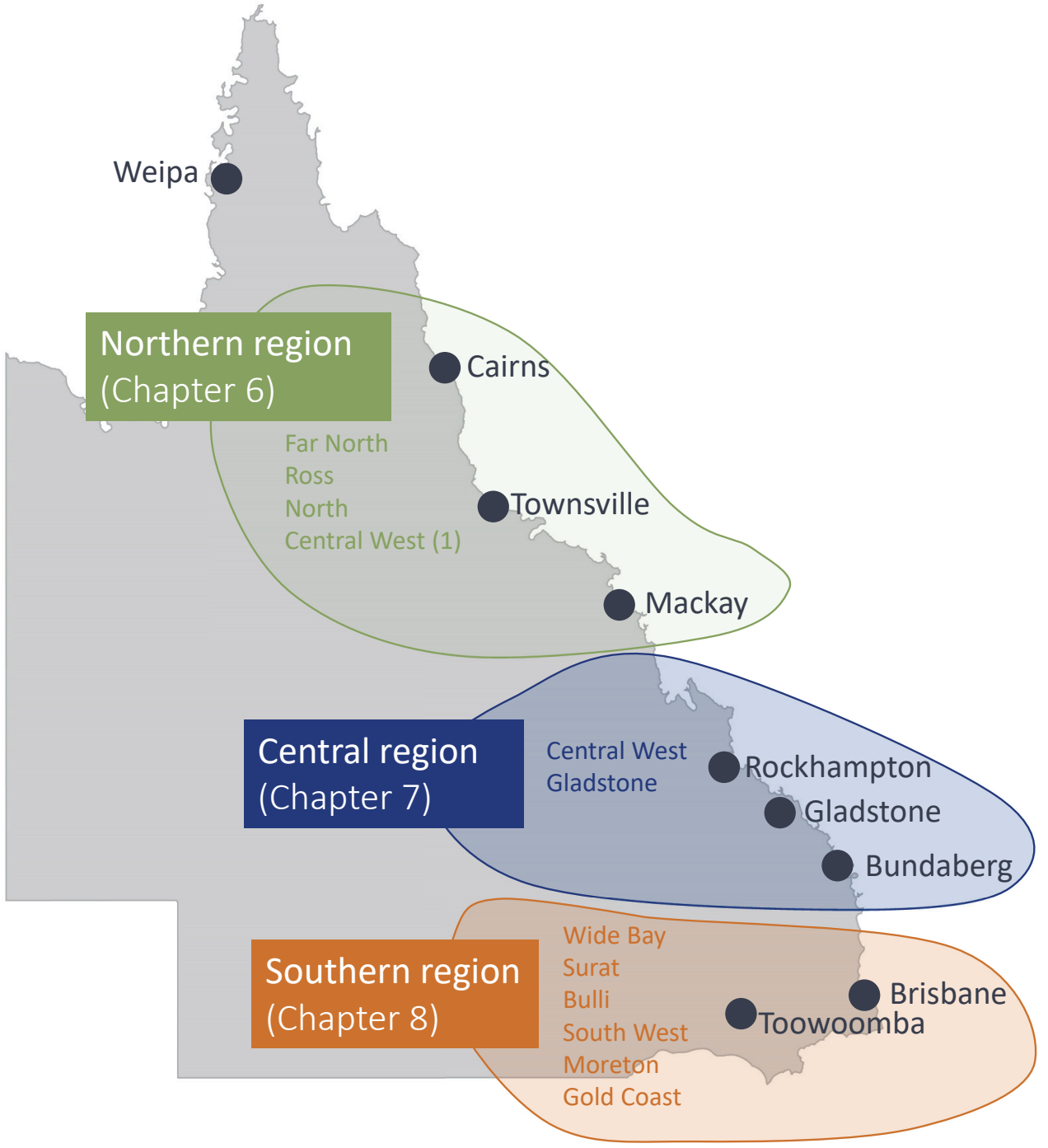
This chapter provides a network-wide overview of Powerlink's development outlook including major investment drivers, consultation activities, programs of work and connection activities. Further information on emerging network limitations, opportunities and potential network developments within parts of the Queensland transmission network information is provided in Chapter 6 (Northern Region), Chapter 7 (Central Region) and Chapter 8 (Southern Region).

Consistent with the requirements of the National Electricity Rules (NER) and the Australian Energy Regulator's (AER) TAPR Guidelines, this chapter and chapters 6 to 8 include information on forecast network limitations, proposed augmentations, asset reinvestment activities, potential asset retirements and de-ratings, consultation activities, and the relationship between proposed developments and AEMO's most recent ISP.

Figure 5.1 illustrates Powerlink's planning regions and zones used throughout this chapter and chapters 6 to 8. The functions performed by major transmission network assets are shown in Figure 5.2.

For the purposes of chapters 6 to 8, the transmission network is presented across Northern, Central and Southern regions. These regional delineations are used to present the network development outlook and do not necessarily align with individual TAPR zone boundaries. Figure 5.1 illustrates the relationship between the regions and TAPR zones, with the geographical zones defined in Appendix H.

Figure 5.1 Powerlink TAPR regions and zones

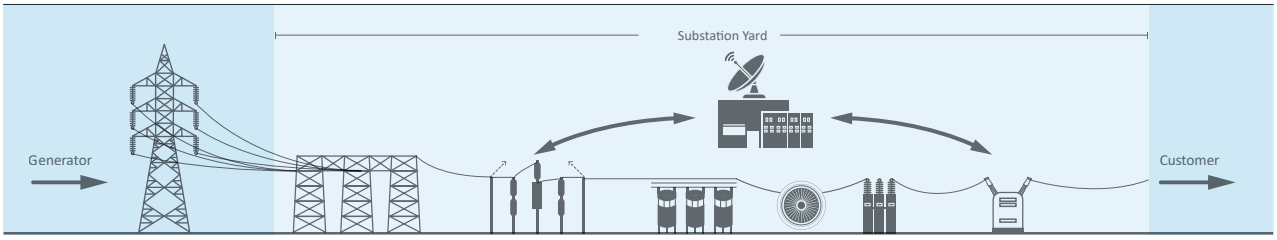


Notes:

(1) The Central West zone traverses the Northern and Central regions.

(2) Refer to Appendix F which lists possible network investments for the 10-year outlook period according to region and zone.

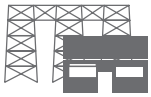
Figure 5.2 Functions of major transmission network assets





Transmission line

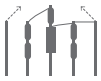
A transmission line consists of tower structures, high voltage conductors and insulators and transports bulk electricity via substations to distribution points that operate at lower voltages.



Substation

A substation, which is made up of primary plant, secondary systems, telecommunications equipment and buildings, connects two or more transmission lines to the transmission network and usually includes at least one transformer at the site.

A substation that connects to transmission lines, but does not include a transformer, is known as a switching station.



- Substation bay

  A substation bay connects and disconnects network assets during faults and also allows maintenance and repairs to occur. A typical substation bay is made up of a circuit breaker (opened to disconnect a network element), isolators and earth switches (to ensure that maintenance and repairs can be carried out safely), and equipment to monitor and control the bay components.



- Static VAr Compensator (SVC)

  A SVC is used where needed, to smooth voltage fluctuations, which may occur from time-to-time on the transmission network. This enables more power to be transferred on the transmission network and also assists in the control of voltage.



- Synchronous condenser

  A synchronous condenser is a large rotating machine connected to the transmission network with no driving force (spins freely). It is similar to a synchronous generator but does not produce energy. It helps the power system with voltage control, system strength, and inertia.



- Capacitor Bank

  A capacitor bank maintains voltage levels by improving the 'power factor'. This enables more power to be transferred on the transmission network.



- Transformer

  A transformer is used to change the voltage of the electricity flowing on the network. At the generation connection point, the voltage is 'stepped up' to transport higher levels of electricity at a higher voltage, usually 132kV or 275kV, along the transmission network. Typically at a distribution point, the voltage is 'stepped down' to allow the transfer of electricity to the distribution system, which operates at a lower voltage than the transmission network.



- Reactor

  Reactors may be connected directly to a transmission line or a bus at the substation. Line reactors are used to limit the remote end voltage of a long high voltage line when energising (and carrying no load). Bus reactors are typically higher rated and used especially during light load conditions to avoid high voltages which may occur on the network.



Secondary systems

Secondary systems equipment assists in the control, protection and safe operation of transmission assets that transfer electricity in the transmission network.



Telecommunication systems

Telecommunication systems are used to transfer a variety of data about the operation and security of the transmission network including metering data for AEMO.

5.2 Network development approach

5.2.1 Investment planning framework

Powerlink's investment planning framework and approach is designed to identify emerging network needs with sufficient lead time to allow the assessment and implementation of prudent and efficient network and non-network solutions. This approach considers a broad range of factors including asset condition and performance, network capability, future demand and generation forecasts, system security requirements, customer connection needs, market outcomes, and changes in the wider operating environment.

Powerlink applies an integrated planning approach that recognises network needs often arise from a combination of factors rather than a single issue. Consequently, future development opportunities may include asset reinvestment, network augmentation, network reconfiguration, operational measures, non-network solutions, asset retirement or other approaches that provide the most efficient long-term outcome for customers.

As part of this process, Powerlink continually monitors the performance and capability of the transmission network to identify emerging limitations and risks that may affect the safe, reliable and secure operation of the power system. Emerging limitations may be driven by factors such as thermal plant ratings (including fault current ratings), protection relay load limits, voltage stability, dynamic stability, system security requirements, changing power flow patterns, or the condition and performance of ageing network assets.

Where potential limitations are identified, Powerlink assesses the need, timing and potential solutions through a staged planning process that considers both immediate requirements and longer-term network development opportunities.

Appendix J and the TAPR Portal list the indicative minimum and maximum short circuit currents and substation design ratings for each Powerlink substation at transmission voltage levels. The maximum short circuit currents take into account the committed generation shown in the Generation Commitments sheet of the Chapter 9 data workbook, and the committed transmission projects listed in Chapter 10.

5.2.2 Central scenario

Based on Powerlink's Central scenario load forecast (refer to Chapter 2), Queensland's transmission delivered maximum demand is expected to grow steadily, with an average annual increase of approximately 2.7% over the next 10 years.

This growth has been forecast to contribute to emerging network limitations in certain parts of the Powerlink transmission network, particularly within Southern Queensland. Powerlink continues to monitor these developments and undertake planning assessments and joint planning activities to identify the nature, timing and extent of any future network needs.

Future network developments may also be influenced by emerging customer developments, electrification opportunities, major industrial loads, changing generation and storage patterns, evolving system security requirements, changing power flows across the transmission network and the delivery of actionable ISP projects.

Powerlink considers these drivers holistically as part of our integrated planning approach, together with emerging asset condition and performance risks, to identify efficient development pathways across the transmission network. Future investments may therefore be driven by a combination of demand growth, generation and storage integration, system security requirements, joint planning outcomes, and broader market developments.

5.2.3 Brisbane 2032 Olympics

The 2026 TAPR does not include any specific augmentations for the Brisbane 2032 Olympic Games. Powerlink is a member of the Games Energy Council and continues to work closely with the Queensland Government and Energy Queensland in preparation for the Olympics. There may be consequential impacts on the transmission network and Powerlink is engaging with load proponents seeking to connect to the transmission network to enable their connection in a timely manner.

5.2.4 Queensland Energy Roadmap

The Queensland Energy Roadmap identified several critical transmission projects that are anticipated between 2025 and 2035, and affirms the need for new and upgraded transmission infrastructure to ensure the energy system can balance supply and demand. The Queensland Energy Roadmap is a foundational plan that informs our TAPR, with each of the Powerlink projects outlined in the Roadmap included in our 10-year investment plan.

5.2.5 Powerlink Revenue Proposal

Powerlink submitted its Revenue Proposal to the AER in January 2026 for the 2027–32 regulatory period. The investment outlook presented in this TAPR reflects the proposed capital expenditure program and Contingent Projects included in the Revenue Proposal and is current as at 31 August 2026. The AER released its Draft Determination on 30 September 2026, and Powerlink will submit a Revised Revenue Proposal to the AER in December 2026. The AER is expected to issue its Final Determination in April 2027. Any changes arising from that determination will be reflected in future planning assessments and subsequent TAPRs.

5.2.6 Integrated System Plan

AEMO's 2026 ISP included two actionable projects for Queensland for which Powerlink must undertake a Regulatory Investment Test for Transmission (RIT-T) for actionable ISP projects:

- Central to North Queensland Reinforcement (Stage 1)
- Brisbane Area 275kV Reinforcement.

These projects aim to increase transmission network capability and enable new generation to connect to the network. Project Assessment Draft Reports (PADRs) for both needs, which will include consideration of non-network proposals submitted through the ISP process, are due for publication in June 2028.

These PADRs will include an assessment of the costs and benefits of credible network and non-network options to confirm the economic benefits of these projects to ensure they deliver value to customers and identify the proposed preferred options. Further information on these projects is available in Section 6.3.3 for Central to North Queensland Reinforcement (Stage 1) and Section 8.9.3 for Brisbane Area 275kV Reinforcement.

The ISP reclassified QNI Connect from an actionable ISP project (identified in the 2024 ISP) to a future ISP project. AEMO noted that this change was driven by updates to Queensland coal-fired generator assumptions and to incorporate newly committed and anticipated transmission connected battery developments within its modelling framework.

The ISP also indicated the Gladstone Project remained actionable, with Powerlink progressing the project through the Queensland Government's Priority Transmission Investment (PTI) process in the *Energy (Infrastructure Facilitation) Act 2024*.

5.2.7 System security limitations

Table 5.1 summarises limitations in the five-year period identified in AEMO's 2025 Transition Plan for System Security (Transition Plan).

Table 5.1 Limitations in the five-year outlook period

Limitation	Zone	Reason	1-year outlook	3-year outlook	5-year outlook
System strength deficits	Moreton, Central West and Surat zones	AEMO identified system strength deficits	None identified	Deficits at Greenbank, Lilyvale and Western Downs (1)	None identified

Note:

(1) Refer to AEMO's 2025 Transition Plan for System Security.

Refer to Section 3.5.1 for discussion of Powerlink's response to the limitations in Table 5.1.

Separately, AEMO has identified the potential retirement of Gladstone Power Station in March 2029 as creating a combined system strength, inertia, voltage control, thermal transfer and reliability limitation. The Gladstone Project and Central Queensland system strength investments have been developed to address these inter-related limitations and maintain a secure and reliable power system.

5.2.8 Easement planning activities

As transmission development lead times, stakeholder expectations and planning complexity continue to increase, easement planning and acquisition plays an increasingly important role in supporting the efficient development of Queensland's transmission network. Early easement activities can preserve credible future network options, improve delivery certainty and support Powerlink's ability to respond efficiently to future network needs.

Powerlink is committed to early and meaningful engagement with stakeholders impacted by our network development activities. This includes ongoing engagement with communities and landholders throughout corridor selection and easement acquisition processes. While this engagement can increase project development timeframes, it plays an important role in supporting informed decision-making and ensuring community benefit and social value are considered as part of Powerlink's program of work.

Powerlink seeks to achieve an appropriate balance between strong social performance outcomes, which are critical to the ongoing delivery of new transmission infrastructure, and the timely delivery of strategic network investments. Robust planning and the early initiation of targeted easement activities are therefore important factors in improving delivery certainty and supporting the timely delivery of transmission developments where an enduring network need is identified.

Ongoing engagement with customers, market participants, landholders and communities is also important to building understanding of Powerlink's longer-term plans for corridor planning and easement activities.

Powerlink's easement planning activities are guided by long-term network needs identified through annual planning assessments, the Queensland Energy Roadmap, ISP and broader strategic planning assessments. Easement activities may include corridor identification, land and planning investigations, environmental and cultural heritage assessments, stakeholder engagement, and the acquisition of easement rights or strategic land interests where required.

Current easement planning activities focus on preserving credible future development options that may be required to support:

- strategic transmission corridors that facilitate future power transfers between generation centres, load centres and interconnection points to support the efficient development of Queensland's transmission network
- transmission reinvestment and replacement activities required to maintain safe and reliable transmission services as existing assets approach the end of their technical service life
- future load growth and economic development opportunities where emerging population growth or industrial development may influence future transmission requirements
- future transmission sites and site expansion opportunities that may be required to support substations, switching stations and other network developments identified through Powerlink's planning processes.

Powerlink will continue to refine our approach to identifying and prioritising easement planning activities, balancing social performance outcomes, delivery considerations, future network requirements and strategic development opportunities. Easement activities remain subject to further planning, stakeholder engagement, environmental and cultural heritage investigations, options assessment and relevant approval processes.

5.3 Consultation update

Powerlink undertakes consultation processes for proposed regulated transmission investments via a RIT-T or Funded Augmentation under the NER, or under the PTI process. All consultation documents and reports are available on Powerlink's website.

5.3.1 Recently completed consultations

Since publication of the 2025 TAPR, Powerlink has completed RIT-Ts to:

- maintain reliability of supply and address condition risks at Ingham South (February 2026)
- maintain reliability of supply at Townsville South (May 2026)
- address the risk of current transformer failures (May 2026)
- maintain reliability of supply at Tennyson (September 2026)
- maintain reliability of supply to Kamerunga, Cairns and the Northern Beaches area (September 2026).

The 2025 TAPR noted that Powerlink completed a PTI assessment of the Gladstone Project in June 2025.

The Gladstone Project has since been declared a PTI, as notified in the Queensland Government Gazette in August 2026. Following this declaration, Powerlink was issued PTI directions, facilitating the project's construction.

Additional scope detail and anticipated completion timings are provided in Section 7.3.2.

5.3.2 Current consultations

Powerlink has RIT-Ts underway to:

- maintain reliability of supply to the Atherton Tablelands and Cairns areas
- maintain reliability of supply and address condition risks at Ashgrove West
- manage voltage levels and transfer capability in North Queensland
- address the risk of voltage transformer premature failures
- maintain reliability of supply and address condition risks at Townsville South and Townsville East.

5.3.3 Planned consultations

Within the next 12 months Powerlink anticipates applying the RIT-T to:

- maintain reliability of supply at Blackwater
- maintain reliability of supply at Callemondah
- maintain reliability of supply at Newlands
- maintain reliability of supply and address condition risks at Alan Sherriff
- maintain reliability of supply in Ross and Chalumbin area
- maintain reliability of supply at Mudgeeraba
- maintain reliability of supply at Tully
- maintain reliability of supply and address condition risks at Woree
- maintain reliability of supply and address condition risks at Goodna
- maintain reliability of supply and address condition risks at Molendinar
- maintain reliability of supply at Woolooga and South Pine.

Further, as noted in Section 5.2.6, Powerlink is applying the RIT-T process for actionable ISP projects to reinforce the transmission network between Central and North Queensland, and in the Brisbane Area.

5.4 Network wide investment programs

5.4.1 Programs of work

Powerlink monitors and undertakes a regular program of condition assessments of all network assets, including those considered minor value asset classes or sub-populations across the transmission network. This approach ensures that risks arising from asset condition and performance are managed in a safe, reliable and cost-effective manner. When a significant portion of an asset class or sub-population has been identified as requiring investment across the network within a similar timeframe, Powerlink may implement coordinated programs of work. These programs are designed to achieve cost savings from economies of scale and efficiencies in resource allocation, and support timely, proactive replacement.

Condition-based programs

Table 5.2 identifies potential programs of work over the next five years which will be subject to the RIT-T.

Table 5.2 Potential programs of work over the next five years

Program	Consultation	High level scope	Purpose	Earliest possible commissioning date	Indicative cost ($million)
Capacitive Voltage Transformers Replacement Program	Managing the risk of Capacitive Voltage Transformer Failure	Staged replacement of capacitive voltage transformers at substations throughout Queensland	Maintain supply reliability to Queensland	December 2029 RIT-T in progress	$7.5 million
Direct Current Battery Replacement Program	Managing the Risk of Direct Current Battery Failure	Ongoing program of replacement of Direct Current battery systems at end of life across Powerlink's fleet of substations	Maintain supply reliability to Queensland	This is an ongoing annual program replacing those systems that are at end of life across the Powerlink network (refer to Chapter 10 for committed projects for 2026/27)	$60 million for the 2027-32 regulatory period
Traction Supply Infrastructure Replacement Program	Managing the Risk of High Voltage and Secondary Equipment Failure	Selective replacement of primary plant, full replacement of secondary systems and SVC refurbishment	Maintain supply reliability to Queensland	Between 2029 and 2034	$232 million for the 2027-32 regulatory period

Transmission line refit works

Powerlink's transmission line refit program applies a targeted, risk-based approach to asset reinvestment where there is an enduring prescribed network need and intervention is required to manage asset condition risks. Asset condition assessments, risk analysis and future network requirements are used to inform the need, timing and scope of potential interventions.

Consistent with recommendations arising from Powerlink's Asset Reinvestment Review, transmission line refit investment decisions may consider a range of delivery approaches, including both single-stage and staged interventions, to identify the most prudent and cost-effective response. In some circumstances, a proposed refit may be intended to extend asset life to manage emerging risks and preserve flexibility while longer-term network requirements and future investment needs continue to be assessed.

Where smaller transmission line refit requirements have been identified, these may be grouped into regional programs as part of Powerlink's Geographic Line Refit Program[1]. This approach is intended to improve delivery efficiency and reduce costs by coordinating geographically proximate transmission line refit requirements that might otherwise be addressed separately.

Details of transmission lines currently identified within the Northern, Central and Southern regional line refit programs are provided in chapters 6, 7 and 8.

5.5 Investment and delivery factors

5.5.1 Cost changes and deliverability

Powerlink, together with other network service providers, faces significant challenges in delivering safe, reliable and cost-effective transmission services. These challenges arise from the scale of work increasing demand for skilled resources, the need to secure and maintain social licence, the ongoing requirement to protect the environment and manage impacts, and the need to meet additional regulatory and legislative obligations.

Local and global demand for resources that are essential for transmission projects continues to put upward pressure on costs and extend equipment delivery timeframes. Events such as the long-tailed global supply disruption following COVID-19, Russia's invasion of Ukraine, and global targets for emissions reduction driving unprecedented demand for materials, equipment and specialised labour, have significantly impacted Powerlink's costs.

[1] See Powerlink, ***Powerlink 2027-32 Revenue Proposal Project Pack: Geographic Line Refit Program***, January 2026 on the AER website for further detail.

These cost pressures are not unique to Powerlink, with similar trends being experienced by other transmission and distribution businesses across the NEM and around the globe. We expect the global and local competition impacting the supply chain to continue for the foreseeable future, with a challenging operating environment continuing through (at least) the first five years of the 10-year outlook period.

The indicative costs of potential projects identified in chapters 6 to 8 are updated each year to keep pace with external project cost increases, and where possible are based on other recently completed similar projects. Where there may be other factors materially influencing the updated indicative cost, such as a more granular view of condition and project scope, or a new proposed solution is identified, these factors are noted in Appendix F which summarises all proposed network investments for the 10-year outlook period. It should be noted that the indicative cost of potential projects also excludes known and unknown contingencies.

5.5.2 Timing considerations

The timing shown for emerging network limitations and potential developments is indicative and reflects the best information available at the time of publication.

Consistent with Powerlink's integrated planning approach, the timing, scope and nature of potential investments continue to be refined as demand and generation forecasts, customer developments, asset condition information, network studies, regulatory requirements, delivery considerations and alternative network and non-network solutions are further assessed and developed.

5.5.3 Connection activities

Planning of new connections involves consultation between Powerlink and the connecting party, determination of technical requirements and completion of connection agreements. New connections can result from joint planning with the relevant Distribution Network Service Provider (Energex or Ergon Energy) or be initiated by generators or customers.

Table 5.3 lists connection works that are anticipated to be required within the 10-year outlook period.

Table 5.3 Connection point commitments

Connection point (1) (2)	Proposal	Zone
Lotus Creek Wind Farm (3)	New wind farm	Central West
Boulder Creek Wind Farm (3)	New wind farm	Central West
Punchs Creek Solar Farm (3)	New solar farm	Bulli
Yabulu BESS (3)	New BESS	Ross
Gawara Baya (3)	New hybrid wind / BESS facility	Ross
Ganymirra Solar Power Station (3)	New hybrid solar / BESS facility	Ross
Majors Creek Solar Power Station (3)	New hybrid solar / BESS facility	Ross
Smoky Creek Solar Power Station (3)	New hybrid solar / BESS facility	Central West
Guthrie's Gap Solar Power Station (3)	New hybrid solar / BESS facility	Central West
Fraser Coast Solar Park (3)	New hybrid solar / BESS facility	Wide Bay
Lower Wonga Hybrid (3)	New hybrid solar / BESS facility	Wide Bay
Supernode BESS Stage 3 (3)	New BESS	Moreton
Tangkam BESS (3)	New BESS	South West

Notes:

(1) Powerlink has adopted AEMO's definition of 'committed' project from the System Strength Impact Assessment Guidelines Version 2.2 (effective 1 July 2024) for connection point proposals identified in the TAPR. The connection point proposals listed are as at 30 September 2026.

(2) When Powerlink constructs a new line or substation as a non-regulated customer connection (e.g. conventional generator, inverter-based resource (IBR) generator, mine or industrial development), the costs of acquiring easements, constructing and operating the transmission line and/or substation are paid for by the company making the connection request.

(3) The listed connection point commitment is in progress (refer to Table 10.2).

Table 5.4 summarises connection point activities undertaken by Powerlink since publication of the 2025 TAPR. Further details on potential new generation connections are available in the relevant TAPR template located on Powerlink's TAPR Portal.

Table 5.4 Connection point activities

Generator location	Number of applications	Number of connection agreements	Generator type and technology
North	2	4	BESS, Hybrid (Wind Farm + BESS)
Central	5	3	BESS, Hybrid (Solar Farm + BESS)
South	13	4	BESS, Hybrid (Solar Farm + BESS)
Total	**20**	**11**	

5.6 Lines approaching end of technical service life

As transmission assets approach their expected end of technical service life, Powerlink undertakes ongoing asset management, planning and network assessments to determine each asset's enduring need. These assessments consider asset condition, risk profile, compliance requirements, and alignment with future investment or network optimisation strategies.

Where an enduring prescribed network need no longer exists, or where alternative network or non-network solutions can more efficiently meet future service requirements, assets may be de-rated, reconfigured or retired.

Where intervention is required to maintain assets that continue to provide an enduring network service, a range of technically and economically feasible options are considered to determine the most prudent and efficient response. Potential responses may include targeted line refit, staged refit or replacement, upfront replacement or rebuild (including at higher capacity). In some circumstances, a proposed response may be intended to extend asset life and manage emerging risks for a defined period while maintaining reliable network operation. While this may represent the most prudent response based on current information, longer-term network requirements, asset condition and broader investment drivers may ultimately result in a different future intervention or investment response.

Details of transmission lines approaching end of technical service life that may require future intervention or investment decisions in the Northern, Central and Southern regions are provided in chapters 6 to 8. The outlook includes transmission lines currently identified within Powerlink's Geographic Line Refit Program, transmission lines associated with investment opportunities identified through the TAPR, and other assets subject to ongoing asset management, planning and network assessments. Appendix F identifies transmission lines that may require future intervention or investment responses beyond the 2026 TAPR outlook period, in the next 10 to 20 years.

The information presented is provided in good faith as a planning snapshot based on the best information available at the time of TAPR publication. Transmission equipment and line ratings information is available on AEMO's website and can also be accessed via the link in the TAPR Portal.

Northern Region Development Outlook

6.1 Regional overview
6.2 Regional investment themes
6.3 Central Queensland to North Queensland transmission backbone
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06

This chapter focuses on potential investment opportunities on the transmission network across the 10-year outlook period for the Northern Region within Queensland. It includes information on forecast network limitations, potential network investments, non-network opportunities, and other future developments which could shape transmission network requirements.

Key highlights

- The Northern Region includes the Far North, Ross and North Transmission Annual Planning Report (TAPR) zones.
- The Northern Region remains a key focus area for future transmission investment, driven by asset renewal requirements, the CopperString Project, generation development, industrial electrification, mining growth, and changing power flow patterns.
- The Central Queensland to North Queensland (CQ-NQ) transmission backbone continues to play a critical role in supporting bulk power transfers between Central, North and Far North Queensland, with several future opportunities identified to maintain network reliability and support the efficient and economic operation of the National Electricity Market (NEM).
- The Australian Energy Market Operator's (AEMO) 2026 Integrated System Plan (ISP) identifies the Central to North Queensland Reinforcement (Stage 1) project as an actionable ISP project, for which Powerlink will assess credible network and non-network options via a Regulatory Investment Test for Transmission (RIT-T).
- To reflect the outcomes of the 2026 ISP, in June 2026 Powerlink updated our proposed contingent projects for the 2027-32 regulatory period. We removed stringing the second circuit of the existing Stanwell to Broadsound 275kV double-circuit from the proposed Central Queensland to North Queensland Augmentation contingent project scope. The remaining Central Queensland to North Queensland Augmentation and northern Bowen Basin Reinforcement were retained as proposed contingent projects in the June update, subject to the Australian Energy Regulator's (AER) Final Determination to be published in April 2027.
- Powerlink is progressing the installation of four synchronous condensers identified through the System Strength RIT-T. One synchronous condenser will be installed at Nebo Substation, one at Stanwell Substation, and two at Calliope River Substation.
- Continued reinvestment within the Northern Region is required to address emerging condition and obsolescence risks across ageing transmission network assets to maintain reliability of supply.
- Future transmission augmentation requirements across the Northern Region will continue to be informed by customer commitments, generation development, industrial growth, market conditions and the outcomes of relevant planning and regulatory assessment processes.
- Potential transmission network augmentations and reinvestment within the Northern Region may present opportunities for non-network solutions.
- Powerlink will continue to work closely with customers, AEMO, Queensland Investment Corporation (QIC), Energy Queensland, market participants, industry and government stakeholders, and other interested parties to identify economic network and non-network solutions that maintain supply reliability, support economic development, and deliver value for customers.

6.1 Regional overview

The Northern Region supplies major population centres including Cairns, Townsville and Mackay, supports significant mining and export industries in the Bowen Basin, and hosts a growing portfolio of energy projects. The transmission network also provides an enabling platform for future economic development, electrification of industrial processes, and the integration of new generation.

The CQ-NQ 275kV transmission backbone, spanning from Bouldercombe Substation to Woree Substation, provides the primary bulk power transfer pathway between Far North Queensland, North Queensland and the wider Queensland transmission network. This backbone is supported by an extensive 132kV network that supplies regional communities, industrial customers, ports, mining operations and major load centres across the region.

6.2 Regional investment themes

Three key investment themes are expected to shape transmission network requirements and development within the Northern Region over the 10-year outlook period:

- future development of the North Queensland transmission backbone
- addressing emerging transmission network asset condition and reliability risks
- supporting economic growth and regional energy development.

Future development of the North Queensland transmission backbone

In the near to medium-term, investment in the 275kV transmission backbone is expected to focus on condition driven reinvestment to maintain reliability and capability. Further augmentation of the CQ-NQ backbone may also be required to increase transfer capability and facilitate future generation and load developments where planning assessments identify net market benefits for consumers.

Addressing emerging condition and reliability risks

Transmission infrastructure across the Northern Region has been progressively developed since the 1960s to support regional growth, mining activity and population expansion. Parts of the network are now reaching an age where targeted reinvestment may be required to address emerging condition, obsolescence and compliance risks to maintain safe and reliable operation of the network.

Supporting economic growth and regional energy development

The Northern Region is expected to play an increasingly important role in Queensland's energy future. The Queensland Energy Roadmap outlines a range of opportunities associated with new and existing generation, industrial expansion, mining electrification, the CopperString Project, critical minerals processing and emerging industries which may influence future transmission requirements. The timing and scale of these developments will continue to be monitored through Powerlink's annual planning process including joint planning with Ergon Energy and engagement with QIC.

6.3 Central Queensland to North Queensland transmission backbone

The CQ-NQ transmission backbone comprises the 275kV transmission network extending between Stanwell, Bouldercombe, Broadsound, Nebo, Strathmore, Haughton River, Ross, Chalumbin and Woree substations.

Investment across the CQ-NQ transmission backbone is expected to focus on condition-driven reinvestment to maintain the reliability and capability of the existing network. Augmentation of the backbone may also be required to support efficient and economic market operation, and where planning assessments identify net market benefits for consumers.

The northern network's system security position is a defining feature of this corridor. There are limited synchronous generation sources in North Queensland, and the region has historically relied on system strength provided from Central Queensland. As synchronous generation in Central Queensland is progressively withdrawn, maintaining adequate system strength and inertia in the north will remain an important planning consideration alongside network capability.

6.3.1 Existing and committed developments

Powerlink commissioned the establishment of a third 275kV connection into Woree Substation to maintain supply reliability within Far North Queensland in January 2026. Line refit works on the 275kV transmission lines between Chalumbin and Woree substations (section between Davies Creek and Bayview Heights) have also been completed.

The CopperString Project, being progressed by QIC, will establish a new transmission connection between the Flinders region and the NEM via the Eastern Link between Hughenden and Townsville.

Further information on completed and committed developments is provided in Chapter 10.

6.3.2 Emerging and evolving investment drivers

Several emerging developments have the potential to drive future reinvestment and augmentation requirements across the CQ-NQ transmission backbone.

Industrial growth and electrification

Proposed industrial developments, expansion of existing industrial precincts and the progressive electrification of mining operations may increase electricity demand and influence future transmission network requirements. Key developments being monitored include the Lansdown Eco-Industrial Precinct, expansion of the Townsville State Development Area and mining developments within the northern Bowen Basin.

Emerging asset condition risks and network reliability

As transmission assets across the Northern Region continue to age, reinvestment may be required to address emerging condition, obsolescence and compliance risks. Opportunities may exist to coordinate reinvestment with other network developments to deliver efficient investment outcomes for customers.

Delivering market benefits through network development

Developments such as CopperString combined with future generation and industrial load growth will increase transfers across the CQ-NQ transmission backbone. Subject to further assessment, additional transmission capacity may be required to support economic and efficient market outcomes and deliver net market benefits. Powerlink will continue to work with AEMO, Ergon Energy, QIC and other stakeholders to assess future network needs and economic and efficient investment for the CQ-NQ transmission backbone.

6.3.3 Central Queensland to North Queensland investment outlook

Figure 6.1 provides a geographic overview of potential investment opportunities across the CQ-NQ transmission corridor. Table 6.1 summarises these opportunities and their indicative timing, with further detail provided in the sections that follow. The opportunities do not constitute committed projects and their scope, timing and implementation remain subject to further assessment and decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the five-year investment profile tables following Table 6.1. Other investment opportunities identified in the 10-year outlook are not profiled as their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Figure 6.1 Future investment opportunities for the CQ-NQ 275kV transmission backbone

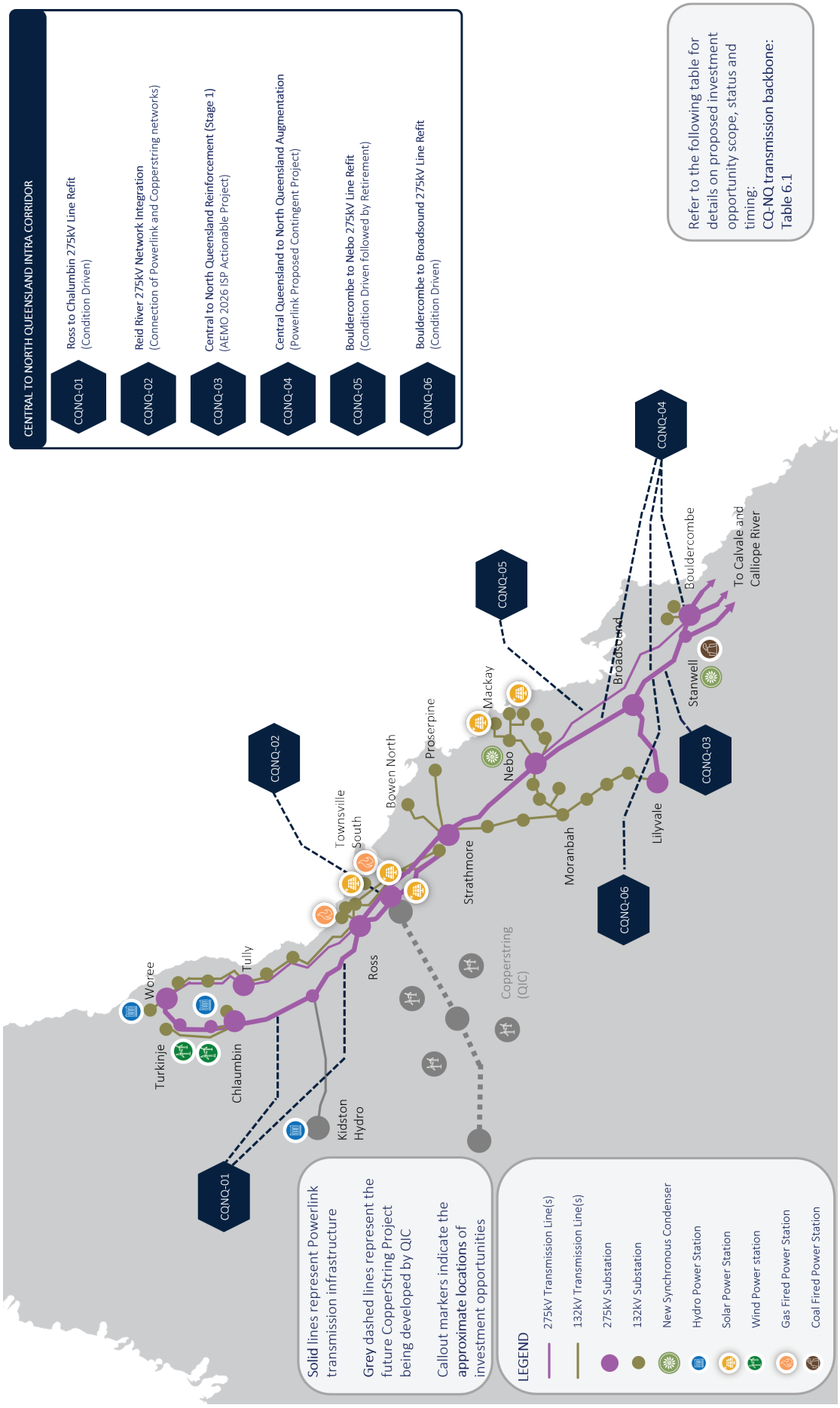


Table 6.1 CQ-NQ transmission backbone future investment opportunities

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
CQNQ-01	Ross to Chalumbin 275kV Refit	Staged line refit works on steel lattice structures	Emerging asset condition and reliability of supply risks	Staged works by June 2031	Refer to Section 6.3.4	$39 million	Uncommitted
CQNQ-02	Reid River 275kV Network Integration (1)	Construction of a new high capacity 275kV double-circuit to cut in to the existing western Strathmore to Ross 275kV transmission line and construction of the Reid River 275kV Substation	Connect CopperString and Powerlink's transmission networks	Required to align with the planned commissioning of CopperString by 2032	Refer to Section 6.3.4	$300 million	Planned
CQNQ-03	Central to North Queensland Reinforcement (Stage 1) (2)	AEMO's 2026 ISP identifies stringing the second circuit of the existing Stanwell to Broadsound 275kV transmission line as the actionable ISP candidate project	Realise net market benefits by increasing transmission capability between Central and North Queensland and potentially enabling access to generation from North Queensland	AEMO's 2026 ISP identifies an indicative delivery by July 2031. The preferred option and optimal timing will be determined through the RIT-T	Other credible options identified through the RIT-T, including staged rebuilds of existing 275kV lines between Bouldercombe and Nebo as described under CQNQ-04 Refer to Section 6.3.4	Dependent on preferred option. AEMO's 2026 ISP indicates a cost of $209 million for the ISP candidate	Progressing through the actionable ISP RIT-T process. PADR required to be published by June 2028
CQNQ-04	Central Queensland to North Queensland Augmentation (2)	This project involves advancing rebuilds of the existing lower capacity overhead 275kV transmission circuits between Bouldercombe, Stanwell, Broadsound and Nebo substations (3)	There may be net market benefits associated with increasing the transfer capability across the CQ-NQ backbone transmission network	Scenario dependent and subject to the optimal economic timing identified through planning and market-benefit assessments	Staged or alternate configurations, including establishment of an adjacent new higher capacity 275kV double-circuit overhead line between Bouldercombe and Nebo substations	$1,795.2 million (2)	Proposed contingent project in Powerlink's 2027–32 Revenue Proposal
CQNQ-05	Bouldercombe to Nebo 275kV Refit	Line refit works on the 275kV transmission line between Bouldercombe and Nebo substations	Emerging asset condition and reliability of supply risks	2032	New 275kV transmission line between Bouldercombe and Nebo substations	$41 million	Uncommitted
CQNQ-06	Bouldercombe to Broadsound 275kV Refit	Line refit works on the 275kV transmission line	Emerging asset condition and reliability of supply risks	2035	Rebuild the 275kV transmission line between Bouldercombe and Broadsound substations	$25 million	Uncommitted

Notes:

(1) Regulatory and cost-recovery treatment remains subject to further assessment.

(2) CQNQ-03 and CQNQ-04 are presented separately to reflect their different ISP classifications. AEMO's 2026 ISP identified CQNQ-03 as an actionable ISP project, and its scope was removed from Powerlink's proposed contingent project in June 2026. The CQNQ-03 RIT-T will assess the ISP candidate project and other credible network and non-network options capable of meeting the identified need for the actionable ISP project. These may include alternative scopes or configurations that incorporate elements of CQNQ-04, where they satisfy the applicable requirements for a credible option. AEMO's 2026 ISP identifies CQNQ-04 as a future ISP project, with timing dependent on the scenario. The final status of this project will be determined as part of the AER's Final Determination on Powerlink's 2027-32 Revenue Proposal to be published in April 2027.

(3) CQNQ-04 represents the scope of Powerlink's proposed Central Queensland to North Queensland Augmentation contingent project set out in the updated June 2026 Appendix 4.04 to Powerlink's 2027–32 Revenue Proposal. It also includes an additional double-circuit 275kV connection from Reid River Substation to the eastern Strathmore–Haughton River–Ross circuit. The reported cost includes this additional scope. The final status of this project will be determined as part of the AER's Final Decision on Powerlink's 2027-32 Revenue Proposal to be published in April 2027.

(4) CQNQ-05 and CQNQ-06 represent initial condition driven refit interventions that may be required, depending on the preferred development pathway and timing for CQNQ-04.

6.3.4 Five-year investment profiles

Powerlink anticipates that three potential network investments above the RIT-T cost threshold may be required across the CQ-NQ transmission backbone within the next five years to address asset condition risks, integrate the Reid River 275kV substation to the Powerlink transmission network and increase transmission capability to deliver net market benefits.

CQNQ-01 Addressing condition risks between Ross and Chalumbin

Item	Description
Location	North Queensland (between Townsville and Cairns)
Asset details	Ross to Chalumbin 275kV overhead transmission line
Investment context	The Ross to Chalumbin 275kV double-circuit line is a key transmission route to Far North Queensland spanning around 244km in length. The overhead line traverses the northern Queensland tropical rainforest passing through environmentally sensitive, protected areas and crossing numerous regional roads and rivers. Delivery of renewal works will be complex and need to be completed outside of summer peak load and the wet season.
Network driver	Condition driven reinvestment to address emerging condition risks associated with the overhead transmission line.
Indicative timing	June 2031
Status	Uncommitted
Proposed network solution	Refit the double-circuit 275kV overhead transmission line between the Chalumbin and Ross substations (via Guybal Munjan Substation) by 2031 at an estimated cost of $39 million.
Other potential network solutions	Other potential network solutions include: 1. Rebuild of the existing Ross to Chalumbin 275kV double-circuit line 2. Restring the existing Ross to Chalumbin 275kV overhead line with higher capacity conductor combined with line refit works 3. Rebuild of the southern section of the 275kV line from Ross to Guybal Munjan substations, and refit of the northern section from Guybal Munjan to Chalumbin substation) 4. Refit and restring with high temperature conductor the southern section of the 275kV line from Ross to Guybal Munjan substations, and refit of the northern section from Guybal Munjan to Chalumbin substations.
Potential non-network solutions	Potential non-network solutions would need to provide injection to the north area of close to 400MW at peak and up to 6,000MWh per day. The network configuration also facilitates generator connections in the area and enables the provision of system strength and voltage support for the region.
Inter-network impact	No material inter-network impact identified.

CQNQ-02 Reid River 275kV Substation and Network Integration

Item	Description
Location	Reid River Substation is located approximately 40km south of Ross Substation in North Queensland
Asset details	The project involves construction of a new high-capacity 275kV double-circuit to cut into the existing western Strathmore to Ross 275kV transmission line and construction of the 275kV substation
Investment context	Reid River Substation will provide the connection point between CopperString and Powerlink's transmission network through a high-capacity 275kV transmission line connection to the Ross to Strathmore 275kV double-circuit transmission line.
Network driver	Facilitate the connection of CopperString and Powerlink's transmission networks
Indicative timing	Initial connection works are required to coincide with the planned commissioning of the CopperString project by 2032
Status	Planned
Proposed network solution	Establish a new high-capacity 275kV double-circuit connection between Reid River Substation and the Ross to Strathmore 275kV double-circuit transmission line to facilitate the connection of CopperString to the Powerlink 275kV transmission network
Other potential network solutions	Establish alternative high-capacity 275kV transmission connections between Reid River Substation and the existing Powerlink 275kV transmission network
Potential non-network solutions	Powerlink has not identified any technically feasible non-network solutions capable of meeting the identified network need
Inter-network impact	The impact of this network development will be assessed against the material inter-network impacts assessment criteria

CQNQ-03 Central to North Queensland Reinforcement (Stage 1)

Item	Description
Location	North Queensland (between Stanwell and Broadsound 275kV substations)
Asset details	Stanwell to Broadsound existing double-circuit 275kV transmission line (currently only one side strung)
Investment context	AEMO's 2026 ISP identifies Central to North Queensland Reinforcement Stage 1 as an actionable ISP project. AEMO identifies stringing the second circuit of the existing Stanwell to Broadsound 275kV double-circuit line as the candidate option. Powerlink will assess this development and other credible network and non-network options under the RIT-T process for actionable ISP projects.
Network driver	The network driver for this project is to deliver net market benefits by increasing transmission capability between Central and North Queensland and enabling greater access to new generation in North Queensland to supply major Queensland load centres.
Indicative timing	Subject to the optimal economic timing identified through market-benefit assessments. AEMO 2026 ISP modelling indicates an anticipated delivery timing around 2031.
Status	Progressing through the actionable ISP RIT-T process with the PADR required to be published by June 2028.
Proposed network solution	Stringing the second circuit of the existing Stanwell to Broadsound 275kV double-circuit transmission line which currently has only one circuit strung at an estimated cost of $209 million. The preferred option and its estimated cost will be determined through the RIT-T assessment.
Other potential network solutions	Other potential network solutions include: 1. Rebuild of the existing Bouldercombe to Broadsound 275kV single circuit line (feeder 820) as a double-circuit 275kV line (via Stanwell or staged initially between Stanwell and Broadsound) 2. Rebuild of the existing Bouldercombe to Nebo single circuit 275kV line (feeder 821) as a double-circuit line between Bouldercombe and Nebo, via Stanwell and Broadsound substations. 3. Other credible network solutions identified through the RIT-T assessment
Potential non-network solutions	Potential non-network solutions will be assessed through the RIT-T, having regard to their ability to address the identified need and deliver net market benefits
Inter-network Impact	Any inter-network impacts with this network development will be assessed as part of the RIT-T for the actionable ISP project

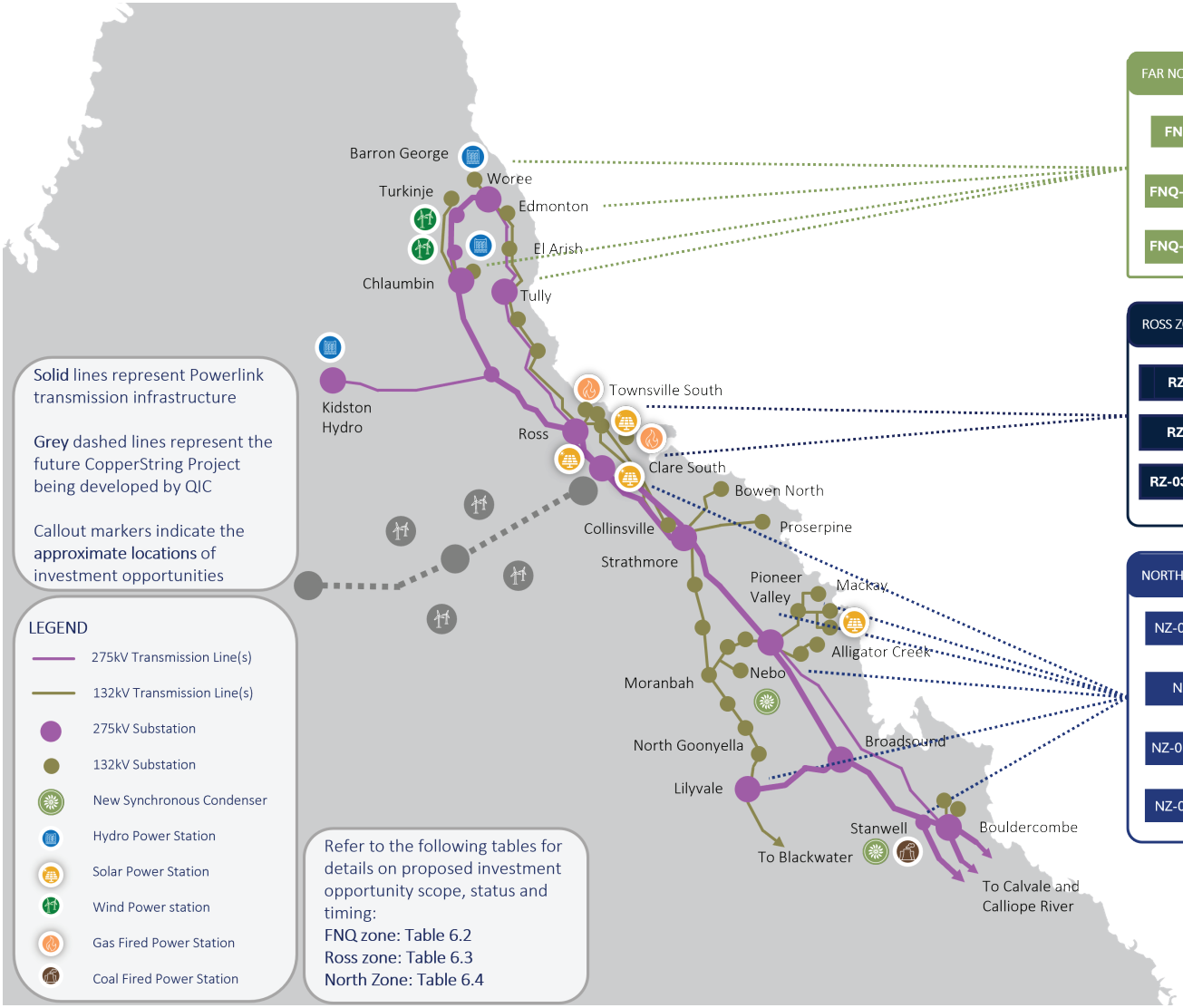
6.3.5 Possible asset retirements

Powerlink has not identified any potential asset retirements across the CQ-NQ 275kV transmission corridor within the 10-year outlook period.

6.4 Zone investment outlook

Figure 6.2 provides a geographic overview of the Far North, Ross and North zones and the potential investment opportunities discussed in sections 6.5 to 6.7. The overview provides context for the zone-based discussion that follows with further information on the scope, timing and drivers for each opportunity provided in the relevant section.

Figure 6.2 Future investment opportunities for the Far North Queensland, Ross and North zones



6.5 Far North zone

The Far North zone extends from Tully in the south to Cairns, the Atherton Tablelands and the northern Beaches in the north. The zone forms the northern-most part of Powerlink's transmission network and is supplied predominantly from the Woree, Chalumbin and Ross substations. The zone provides essential electricity supply to regional communities, tourism precincts, agricultural industries and growing urban centres across Far North Queensland.

Cairns is the principal population centre within the region and serves as the gateway to Far North Queensland and the Great Barrier Reef. Ongoing residential growth, urban expansion and development of major economic precincts, including the Cairns South State Development Area, continue to support increases in electricity demand and broader regional economic activity.

The Far North zone transmission network also supports several important generation assets. Barron Gorge Hydro Power Station, located north of Cairns, contributes synchronous generation and provides valuable voltage support and system security services to the transmission network. Kareeya Hydro Power Station similarly contributes generation capacity connecting to Chalumbin Substation. More recently, additional large-scale wind and pumped hydro generation facilities have been developed within the zone.

The transmission network traverses environmentally sensitive and geographically challenging terrain, including coastal floodplains, tropical rainforest environments and sections of the Wet Tropics World Heritage Area. These factors influence network operation, maintenance strategies and the delivery of future transmission investments.

6.5.1 Existing and committed network developments

Powerlink has completed a range of transmission line and substation reinvestment works, including refurbishment of the Woree Static Var Compensator (SVC), secondary systems reinvestments and targeted line refit programs to address emerging asset condition risks and maintain reliable network operation.

Detailed information on committed developments is provided in Chapter 10.

6.5.2 Emerging and evolving investment drivers

Emerging network capacity requirements in Far North Queensland are expected to be driven by continued residential and industrial growth within the greater Cairns area. The region's tropical coastal environment contributes to elevated asset deterioration with emerging condition and obsolescence risks identified within overhead transmission lines and substations. Targeted reinvestments will be required to address these risks and maintain reliability of supply.

6.5.3 Future network investments and opportunities

Powerlink has identified potential network developments to address emerging network needs and asset condition risks within the Far North Queensland transmission network within the 10-year outlook period. These opportunities are at various stages of development, with some currently progressing through RIT-T assessments.

Table 6.2 summarises these opportunities and their indicative timing, with further detail provided in the sections that follow. The opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes. It should be noted that the indicative cost of potential projects also excludes known and unknown contingencies.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the five-year investment profile tables following Table 6.2. Other investment opportunities identified in the 10-year outlook are not profiled as their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Table 6.2 Far North zone investments within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
FNQ-01	Line refit works on the 132kV transmission lines between Chalumbin and Turkinje substations and 275kV and 132kV reinvestment at the Chalumbin Substation	Line refit works on the 132kV transmission lines by 2027, replace selected 275kV and 132kV primary plant and 275kV and 132kV secondary systems utilising the existing control building at Chalumbin Substation	Maintain supply reliability to the Far North zone	Staged works by 2030	Refer to Section 6.5.4	$74 million	Currently progressing through RIT-T assessment
FNQ-02	Woree PASS M1 replacement	Replacement of Woree PASS M1 hybrid units	Maintain supply reliability to the Far North zone	June 2028	Replacement of PASS M1 units as dead tank circuit breakers	$9 million	Uncommitted
FNQ-03	Tully 132/22kV transformer replacement	Replacement of the transformer	Maintaining Reliability of Supply at Tully	June 2029	Life extension of the existing transformer	$10 million	Uncommitted
FNQ-04	Woree 275kV and 132kV secondary systems replacement	Selected replacement of 275kV and 132kV secondary systems	Maintain supply reliability to the Far North zone	June 2033	Full replacement of 275kV and 132kV secondary systems	$17 million	Uncommitted
FNQ-05	Barron Gorge 132kV secondary systems replacement	Full replacement of 132kV secondary systems	Maintain supply reliability to the Far North zone	June 2036	Selected replacement of 132kV secondary systems	$3 million	Uncommitted
FNQ-06	Edmonton 132kV secondary systems replacement	Full replacement of 132kV secondary systems	Maintain supply reliability to the Far North zone	June 2032	Selected replacement of 132kV secondary systems	$9 million	Uncommitted
FNQ-07	El Arish 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability to the Far North zone	June 2036	Full replacement of 132kV secondary systems	$10 million	Uncommitted

6.5.4 Five-year investment profile

Powerlink anticipates several potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets within the Far North Queensland zone within the next five years.

FNQ-01 Maintaining reliability of supply to the Atherton Tablelands and Cairns areas

Item	Description
Location	Atherton Tablelands
Asset details	Chalumbin Substation was established in 1988. The Chalumbin to Turkinje 132kV double-circuit transmission line was constructed in 1986
Investment context	Chalumbin Substation supplies load into the Cairns and Atherton Tablelands areas and provides the connection point for Kareeya Hydro Power Station. The Chalumbin to Turkinje 132kV double-circuit transmission line operates in an aggressive tropical environment. In particular, the most northerly section (12km from Turkinje Substation) and southerly section (15km from Chalumbin Substation) have consistently higher levels of corrosion increasing the risk of supply to the Turkinje area.
Investment driver	Transmission line: Condition driven replacement to address emerging condition risks due to structural corrosion. Substation: Condition driven replacement to address emerging condition, obsolescence and compliance risks on the 275kV and 132kV primary plant and secondary systems.
Indicative timing	December 2030
Status	Current joint RIT-T consultation. PADR submissions close 11 November 2026.
Proposed network solution	Targeted life extension of the Turkinje to Chalumbin 132kV transmission lines by 2027; replacement of selected 275kV and 132kV primary plant by 2030; replacement of selected 275kV and 132kV secondary systems in the existing control building by 2030 at an estimated cost of $74 million
Other potential network solutions	Targeted life extension of the Turkinje to Chalumbin 132kV transmission lines by 2027; replacement of selected 275kV and 132kV primary plant by 2030; replacement of selected 275kV and 132kV secondary systems in the existing control building by 2034 at an estimated cost of $87 million
Potential non-network solutions	Potential non-network solutions would need to supply over 90MW of delivered demand (150MW underlying demand) and more than 1,700MWh delivered demand (2,250MWh underlying demand) per day on a continuous basis. It would also be required to provide a stable frequency reference and voltage control to support local generation and energy storage systems.
Inter-network impact	This network development is not anticipated to have material inter-network impacts

FNQ-02 Maintaining reliability of supply at Woree

Item	Description
Location	Cairns area
Asset details	PASS M1 hybrid modules were installed in 2002
Investment context	Woree 275/132kV was established in 2002 to support load growth in Cairns and Far North Queensland and provides essential reactive power support and voltage regulation in the area
Investment driver	Emerging condition risks for two PASS M1 hybrid units impacting compliance with system standards
Indicative timing	June 2028
Status	Uncommitted
Proposed network solution	Condition driven replacement of PASS M1 hybrid units by June 2028 at an estimated cost of $9 million
Other potential network options	Replacement of two PASS M1 hybrid units with dead tank circuit breakers
Potential non-network solutions	Powerlink does not consider non-network options can meet the identified need to ensure ongoing compliance with Schedule 5.1 as required under the NER
Inter-network impact	This network development is not anticipated to have material inter-network impacts

FNQ-03 Maintaining power transfer capability and reliability of supply at Tully

Item	Description
Location	Tully area (between Cairns and Townsville)
Asset details	Established in 1976
Investment context	Tully 132kV Substation provides supply to the Ergon Energy distribution network in the region south of Innisfail. The associated 22kV network also connects the Tully Sugar Mill (bagasse-fired generation with a capacity of 32.8MW).
Investment driver	Condition driven replacement to address risks on one of the 132/22kV transformers
Indicative timing	June 2029
Status	Uncommitted
Proposed network solution	Replacement of Transformer 2 by June 2029 at an estimated cost of $10 million
Other potential network solutions	Establishment of new El Arish to Tully 22kV distribution line
Potential non-network solutions	Potential non-network solutions would need to provide up to 18MW at peak and up to 275MWh per day on a continuous basis to provide supply to the 22kV network at Tully.
Inter-network impact	This network development is not anticipated to have material inter-network impacts

FNQ-06 Addressing the secondary systems condition risks at Edmonton

Item	Description
Location	South of the greater Cairns area
Asset details	Edmonton Substation, a joint Powerlink Ergon Energy substation, was first established in 1956. Most of the secondary systems were commissioned in 2004.
Investment context	Edmonton 132/22kV Substation provides supply to the Edmonton suburban area and to the south of the city towards Gordonvale. Extensions with load growth have resulted in a mixture of secondary systems from 2000 through to 2008.
Investment driver	Condition driven replacement to address emerging condition, obsolescence and compliance risks on the 132kV secondary systems
Indicative timing	June 2032
Status	Uncommitted
Proposed network solution	Full replacement of the 132kV secondary systems by June 2032 at an estimated cost of $9 million
Other potential network solutions	Selected replacement of 132kV secondary systems
Potential non-network solutions	Potential non-network solutions would need to provide up to 56MW at peak and up to 830MWh per day on a continuous basis to provide supply to the 22kV network within the Edmonton area
Inter-network impact	This network development is not anticipated to have material inter-network impacts

6.5.5 Other potential developments

Continued population growth and urban expansion, particularly within the northern Beaches and southern Cairns growth corridors, are expected to influence future network investment requirements within the Far North zone.

Joint planning with Ergon Energy has identified future requirements for additional distribution injection capacity within the Cairns South area. The proposed solution is to establish a new Transmission Connection Point between Edmonton and Gordonvale via a 132kV substation and associated transmission connections to support the forecast residential, commercial and industrial development.

Acquiring substation site land and associated easements now allows for coordinated development, preserving the ability to secure the necessary easement corridors to support the long-term interests of sustainable development, before development changes land use and removes the preferred option.

Powerlink will continue to monitor these developments through its annual planning process and ongoing joint planning activities with Ergon Energy.

6.5.6 Possible asset retirements

Possible asset retirements include the Cairns 132/22kV Transformer 4, and the existing 132kV transmission line between Woree and Kamerunga (proposed to be replaced by a new 132kV transmission line).

6.6 Ross zone

The Ross zone is centred on Townsville and extends from Ingham in the north to the Haughton River and Collinsville areas in the south. The zone forms an important component of the North Queensland transmission network and plays a critical role in supporting regional communities, industrial development, port operations, and economic activity within north Queensland.

Townsville is one of Queensland's largest regional urban centres and serves as a major commercial, industrial and logistics hub for North Queensland. The region is anchored by the Port of Townsville, which supports significant export activity associated with mining, minerals processing and broader trade throughout northern Australia. The city is also an important centre for defence, health, education and government services, supporting a diverse and growing economy.

The transmission network comprises a combination of 275kV and 132kV infrastructure supplied primarily from the Ross 275/132kV Substation. The network supports a broad range of residential, commercial and industrial customers through key substations including Townsville South, Townsville East, Garbutt, Alan Sherriff, Dan Gleeson and Ingham South. The zone also supplies major industrial facilities including Sun Metals, Glencore Copper Refinery, Yabulu industrial precinct and the Port of Townsville.

The Ross zone transmission network also supports important gas-powered generation plant, battery energy storage systems and solar farms.

Ongoing residential growth, industrial development and expansion of port and logistics activities continue to influence the long-term development of the Townsville electricity supply area and reinforce the strategic importance of the Ross zone within North Queensland.

6.6.1 Existing and committed network developments

Recent investments within the Ross zone have focused on maintaining reliable supply and supporting the continued operation of the Townsville transmission network.

Powerlink has completed several transmission and substation reinvestment projects, including replacement of primary plant at Ross and Townsville South substations, installation of a second transformer at Strathmore Substation, refurbishment and replacement of Ross transformers, reinvestment in overhead transmission infrastructure, and reinvestment in secondary systems.

Further information on committed and anticipated developments is provided in Chapter 10.

6.6.2 Emerging and evolving investment drivers

The existing transmission network within the Ross zone is expected to provide sufficient capacity to meet forecast electricity demand under the central load forecast scenario. Future investment requirements are primarily associated with maintaining the reliability of ageing transmission assets.

Much of the network was developed between the 1960s and 1970s and operates in a tropical coastal environment characterised by high humidity, marine salt exposure and elevated atmospheric corrosion. Asset condition, obsolescence and compliance risks have been identified across parts of the network supplying Townsville and surrounding communities, with ongoing reinvestment required to maintain reliable electricity supply.

6.6.3 Future network investments and opportunities

Powerlink has identified potential network developments to address emerging asset condition risks in the Ross zone within the 10-year outlook period. These opportunities are at various stages of development with some projects currently progressing through RIT-T assessments.

Table 6.3 summarises these opportunities and their indicative timing, with further detail provided in the sections that follow. The opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the five-year investment profile tables following Table 6.3. Other investment opportunities identified in the 10-year outlook are not profiled as their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Table 6.3 Summary of Ross zone investments within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
RZ-01	Line refit works on the 132kV transmission line between Ross and Dan Gleeson substations	Line refit works on steel lattice structures	Maintain supply reliability to the Ross zone	June 2031	New 132kV transmission line	$8 million (1)	Uncommitted
RZ-02	Ross 275kV reactor bushing replacement	Replacement of bushing on one of the 275kV reactors	Maintain compliance with power system performance standards	June 2033	Replacement of 275kV reactor	$4 million	Uncommitted
RZ-03	Alan Sherriff 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability to the Ross zone	June 2028	Full replacement of 132kV secondary systems	$20 million (1)	Uncommitted
RZ-04	Garbutt 132kV secondary systems replacement	Full replacement of 132kV secondary systems	Maintain supply reliability to the Ross zone	June 2029	Selected replacement of 132kV secondary systems	$11 million	Uncommitted
RZ-05	Townsville East 132kV secondary systems replacement	Staged replacement of secondary systems	Maintain supply reliability to the Ross zone	June 2028	Full replacement of secondary systems	$8 million	RZ-05 and 06 are currently being progressed as a combined RIT-T
RZ-06	Townsville South 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability to the Ross zone	June 2028	Full replacement of 132kV secondary systems	$16 million	RZ-05 and 06 are currently being progressed as a combined RIT-T
RZ-07	Yabulu South 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability to the Ross zone	June 2034	Full replacement of 132kV secondary systems	$13 million	Uncommitted
RZ-08	Clare South 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability to the Ross zone	June 2036	Full replacement of 132kV secondary systems	$14 million	Uncommitted

Note:

(1) Compared to the 2025 TAPR, the change in the indicative cost of the proposed network solution is based upon updated information in relation to the scope of work.

6.6.4 Five-year investment profiles

Powerlink anticipates several potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets in the Ross zone within the next five years.

RZ-01 Addressing condition risks between Ross and Dan Gleeson

Item	Description
Location	North Queensland (running parallel to Ross River)
Asset details	The Ross to Dan Gleeson 132kV double-circuit transmission line was constructed in 1978
Investment context	The Ross to Dan Gleeson 132kV overhead transmission line operates in a tropical environment which advances corrosion of the galvanised structure components.
Investment driver	Condition driven replacement to address emerging condition, operational and safety risks associated with the overhead transmission line
Indicative timing	June 2031
Status	Uncommitted
Proposed network solution	Targeted line refit works on the 132kV transmission line between Ross and Dan Gleeson substations by June 2031 at an estimated cost of $8 million.
Other potential network solutions	Other potential network solutions include line refit works on the 132kV transmission line between Ross and Dan Gleeson substations, and development of a new 132kV transmission line between Ross and Dan Gleeson substations
Potential non-network solutions	Potential non-network solutions would need to provide supply to Townsville Ergon Energy load up to 133MW and 2,230MWh of energy each day to maintain network reliability until normal supply is restored
Inter-network impact	This network development is not anticipated to have material inter-network impacts

RZ-03 Addressing secondary systems condition risks at Alan Sherriff

Item	Description
Location	Townsville
Asset details	Established in 2002
Investment context	Alan Sherriff Substation is a major injection point into Ergon Energy's 66kV and 11kV distribution network providing supply to the Townsville area
Investment driver	Condition driven replacement to address emerging obsolescence and compliance risks on the 132kV secondary systems to maintain reliability of supply
Indicative timing	June 2028
Status	Uncommitted
Proposed network solution	Selected replacement of secondary systems at an estimated cost of $20 million by June 2028
Other potential network solutions	In-situ selected replacement of secondary systems by December 2028
Potential non-network solutions	Potential non-network solutions would need to provide supply to the 66kV and 11kV network at Alan Sherriff of up to 128MW and up to 2,128MWh per day. The nonnetwork solution would be required for an unplanned contingency event, and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages.
Inter-network impact	This network development is not anticipated to have material inter-network impacts

RZ-04 Addressing secondary systems condition risks at Garbutt

Item	Description
Location	Approximately 6km west of the Townsville Central Business District
Asset details	Established in late 1950s with the last replacement in 2004
Investment context	Garbutt Substation is a major injection point into the Ergon Energy 66kV and 11kV distribution network providing supply to the Townsville area.
Investment driver	Condition driven replacement to address emerging obsolescence and compliance risks on the 132kV secondary systems to maintain reliability of supply
Indicative timing	June 2029
Status	Uncommitted
Proposed network solution	Full secondary systems replacement at an estimated cost of $11 million by June 2029
Other potential network solutions	Selected replacement of secondary systems by June 2029
Potential non-network solutions	Potential non-network solutions would need to provide supply to the 66kV network at Garbutt Substation of up to 97MW and up to 1,640MWh per day. The non-network solution would be required for an unplanned contingency event and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages.
Inter-network impact	This network development is not anticipated to have material inter-network impacts

RZ-05 and RZ-06 Maintaining reliability of supply and addressing condition risks at Townsville South and Townsville East

Item	Description
Location	Townsville South and Townsville East
Asset details	Townsville South Substation was established in 1977. Townsville East Substation was established in 2008.
Investment context	Townsville South Substation provides an injection point into the Ergon Energy distribution network to supply power to southern and eastern Townsville. The substation is also a transfer point for enabling the flow of electricity between Clare to the south and Townsville to the north. Townsville East Substation was established to supply Townsville central business district and port.
Investment driver	Condition driven replacement to address emerging obsolescence and compliance risks on the 132kV secondary systems to maintain reliability of supply
Indicative timing	June 2028
Status	This project is currently undergoing RIT-T consultation. Submissions to the PSCR closed on 22 October 2026.
Proposed network solution	Selected secondary systems replacement at Townsville East Substation by June 2028 at an estimated cost of $8 million. Selected secondary systems replacement within the existing control building at Townsville South Substation by June 2028 at an estimated cost of $16 million.
Other potential network solutions	The PSCR has not identified any other credible network options
Potential non-network solutions	For Townsville South Substation, to mitigate the impact of a single 132kV feeder outage, a non-network solution would need to provide supply to major customers in the greater Townsville area of up to 70MW and up to 1,160MWh per day on a continuous basis. To maintain supply to major customers in the area and the Ergon Energy distribution network, a non-network solution would need to provide up to 150MW and up to 2,700MWh per day on a continuous basis. For Townsville East Substation, to maintain supply to the Ergon Energy distribution network, a non-network solution would need to provide up to 52MW and up to 379MWh per day on a continuous basis
Inter-network impact	This network development is not anticipated to have material inter-network impacts

6.6.5 Other potential developments

Broader developments within the greater Townsville area that may influence future transmission network requirements in the Ross zone include the proposed Lansdown Eco-Industrial Precinct, continued development of the Townsville State Development Area, expansion of Port of Townsville facilities, and residential and community growth in north-west Townsville.

6.6.6 Possible asset retirements

Powerlink has not identified any potential asset retirements in the Ross zone within the 10-year outlook period.

6.7 North zone

The North zone extends from Strathmore in the north to Nebo in the south and encompasses the transmission networks supplying Mackay, the northern Bowen Basin, major coal export infrastructure, industrial facilities, mining operations and regional communities. The zone is supplied by a combination of 275kV and 132kV transmission infrastructure.

The Mackay network is supplied primarily from Nebo 275/132kV Substation and provides supply to the Mackay region, Hay Point Coal Terminal, Dalrymple Bay Coal Terminal and surrounding communities through the wider 132kV transmission network. The Mackay to Hay Point corridor contains significant export infrastructure and associated rail networks that support mining exports from the northern Bowen Basin.

The northern Bowen Basin network comprises a meshed 132kV network supplied from Strathmore, Nebo and Lilyvale substations. The network supplies major mining operations, rail infrastructure, industrial facilities and regional communities throughout the basin.

The northern Bowen Basin is expected to remain a significant source of electricity demand growth, driven by mining developments, mine expansions and the progressive electrification of mining operations. These developments have the potential to influence future transmission network requirements across the North zone.

6.7.1 Existing and committed network developments

Recent investment across the North zone has focused on maintaining reliable supply to mining, industrial and regional customers while preserving the capability and reliability of existing transmission infrastructure.

Powerlink has completed a range of transmission line refit works, substation reinvestment projects and secondary systems replacements within the Mackay and northern Bowen Basin areas to address condition and obsolescence related risks to maintain reliability of supply.

Further information on committed and anticipated projects is provided in Chapter 10.

6.7.2 Emerging and evolving investment drivers

The North zone is characterised by a combination of asset reinvestment requirements and future load growth associated with mining, industrial and export-related developments.

Within the Mackay area, the existing transmission network is expected to provide sufficient capacity to meet forecast electricity demand over the 10-year outlook period under the central load forecast scenario. Future investment requirements are primarily associated with managing asset condition, obsolescence and compliance risks to maintain network reliability.

Within the northern Bowen Basin, the existing 132kV transmission network supplies mining operations, rail infrastructure, industrial facilities and regional communities. While network limitations are not forecast under the Central scenario load forecast, limited spare capacity may trigger the need for network investment and/or non-network solutions to support mining developments, mine expansions and mining electrification. The timing and scale of this growth remains uncertain.

Powerlink will continue to monitor these customer connection activities and other emerging developments through its annual planning process and ongoing joint planning activities with Ergon Energy.

6.7.3 Future network investments and opportunities

Powerlink has identified potential network developments to address emerging network needs and asset condition risks in the North zone within the 10-year outlook period. These opportunities are at various stages of development, with some projects currently progressing through RIT-T assessments.

Table 6.4 summarises these opportunities and their indicative timing, with further detail provided in the sections that follow. The opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the five-year investment profile tables following Table 6.4. Other investment opportunities identified in the 10-year outlook are not profiled as their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Table 6.4 Summary of North zone investments within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
NQ-01	Line refit works on the 132kV transmission line between Collinsville North, Strathmore and Clare South substations	Line refit works on the 132kV transmission line	Maintain supply reliability to the North zone	June 2035	Rebuild of the 132kV transmission line between Collinsville North, Strathmore and Clare South substations	$44 million	Uncommitted
NQ-02	Line refit works on the 132kV transmission line between Collinsville North, Goonyella Riverside and Moranbah substations	Line refit works on the 132kV transmission line	Maintain supply reliability in the Northern Region and Central West zones	June 2035	Rebuild the 132kV transmission line between Collinsville North, Goonyella Riverside and Moranbah substations	$58 million	Uncommitted
NQ-03	Line refit works on the 132kV transmission line between Moranbah, Kemmis and Nebo substations	Line refit works on the 132kV transmission line	Maintain supply reliability in the Northern Region and Central West zones	June 2035	Rebuild the 132kV transmission line between Moranbah, Kemmis and Nebo substations	$40 million	Uncommitted
NQ-04	Northern Bowen Basin reinforcement (1)	The scope of work ranges from installation of power flow control devices through to rebuild of the existing Nebo to Moranbah 132kV double-circuit line	Maintain reliability of supply within the northern Bowen Basin	The timing and scope of network investments is dependent on scale, pace and timing of load developments	The optimal network investment will depend on potential load developments within the northern Bowen Basin, and available non-network solutions. The optimal investment pathway will also take into account condition drivers (refer NQ-03)	Dependent on optimal network and non-network solution	Proposed contingent project in Powerlink's 2027–32 Revenue Proposal
NQ-05	Broadsound 275kV selected primary plant replacement	Selected replacement of 275kV primary plant	Maintain CQNQ power transfer capability and supply reliability to the Northern Region and Central West zone	June 2030	Full replacement of 275kV primary plant	$19 million	Uncommitted

Table 6.4 Summary of North zone investments within the 10-year outlook period (*continued*)

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
NQ-06	Stanwell selected 275kV primary plant replacement	Selected replacement of 275kV primary plant	Address emerging condition related risks to maintain reliability of supply	December 2032	Rebuild of Stanwell 275kV substation	$22 million	Uncommitted
NQ-07	Pioneer Valley 132kV primary plant replacement	Selected replacement of 132kV primary plant	Maintain supply reliability to the North zone	June 2035	Full replacement of 132kV primary plant	$8 million (2)	Uncommitted
NQ-08	Alligator Creek 132kV Substation reinvestment	Selected replacement of 132kV primary plant and SVC secondary systems replacement	Maintain supply reliability to the North zone	December 2030	Full replacement of 132kV primary plant and SVC secondary systems replacement	$33 million	Uncommitted
NQ-09	North Goonyella 132kV secondary systems replacement	Selected replacement of 132kV secondary systems in the existing building	Maintain supply reliability to the North zone	June 2029	Full replacement of 132kV secondary systems in a new building	$9 million	Uncommitted
NQ-10	Strathmore 275kV and 132kV secondary systems replacement	Selected replacement of 275kV and 132kV secondary systems in a new prefabricated building	Maintain supply reliability to the North zone	June 2034	Selected replacement of 275kV and 132kV secondary systems in existing panels	$14 million	Uncommitted
NQ-11	Strathmore SVC secondary systems replacement	Selected replacement of 132kV secondary systems in existing building including thyristor valves and cooling system	Maintain CQ-NQ power transfer capability and compliance with system standards	December 2030	Full replacement of 132kV secondary systems in a new building	$24 million	Currently progressing through RIT-T assessment
NQ-12	Lilyvale 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability to the Northern Region and Central West zone	June 2036	Full replacement of 132kV secondary systems	$5 million	Uncommitted

Notes:

(1) The final status of this project will be determined as part of the AER's Final Determination on Powerlink's 2027-32 Revenue Proposal to be published in April 2027.

(2) Compared to the 2025 TAPR, the change in the estimated cost of the proposed network solution is based upon updated information in relation to the condition and scope of works.

6.7.4 Five-year investment profiles

Powerlink anticipates several potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets in the North zone within the next five years.

NQ-05 Maintaining reliability of supply at Broadsound

Item	Description
Location	Livingstone near Marlborough
Asset details	Established in 1983. Further extensions have been made with additions of 275kV feeders to the west, south and north.
Investment context	Broadsound Substation is a major transmission node connecting power flows between northern and Central Queensland. It also connects Lilyvale Substation and the Central West loads.
Investment driver	Condition driven replacement to address emerging condition risks on the 275kV primary plant to maintain reliability of supply
Indicative timing	June 2030
Status	Uncommitted
Proposed network solution	Selected 275kV primary plant replacement at Broadsound Substation by June 2030 at an estimated cost of $19 million
Other potential network solutions	Full 275kV primary plant replacement by June 2030
Potential non-network solutions	Potential non-network solutions would need, as a minimum, to provide supply to Lilyvale and Blackwater loads of approximately 220MW and 4,050MWh per day.
Inter-network Impact	This network development is not anticipated to have material inter-network impacts

NQ-08 Addressing the primary plant and secondary systems condition risks at Alligator Creek

Item	Description
Location	Approximately 30km south-east of Mackay
Asset details	Established in 1982
Investment context	Alligator Creek Substation supplies the Hay Point and Dalrymple Bay coal terminals, associated rail infrastructure and the Ergon Energy distribution network serving communities south of Mackay
Investment driver	Condition driven replacement to address emerging condition and obsolescence risks on the 132kV primary plant and SVC secondary systems.
Indicative timing	December 2030
Status	Uncommitted
Proposed network solution	Selected 132kV primary plant replacement, and 132kV and SVC secondary systems replacement by December 2030 at an estimated cost of $33 million
Other potential network solutions	Staged selected 132kV primary plant replacement, and 132kV and SVC secondary systems replacement by December 2030
Potential non-network solutions	Potential non-network solutions would need to provide supply to the 132kV loads connected at Alligator Creek Substation of up to 70MW and up to 1,500MWh per day
Inter-network Impact	This network development is not anticipated to have material inter-network impacts

NQ-09 Addressing the secondary systems condition risks at North Goonyella

Item	Description
Location	Approximately 40km north of Moranbah
Asset details	Established in 1992
Investment context	North Goonyella Substation provides supply to the adjacent coal mine. The existing secondary systems were installed more than 20 years ago and are now obsolete.
Investment driver	Condition driven replacement to address emerging obsolescence and compliance risks on the 132kV secondary systems
Indicative timing	June 2029
Status	Uncommitted
Proposed network solution	Selected replacement of 132kV secondary systems in existing building by June 2029 at an estimated cost of $9 million
Other potential network solutions	Full replacement of 132kV secondary systems in a new building
Potential non-network solutions	Potential non-network solutions would need, as a minimum, to provide supply to the Goonyella loads of approximately 22MW and 516MWh per day
Inter-network Impact	This network development is not anticipated to have material inter-network impacts

NQ-11 Managing voltage levels and transfer capability in North Queensland

Item	Description
Location	Approximately 5km from Collinsville
Asset details	Installed in 2007
Investment context	Strathmore 275/132kV Substation is a major injection point to supply Ergon Energy's distribution network and Powerlink's direct connected customers in the northern Bowen Basin
Investment driver	Condition driven replacement to address emerging condition risks on the SVC secondary systems, thyristor valves and cooling system
Indicative timing	December 2030
Status	Current RIT-T. Submissions to the PSCR closed on 22 October 2026
Proposed network solution	Replacement of the Strathmore SVC secondary systems, thyristor valves and cooling system by December 2030 at an estimated cost of $24 million
Other potential network options	Install a new 275kV reactor at Strathmore Substation by December 2030, decommission Strathmore SVC by December 2031 and install a new 275kV capacitor bank at Strathmore Substation by 2032
Potential non-network solutions	A non-network solution would need to be capable of delivering a minimum of 50MVAr and up to 100MVAr of capacitive voltage support, and a minimum of 80MVAr of inductive voltage support on a continuous basis
Inter-network impact	This network development is not anticipated to have material inter-network impacts

6.7.5 Other potential developments

The Mackay region is expected to experience continued residential, commercial and industrial growth which may drive the need for future network investment. Longer-term load demand may also be influenced by expansion of industrial and export-related infrastructure within the Mackay to Hay Point corridor, including the Port of Mackay, Hay Point Coal Terminal and Dalrymple Bay Coal Terminal, the timing and scale of which remain uncertain.

Powerlink will continue to monitor these developments through its annual planning process and ongoing joint planning activities with Ergon Energy.

6.7.6 Potential asset retirements

Powerlink has not identified any potential asset retirements in the North zone within the 10-year outlook period.

6.8 Northern Region transmission line refit program

Where smaller transmission line refit requirements have been identified within the Northern Region, these may be grouped into regional programs as part of Powerlink's Geographic Line Refit Program. This approach is intended to improve delivery efficiency and reduce costs by coordinating geographically proximate transmission line refit requirements that might otherwise be addressed separately. Transmission lines currently identified for potential inclusion in the Northern Region line refit program are summarised in Table 6.5.

Table 6.5 Transmission lines under consideration for inclusion in Northern Region line refit program in the 10-year outlook period

Transmission line	Zone	Potential line refit program
Line refit works on the 275kV transmission line between Woree and White Rock	Far North	Cairns
Line refit works on the 275kV transmission line between Bayview Heights and Davies Creek	Far North	Cairns
Line refit works on the 132kV transmission line between Chalumbin and Turkinje	Far North	Cairns
Line refit works on the 132kV transmission line between Woree and Edmonton substations	Far North	Cairns
Line refit works on the 275kV transmission line between Strathmore and Ross substations	Ross	Townsville/Mackay
Line refit works on the 132kV transmission line between Townsville South and Clare South tee Invicta	Ross	Townsville/Mackay
Line refit works on the 132kV transmission line between Townsville South and Ross substations	Ross	Townsville/Mackay
Line refit works on the 132kV transmission line between Pioneer Valley and Eton Tee	North	Townsville/Mackay
Line refit works on the 132kV transmission line between Nebo and Pioneer Valley substations	North	Townsville/Mackay
Line refit works on the 132kV transmission line between Mackay and Pioneer Valley substations	North	Townsville/Mackay

6.9 Northern Region lines approaching end of technical service life

The following table provides a consolidated outlook of transmission lines in the Northern Region expected to approach end of technical service life within the 10-year outlook period and may require future intervention, reinvestment or other lifecycle management actions.

Assets identified within the 10-year outlook are subject to active planning, investment assessment or lifecycle management activities, with potential responses including life extension, refurbishment, replacement, operational management strategies or retirement.

Transmission lines expected to approach end of technical service life between 10 and 20 years are provided in Appendix F.

Table 6.6 Northern Region transmission lines approaching end of technical service: 10-year outlook

Zone	Feeder	Voltage	General location
Far North	857, 858	275kV	Between Guybal Munjan and Chalumbin substations
Far North	877	275kV	Between Tumoulin and Woree substations
Far North	8902	275kV	Between Woree and Walkamin substations
Far North	7141, 7142	132kV	Between Kamerunga and Woree substations
Far North	7165, 7166	132kV	Between Chalumbin and Turkinje substations
Far North	7191, 7192	132kV	Between Kareeya and Chalumbin substations
Far North	7284	132kV	Between Woree and Edmonton substations
Ross	8916, 8917	275kV	Between Ross and Guybal Munjan substations
Ross	7128/2	132kV	Between Strathmore and Clare South Tee King Creek substations
Ross	7144/1, 7144/2, 7151/1, 7151/2	132kV	Between Ross and Alan Sherriff Tee Dan Gleeson substations
Ross	7156	132kV	Between Ross and Townsville South substations
Ross	7208	132kV	Between Strathmore and Clare South substations
North	820	275kV	Between Bouldercombe and Broadsound substations
North	821	275kV	Between Bouldercombe and Nebo substations
North	7119	132kV	Between Nebo and Alligator Creek substations
North	7120, 7304	132kV	Between Nebo and Pioneer Valley substations
North	7127	132kV	Between Collinsville North and Strathmore substations
North	7152	132kV	Between Alligator Creek and Pioneer Valley substations
North	7238	132kV	Between Pioneer Valley and Mackay substations
North	7369, 7370	132kV	Between Moranbah and Goonyella Riverside substations
North	7451	132kV	Between Pioneer Valley and Mackay substations

Central Region Development Outlook

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7.8 Central Region lines approaching end of technical service life

07

This chapter focuses on potential investment opportunities on the transmission network across the 10-year outlook period for the Central Region within Queensland. It includes information on forecast network limitations, potential network investments, non-network opportunities, and other future developments which could shape transmission network requirements for the state.

Key highlights

- The Central Region includes the Central West and Gladstone Transmission Annual Planning Report (TAPR) zones.
- The Central Region hosts Queensland's largest concentration of heavy industrial electricity demand and is expected to experience changing power transfer patterns associated with generation developments, industrial growth and major customer connections.
- The Gladstone Project progressing under the Priority Transmission Investment (PTI) framework remains the defining near-term network investment in the region and is intended to establish the baseline network capability required to maintain reliable and secure supply following the potential closure of Gladstone Power Station in March 2029.
- Powerlink is progressing the installation of four synchronous condensers identified through the System Strength Regulatory Investment Test for Transmission (RIT-T). These investments will provide essential services to maintain secure and reliable operation of the Queensland transmission network. Two synchronous condensers will be installed at Calliope River Substation, with one each at the Stanwell and Nebo substations.
- Future investment requirements in the Gladstone area are dependent on the scale, location and timing of emerging industrial load growth, potential electrification of existing processes, major customer connections, generation and storage developments, and system security requirements.
- Significant portions of the region's 275 kilovolt (kV) and 132kV network are approaching end of technical service life, with future investment focused on managing asset condition and obsolescence risks while optimising long-term network configuration.
- The Central West and Rockhampton areas are expected to remain capable of meeting forecast demand over the outlook period, with investment primarily driven by asset condition, reliability of supply and network reinvestment requirements.
- The Central West 132kV network presents an opportunity for the staged consolidation of ageing single circuit assets over the medium to long-term supporting a more economic network configuration delivering long-term value to customers.

7.1 Regional overview

The Central Queensland transmission network comprises a broadly triangular 275kV backbone, extending between the Bouldercombe and Stanwell area in the north, the Callide and Calvale area in the west, and the Calliope River and Wurdong area in the east.

The region also includes the Central West 132kV network, which was primarily developed in the 1960s to supply mining loads, and the Rockhampton 132kV network supplied from Bouldercombe Substation servicing the greater Rockhampton residential, agricultural and tourism regional area.

7.2 Regional investment themes

Five key investment themes are expected to shape transmission network requirements and development within the Central Region over the 10-year outlook period:

- maintaining reliability and security of supply
- optimising network asset reinvestment with capacity requirements
- responding to uncertain industrial, mining and generation development
- changing generation and system security requirements
- managing land use and corridor constraints.

Maintaining reliability and security of supply

Gladstone is one of Queensland's most strategically significant industrial electricity supply areas with energy-intensive customers requiring reliable and secure supply. Changes in generation and demand patterns, including the potential closure of the 1,680 megawatt (MW) Gladstone Power Station in March 2029, will significantly change transmission capacity requirements across the region. Future investment planning is focusing on ensuring network investment to maintain reliability of supply and support efficient and economic market operation.

Optimising network asset reinvestment with capacity requirements

A substantial proportion of the region's 275kV and 132kV assets were developed between the 1960s and early 1990s. The optimal investment pathway will need to balance emerging asset condition and obsolescence risks with future network requirements. Changes in generation and load patterns over the past decade provide opportunities to optimise network configuration to deliver efficient long-term outcomes for customers.

Responding to uncertain industrial, mining and generation development

Central Queensland continues to attract interest from industrial electrification, emerging industries, and generation and storage developments. As the timing, scale and location of these developments remain uncertain, a staged planning approach is adopted to align network capability with confirmed customer requirements and emerging system needs.

Changing generation and system security requirements

As generation and storage developments change the availability of synchronous generation, additional system security services will be required. Powerlink is progressively planning and developing solutions to maintain system security services, including system strength and inertia. Further information is provided in Chapter 3.

Managing land use and corridor constraints

Transmission development around Gladstone is constrained by industrial land use, site congestion and competing infrastructure. Existing easements often intersect or adjoin gas, water, sewerage and industrial infrastructure, increasing the complexity of access, construction and outage coordination.

As land use continues to evolve, preserving or acquiring new strategic easement corridors and substation expansion areas maintains future development options and reduces the risk of higher cost or delayed network investment.

7.3 Greater Gladstone and Wurdong area

7.3.1 Background

The Gladstone 275kV and 132kV network was progressively developed from the 1970s to support metals processing industry in the region. Key transmission nodes include the Calliope River, Larcom Creek and Wurdong substations, which connect major industrial customers, Ergon Energy distribution networks, and the broader Central Queensland transmission network.

7.3.2 Emerging and committed network developments

Gladstone Project

As noted in Section 5.3.1, in June 2025 Powerlink completed a PTI assessment for the Gladstone Project. In August 2026, the Queensland Government declared the Gladstone Project as a PTI under the *Energy (Infrastructure Facilitation) Act 2024*. The project is intended to establish the baseline network configuration required to maintain reliable supply following the potential closure of Gladstone Power Station.

Following the declaration, the Queensland Government issued directions to Powerlink to facilitate the project's construction. The project comprises two stages of work:

- Stage 1: Calvale to Calliope River Transmission Line Reinforcement Project – involves construction of a new 275kV line from Calvale to Gladstone West to Calliope River and is to be completed by March 2029.
- Stage 2: Gladstone West Substation and Bouldercombe to Gladstone West transmission line – involves establishing a new Gladstone West Substation by June 2029, and construction of a new 275kV line from Bouldercombe to Gladstone West by August 2030.

The June 2025 PTI assessment included construction of a Gladstone West to Larcom Creek transmission line as part of the proposed Gladstone Project PTI scope. Construction of this line is no longer included in the PTI project scope. This change reflects the Gladstone Project's investment time horizons and updated demand forecasts which saw a reduction in demand projections for Larcom Creek Substation.

Construction of the line remains within Powerlink's future network investment plans and is one of the potential network solutions identified in Powerlink's proposed Gladstone Area Augmentation Contingent Project. Any future investment would remain subject to further planning, regulatory assessment and approval processes if the relevant trigger event(s) occur.

The Gladstone Project scope includes installation of a third 275/132kV transformer at Calliope River Substation and installation of additional reactive plant. The scope also includes establishment of Wide Area Monitoring, Protection and Control (WAMPAC) schemes at multiple Powerlink substations to maintain network stability, support network security requirements and maintain transfer capability during planned and unplanned outage conditions. Table 7.1 outlines the main scope elements of Stages 1 and 2 of the Gladstone Project.

Table 7.1 Gladstone Project Stages 1 and 2

Stage	Scope
Stage 1 main scope elements	• Calvale to Calliope easement acquisition • Calvale to Gladstone West to Calliope River 275kV high-capacity double-circuit transmission line (87km, rated at 2,091MVA) • Calvale Substation works • Calliope River Substation works • Calliope River 3rd 275/132kV transformer, substation works and related transmission works • Supply of essential system services, including a non-network solution
Stage 2 main scope elements	• Bouldercombe to Gladstone West easement acquisition • Bouldercombe to Gladstone West 275kV high-capacity double circuit transmission line (80km, rated at 2,091MVA) • Bouldercombe Substation works • Gladstone West 275kV Substation land, establishment substation works and related transmission line and remote end substation works • Gladstone West to Larcom Creek easement acquisition • Wide Area Monitoring, Protection and Control schemes at relevant Powerlink substations • Supply of essential system services, including exploring a non-network solution

Synchronous condensers

Powerlink has commenced procurement activities for the installation of four synchronous condensers identified as part of the preferred option through the System Strength RIT-T, two of which will be located at Calliope River Substation, and one each at the Stanwell and Nebo substations. The investment is proposed to be delivered in stages and aligned with the potential closure of Gladstone Power Station.

In October 2026, prior to TAPR publication, Powerlink published a draft Material Change in Circumstances (MCC) Assessment for the System Strength RIT-T due to three key events since publication of the Project Assessment Conclusions Report (PACR) in June 2025:

- The release of the Queensland Energy Roadmap in October 2025;
- CS Energy publicly announcing in September 2025 formal advice to AEMO of the potential closure of Gladstone Power Station in March 2029; and
- AEMO's most recent Inputs, Assumptions and Scenarios Report and 2026 Integrated System Plan which include the most recently announced generator retirement dates across the National Electricity Market, which for Queensland are significantly different to those used in the PACR analysis.

The draft MCC assessment report supports the near-term critical requirement for four network synchronous condensers to maintain system strength in Central Queensland, and further identifies the requirement for a fifth synchronous condenser or equivalent service in Central Queensland by January 2031. At the time of TAPR publication, the draft MCC assessment report is undergoing a 30 business day public consultation period.

Powerlink continues to actively seek out opportunities for non-network solutions to replace, in part or in full, the need to invest in future network synchronous condensers, and will utilise regulatory consultation processes to pivot to and support the development of new system strength solutions should they become available and an identified need for system strength services is confirmed.

Other committed investments

Other committed network reinvestments in the Gladstone area include targeted line refit works, secondary systems replacements at the Gladstone South and Queensland Alumina Limited (QAL) West substations, and current transformer replacements under the Central Region program. Committed connection projects in the broader Central Region include Boulder Creek Wind Farm, Smoky Creek Solar Power Station and Guthrie's Gap Solar Power Station.

Further information on completed and committed developments are provided in Chapter 10.

7.3.3 Emerging and evolving investment drivers

Future network requirements in the Gladstone area will be dependent on the scale, location and timing of industrial electrification, emerging industries, large customer connections, and generation and storage developments. The Gladstone Project is expected to establish a baseline level of network capability with further transmission network investment dependent on future regional industrial developments and operation.

Future transmission requirements in the Gladstone area may also be dependent on the outcome of the Queensland Government's Central Queensland Gas Power Tender and any associated network connection and transmission augmentation requirements.

Emerging asset condition and obsolescence risks within the Gladstone area, combined with constraints associated with land availability, easement access and competing infrastructure, will also continue to influence the timing and scope of future network development and reinvestment decisions.

7.3.4 Greater Gladstone and Wurdong area investment outlook

Figure 7.1 provides a geographic overview of potential investment opportunities within the greater Gladstone and Wurdong areas.

The investment opportunities and their indicative timings are summarised in Table 7.2. These opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and decision-making processes.

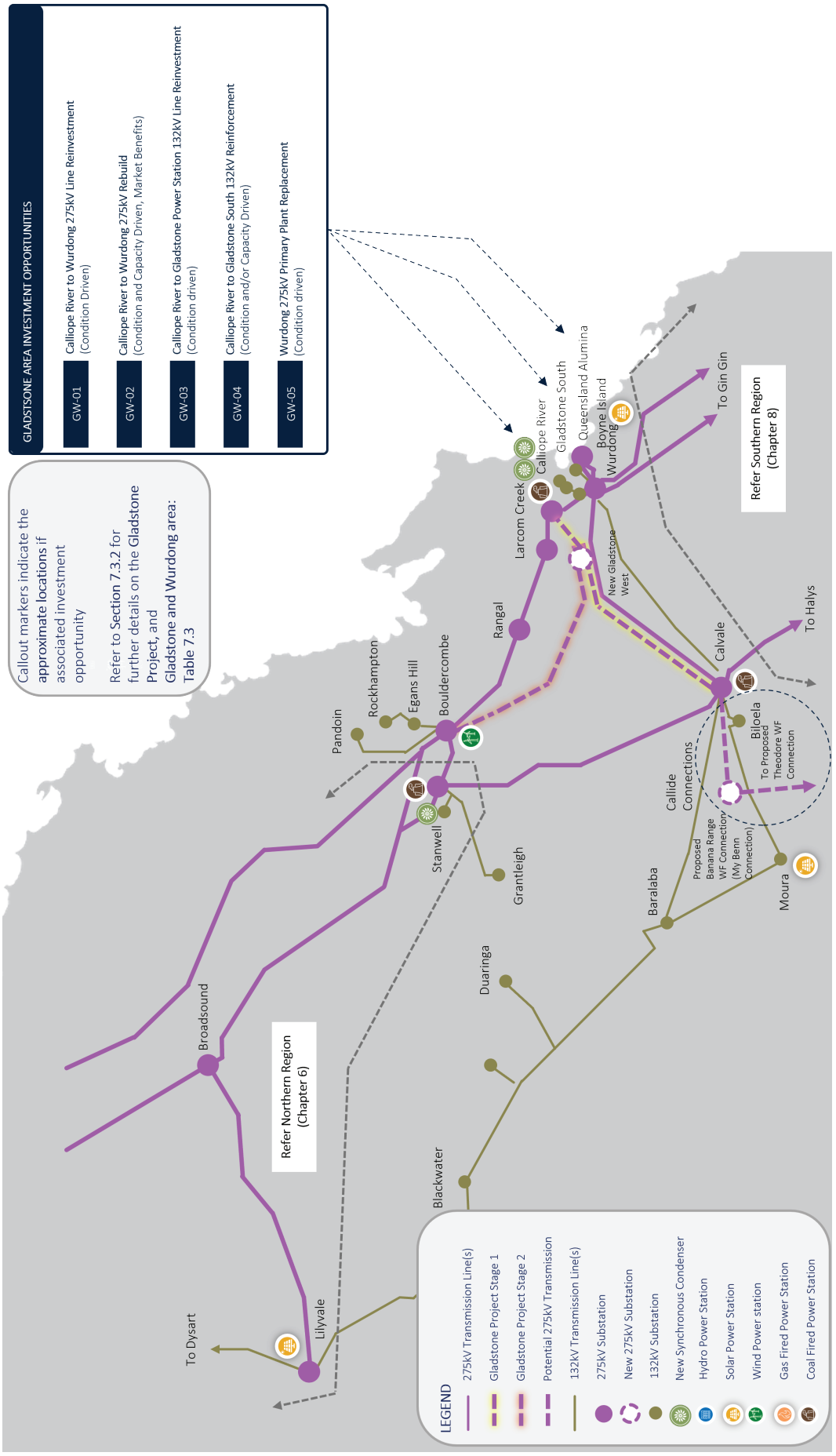


Figure 7.1 Future investment opportunities for the Gladstone and Wurdong areas

Table 7.2 Gladstone and Wurdong investment opportunities within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
GW-01	Calliope River to Wurdong 275kV transmission reinvestment	Line refit on the 275kV transmission line	Emerging network asset condition and reliability of supply risks	June 2033	Rebuild of the Calliope River to Wurdong 275kV line Where increased network capacity is required, a higher capacity rebuild option is considered (refer to GW-02)	$33 million	Uncommitted
GW-02	Calliope River to Wurdong 275kV transmission network rebuild	Replace the three existing single circuit 275kV lines between Calliope River and the Wurdong Tee with two higher capacity double circuit lines	Emerging network asset condition, capacity, and market benefit drivers	Scenario dependent and market benefits. This project would consider both emerging condition related risks (refer GW-01) and capacity drivers to optimise investment scope and timings	Alternative configurations and staging for rebuilding the Calliope River to Wurdong 275kV network to higher capacity	$200 million	Uncommitted
GW-03	Calliope River to Gladstone Power Station 132kV reinvestment	Line refits of the existing 132kV line. These lines supply Ergon Energy loads and will therefore need to be maintained post Gladstone Power Station closure	Emerging network asset condition and reliability of supply risks	June 2035	Rebuild of the Calliope River to Gladstone 132kV transmission line	$7 million	Uncommitted
GW-04	Calliope River and Gladstone Power Station to Callemondah Substation reinforcement	Rebuild of the existing 132kV double circuit line to higher capacity	Emerging asset condition and capacity drivers	Scenario dependent on block load increases within the Gladstone South and QAL area. This project would consider both emerging condition related risks and capacity drivers to optimise investment scope and timings	Construction of new 132kV line from alternate substation locations	$120 million	Uncommitted
GW-05	Wurdong 275kV selected primary plant replacement	Replacement of selected primary plant	Emerging asset condition risks	June 2035	Rebuild of Wurdong 275kV substation site	$30 million	Uncommitted

7.3.5 Five-year investment profiles

Powerlink does not currently anticipate any further network investments above the RIT-T cost threshold being required to address emerging asset condition or network capacity risks within the Gladstone and Wurdong areas within the next five years.

7.3.6 Other potential developments

Further augmentation may be required where future demand exceeds the capability of the baseline network established by the Gladstone Project. Potential industrial electrification and new large loads within the Gladstone area could result in demand growth beyond current planning forecasts and the capability of the transmission network following completion of the Gladstone Project. The scale and pace of additional load development will shape the scope and timing of future network developments and potential non-network solutions.

Emerging condition-based risks on existing 275kV transmission lines may also require line-refit works within the 10-year outlook period and more substantial lifecycle intervention beyond this period. These needs may provide opportunities to coordinate asset reinvestment with future network augmentation and reconfiguration.

Potential transmission network solutions to increase the net supportable load within the greater Gladstone and Wurdong areas include the following:

- Installation of power flow control devices to optimise power flow transfers across the 275kV meshed network (nominally on the existing Calvale to Wurdong 275kV transmission line)
- Construction of a 275kV double circuit transmission line between the future Gladstone West and Larcom Creek substations
- Advancement of the rebuild of the existing single circuit 275kV transmission lines between Larcom Creek and Calliope River
- Advancement of the rebuild of the existing single circuit 275kV transmission lines between the Calliope River and Wurdong substations
- Advancement of the rebuild of the existing single circuit 275kV transmission line between the future Gladstone West and Calliope River substations
- Rebuild of the existing single circuit coastal 275kV transmission line between the Bouldercombe and Larcom Creek (via Raglan) substations.

The optimal scope and sequencing of potential network augmentation, reinvestment or reconfiguration will depend on location and scale of generation and load developments, both within the Gladstone and Wurdong area, and more broadly across the Queensland network to maintain supply reliability and support efficient and economic market operation.

7.3.7 Possible asset retirements

Powerlink has not identified any potential asset retirements within the greater Gladstone and Wurdong area within the 10-year outlook period.

7.4 Bouldercombe and Rockhampton, and Central West investment outlook

Figure 7.2 provides a geographic overview of the Bouldercombe and Rockhampton, and Central West areas. Potential investment opportunities for these areas are discussed in sections 7.5 and 7.6.

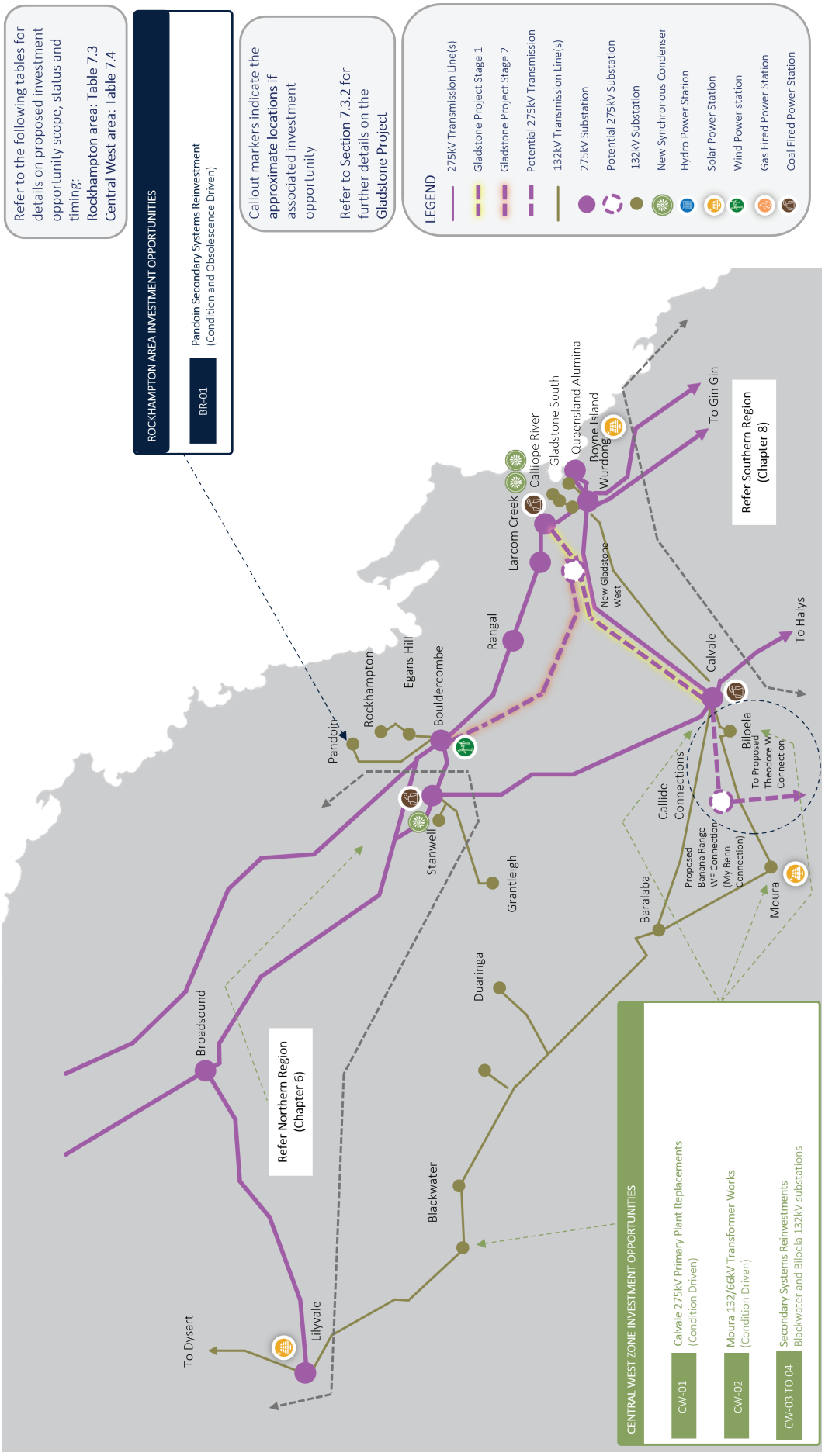


Figure 7.2 Future investment opportunities for the Bouldercombe and Rockhampton, and Central West area

7.5 Bouldercombe and Rockhampton area

The Bouldercombe and Stanwell substations form the northern connection points of the Central Queensland transmission network. While Stanwell Substation and Power Station are geographically located within Central Queensland, transmission investments associated with Stanwell are discussed in Chapter 6 (Northern Region) as this forms part of the Central Queensland to North Queensland transmission backbone.

Bouldercombe Substation is the primary 275/132kV supply point for the Rockhampton area. The Rockhampton 132kV transmission network extends to the Rockhampton, Egans Hill and Pandoin substations. The network supports the Ergon 66kV and 33kV networks and distribution systems supplying residential, commercial and industrial customers throughout the greater Rockhampton region and surrounding communities.

The 132kV network supplied from Bouldercombe also provides supply to Aurizon traction substations and auxiliary supplies for Stanwell Power Station.

7.5.1 Existing and committed network developments

Network investments within the Rockhampton area have included line refit works on the 132kV transmission network, and secondary systems works at Egans Hills Substation. Powerlink has also completed connection of large-scale generation projects and Stanwell Battery Energy Storage System (BESS).

Detailed information on committed developments is provided in Chapter 10.

7.5.2 Emerging and evolving investment drivers

Based on current demand forecasts, the existing transmission network is forecast to remain capable of supplying customer requirements over the 10-year outlook period.

Future investment drivers are expected to be primarily associated with asset condition and obsolescence risks across the existing 132kV network. Emerging condition risks have been identified on sections of the transmission network, together with associated primary plant, transformers and secondary systems.

Powerlink will continue to monitor these developments through our annual planning process and ongoing joint planning activities with Ergon Energy.

7.5.3 Future network investments and opportunities

One future investment opportunity within the Bouldercombe and Rockhampton area is detailed within Table 7.3. The opportunity does not constitute a committed project, and the scope, timing and implementation remain subject to further assessment and investment decision-making processes.

Table 7.3 Bouldercombe and Rockhampton area investment opportunity within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative Timing	Alternatives	Indicative cost	Status
BR-01	Pandoin 132kV secondary systems replacement	Replacement of secondary systems	Address emerging condition and obsolescence risks	June 2036	Selected secondary systems replacement and reinforcement of the Ergon Energy 66kV sub-transmission network	$6 million	Uncommitted

7.5.4 Five-year investment profiles

Powerlink does not currently anticipate any network investments above the RIT-T cost threshold being required to address asset condition risks or network capacity limitations within the next five years.

7.5.5 Other potential developments

The Rockhampton area continues to experience residential, commercial and industrial growth, particularly in the north-western part of the greater Rockhampton area and nearby coastal Yeppoon communities. Future augmentation requirements may emerge if demand growth exceeds current forecasts or additional large customer developments proceed.

7.5.6 Possible asset retirements

Powerlink has not identified any potential asset retirements in the Rockhampton area within the 10-year outlook period.

7.6 Central West area

The Central West area comprises the inland transmission network serving Moura, Biloela, Blackwater and surrounding mining, agricultural, rail and regional communities. Electricity demand is driven by mining operations, Aurizon's electrified rail network, and the Ergon Energy distribution supply to regional townships and agricultural communities.

The area is primarily supplied by a 132kV network extending from the Calvale and Lilyvale 275/132kV substations. A significant proportion of the network was developed between the 1960s and 1980s to support mining development and rail electrification across Central Queensland.

7.6.1 Existing and committed network developments

Recent investments within the Central West area have included transformer replacement and substation works to address asset condition risks associated with ageing infrastructure. Powerlink has also completed or committed a number of network connection projects to support new large-scale generation and BESS developments.

Further information on completed and committed developments is provided in Chapter 10.

7.6.2 Future network investment and opportunities

The existing transmission network is expected to continue providing sufficient capacity to meet forecast electricity demand within the Central West area. Future reinvestment needs are driven primarily by emerging condition and obsolescence risks.

Table 7.4 summarises these opportunities and their indicative timing with further detail provided in the following sections. These opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

The investment profile for the one project Powerlink anticipates may be required within five years is included in the investment profile table following Table 7.4. Other investment opportunities identified in the 10-year outlook are not profiled as their indicative need falls outside the five-year period.

Table 7.4 Central West area investment opportunities within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative Timing	Alternatives	Indicative cost	Status
CW-01	Calvale 275kV selected primary plant replacement	Replacement of 275kV primary plant, uprate 275kV busbars and remove bus zone CT feeder rating limitations	Address emerging condition related risks	December 2033	Rebuild of existing Calvale 275kV switchyard	$39 million	Uncommitted
CW-02	Moura 132/66kV transformer rectification or replacement	Replacement of existing transformer and life extension of the second transformer	Address emerging transformer condition risks	June 2032	Replacement of both Moura 132/66kV transformers	$11 million	Uncommitted
CW-03	Blackwater 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Address emerging network asset condition and obsolescence risks	June 2033	Full 132kV secondary systems replacement	$19 million	Uncommitted
CW-04	Biloela 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Address emerging network asset condition and obsolescence risks	December 2033	Full 132kV secondary systems replacement	$21 million	Uncommitted

7.6.3 Five-year investment profiles

Powerlink anticipates one potential network investment above the RIT-T cost threshold may be required to address the risks arising from the condition of assets in the Central West area within the next five years.

CW-02 Maintaining reliability of supply at Moura

Item	Description
Location	Moura substation located around 80km west of Calvale
Asset details	Established in the 1970s as part of the 132kV inland transmission network supplying mining loads
Investment context	The Moura 132/66kV transformers primarily supply mining load and the Ergon Energy distribution network servicing the local township. Moura Solar Farm was commissioned in 2022 and is connected to the transmission network at Moura Substation. The solar farm supplies local demand and reduces power transfers across sections of the surrounding 132kV transmission network during periods of generation output.
Investment driver	Address emerging condition risks associated with the Moura 132/66kV transformers
Indicative timing	June 2032
Status	Uncommitted
Proposed network solution	Replacement of Transformer T1 by June 2032 and refit of Transformer T2 by June 2032 at an estimated cost of $11 million
Other potential network solutions	Replacement of both 132/66kV transformers by June 2032
Potential non-network solutions	Potential non-network solutions would need to provide supply to the Moura load of up to 70MW and 1,500MWh on a continuous basis
Inter-network impact	This network development is not anticipated to have material inter-network impacts

7.6.4 Other potential developments

Block load developments

Based on current demand forecasts and committed developments, network limitations have not been identified across the Central West 132kV network over the 10-year outlook. However, available headroom on the Calvale to Moura 132kV network is limited, and additional demand growth associated with mining expansion, electrification, or other load developments above current forecasts may require future network investment.

Moura 132kV consolidation strategy

As sections of the existing 132kV network in the greater Moura area approach end of technical service life, future reinvestment activities provide an opportunity to optimise network configuration while maintaining reliable supply.

The existing network comprises a series of single circuit 132kV lines connecting the Calvale, Baralaba, Moura and Duaringa substations. One potential medium to longer-term pathway involves establishing a new double circuit 132kV line between the Calvale and Moura substations, enabling the progressive retirement of Baralaba Substation and selected 132kV line sections between the Calvale, Baralaba, Moura and Duaringa substations. This may provide a more efficient and economic longer-term network configuration.

The timing and scope of any network configuration changes will be assessed as network requirements evolve, and will be aligned with network asset condition, load forecasts, customer requirements, and telecommunications and protection system needs.

Calvale connections

Powerlink is working with a number of proponents seeking to connect into Calvale Substation. Two customer connection projects, the Banana Range Wind Farm Connection Project and Theodore Wind Farm Connection Project, continue to progress through project development and investment processes.

Technical, commercial, land, approvals, delivery, and stakeholder engagement work is ongoing, and Powerlink continues to work with proponents and various stakeholders to support future investment decisions and the ongoing development of the projects.

7.6.5 Possible asset retirements

Powerlink has not identified any potential asset retirements in the Central West area within the 10-year outlook period.

7.7 Central Region transmission line refit program

Where smaller transmission line refit requirements have been identified within the Central Region, these may be grouped into regional programs as part of Powerlink's Geographic Line Refit Program. This approach is intended to improve delivery efficiency and reduce costs by coordinating geographically proximate transmission line refit requirements that might otherwise be addressed separately. Transmission lines currently identified for potential inclusion in the Central Region line refit program are summarised in Table 7.5.

Table 7.5 Transmission lines under consideration for inclusion in Central Region line refit program in the 10-year outlook period

Transmission line	Zone	Potential line refit program
Line refit works on the 275kV transmission line between Calliope River and Larcom Creek substations	Gladstone	Rockhampton/Gladstone
Line refit works on the 275kV transmission line between Bouldercombe Substation and Bouldercombe Tee	Central West	Rockhampton/Gladstone
Line refit works on the two 132kV transmission lines between Gladstone South and QAL substations	Gladstone	Rockhampton/Gladstone

7.8 Central Region lines approaching end of technical service life

The following table provides a consolidated outlook of transmission lines in the Central Region expected to approach end of technical service life within the 10-year outlook period and may require future intervention, reinvestment or other life cycle management actions.

Assets identified within the 10-year outlook are subject to active planning, investment assessment or lifecycle management activities, with potential responses including life extension, refurbishment, replacement, operational management strategies or retirement.

Transmission lines expected to approach end of technical service life between 10 and 20 years are provided in Appendix F.

Table 7.6 Central Region transmission lines approaching end of technical service: 10-year outlook

Zone	Feeder	Voltage	General location
Central West	812	275kV	Between Calliope River and Bouldercombe substations
Central West	7109/1, 7109/2	132kV	Between Calvale and Baralaba Tee Biloela substations
Central West	7110/1, 7110/2, 7110/3	132kV	Between Calvale and Moura Tee Biloela substations
Central West	7112	132kV	Between Moura and Baralaba substations
Central West	7170	132kV	Between Bouldercombe and Rocklands substations
Central West	7221	132kV	Between Bouldercombe and Egans Hill substations
Gladstone	818	275kV	Between Calliope River and Wurdong substations
Gladstone	8859	275kV	Between Calliope River and Larcom Creek substations
Gladstone	8875	275kV	Between Larcom Creek and Raglan substations
Gladstone	8876, 8879	275kV	Between Gladstone and Calliope River substations
Gladstone	8877, 8878	275kV	Between Gladstone and Calliope River substations
Gladstone	760	132kV	Between Calliope River and Gladstone South substations
Gladstone	761	132kV	Between Calliope River and Callemondah substations
Gladstone	7101, 7102/1	132kV	Between Gladstone South and QAL substations
Gladstone	7145, 7146	132kV	Between Calliope River and Boyne Island substation
Gladstone	7169	132kV	Between Gladstone South and Callemondah substations

Southern Region Development Outlook

8.1 Regional overview
8.2 Regional investment themes
8.3 Central Queensland to South Queensland transmission backbone
8.4 South West to South East Queensland transmission backbone
8.5 Wide Bay, South West, Bulli and Surat zones investment outlook
8.6 Wide Bay zone
8.7 South West, Surat and Bulli zones
8.8 Moreton and Gold Coast zones investment outlook
8.9 Moreton zone
8.10 Gold Coast zone
8.11 Southern Region line refit program
8.12 Southern Region transmission lines approaching end of technical service life

08

This chapter focuses on potential investment opportunities on the transmission network across the 10-year outlook period for the Southern Region within Queensland. It includes information on forecast network limitations, potential network investments, non-network opportunities, and other future developments which could shape transmission network requirements.

Key highlights

- The Southern Region includes the Wide Bay, Surat, Bulli, South West, Moreton and Gold Coast Transmission Annual Planning Report (TAPR) zones.
- The Southern Region contains Queensland's largest concentration of electricity demand and is one of the state's most significant generation, firming and storage development regions.
- Two strategic intra-regional transmission corridors are central to the future development of the Southern Region network:
    - The Central Queensland to South Queensland (CQ-SQ) corridor, supporting transfers between Central Queensland, Wide Bay, the Sunshine Coast, South West Queensland and South East Queensland.
    - The South West Queensland to South East Queensland (SWQ-SEQ) corridor, which is expected to play an increasingly important role in transferring energy from generation, firming and storage developments in the Surat Basin, Darling Downs and Southern Downs to major load centres in South East Queensland and the broader National Electricity Market (NEM).
- South East Queensland is expected to remain a key focus area for future transmission investment, with opportunities driven by population growth, large customer connections, urban development, industrial precincts, ageing transmission infrastructure and future reliability of supply requirements.
- South West Queensland continues to attract significant generation and battery energy storage development, potentially creating emerging network limitations or opportunities to deliver net market benefits.
- The Southern Region is experiencing significant interest in large data centre and advanced computing facility connections, which could affect regional power transfers and future network requirements. Powerlink is responding by publishing a technical guide (see Appendix B) to support proponents in planning and integrating these connections.
- The Brisbane Area 275 kilovolt (kV) Reinforcement project associated with augmentation of the network between Blackwall, Karana Downs, Rocklea and South Pine has been identified as an actionable Integrated System Plan (ISP) project in the Australian Energy Market Operator's (AEMO) 2026 ISP.
- Maintaining the reliability and performance of ageing transmission infrastructure remains a key investment theme across the Southern Region, with future opportunities focused on transmission lines, substations, transformers, primary plant, and secondary systems.
- Powerlink will continue to work closely with customers, Energy Queensland, AEMO, Transgrid, industry and government stakeholders to identify efficient network and non-network solutions that maintain reliability, support economic development and deliver value for consumers.

8.1 Regional overview

The Southern Region transmission network comprises an interconnected 330kV, 275kV, 132kV and 110kV network that supplies major population, commercial and industrial load centres, and facilitates bulk power transfers between Central Queensland, South West Queensland, South East Queensland and the broader NEM. The region includes the Wide Bay, Surat, Bulli, South West, Moreton and Gold Coast TAPR zones.

South West Queensland and the Darling Downs continue to attract significant generation and battery energy storage development due to strong renewable resources and access to existing transmission infrastructure. South East Queensland remains Powerlink's largest load centre, with ongoing population growth, urban development, industrial expansion, and potential block load developments expected to influence future transmission requirements.

Two key transmission backbones will play key roles in the future development of the Southern Region.

- The CQ-SQ backbone transmission, enabling bulk power transfers between Central Queensland, Wide Bay, the Sunshine Coast and South East Queensland.
- The SWQ-SEQ backbone transmission, enabling bulk power transfers from the Surat Basin, Darling Downs, Southern Downs and Queensland to New South Wales Interconnector (QNI) areas into South East Queensland.

8.2 Regional investment themes

Four key investment themes are expected to shape transmission network requirements and development within the Southern Region over the 10-year outlook period:

- maintaining reliable supply to South East Queensland
- supporting efficient power transfers across Queensland
- addressing emerging condition and obsolescence risks with ageing network assets
- responding to large-scale data centre and advanced computing facility loads.

Maintaining reliable supply to South East Queensland

Future investment is expected to focus on maintaining the reliability of supply to South East Queensland's major population centres, commercial precincts and industrial loads. This includes addressing asset condition risks, maintaining compliance with reliability requirements and supporting forecast growth in electricity demand across the region.

Supporting efficient power transfers across Queensland

The CQ-SQ and SWQ-SEQ transmission corridors are key components of Queensland's transmission network, supporting bulk power transfers between major generation, storage and load centres. Future investment may be required to maintain or increase transfer capability within these corridors where network assessments identify reliability limitations or market benefits.

Addressing emerging condition and obsolescence risks with ageing network assets

A significant proportion of transmission assets within South East Queensland are approaching the end of their technical service life over the 10-year planning horizon. Future investment may be required to address emerging condition, obsolescence and compliance risks to maintain reliability of supply.

Responding to large-scale data centre and advanced computing facility loads

Growing interest in large-scale data centre and computing facility developments represents an emerging investment theme for Southern Queensland. The substantial electricity demand associated with these developments, together with new generation, storage and firming investment, could materially change power transfers within Southern Queensland, between Queensland's regions and across the broader NEM. These changes may influence future transmission network requirements. Powerlink is responding by providing proponents with practical information on site selection, connection pathways, demand flexibility, reliability expectations, and the technical and planning considerations associated with connecting large loads to Queensland's transmission network (refer to Appendix B). Powerlink will also progressively incorporate data centre developments into its demand forecasts as their timing, scale and development maturity become more certain. Through established network planning processes, Powerlink will assess the potential effects of these loads, together with generation and storage investment, on power transfers, network capability, and the need and timing of future network development.

8.3 Central Queensland to South Queensland transmission backbone

The CQ-SQ transmission backbone comprises the 275kV transmission network extending between the Calliope River and South Pine substations. Future investment requirements will be dependent on changes in demand, generation and storage developments, power transfer requirements, and emerging condition and obsolescence risks.

8.3.1 Existing and committed developments

Powerlink has completed the connection of the Woolooga BESS.

Further information on completed and committed developments are provided in Chapter 10.

8.3.2 Emerging and evolving investment drivers

While the CQ-SQ transmission backbone is currently expected to provide sufficient transfer capability to meet forecast electricity demand over the 10-year outlook period, several emerging developments have the potential to influence future transmission and non-network investment requirements.

Emerging asset condition risks and network reliability

Emerging condition and obsolescence risks have been identified across sections of the coastal 275kV transmission backbone, together with associated substations, primary plant and secondary systems. As these assets approach intervention, opportunities may arise to coordinate condition driven reinvestment with future network capability requirements to deliver economic investment outcomes.

Block load developments and population growth

Continued population growth, urban development and potential block load developments within the Wide Bay, Sunshine Coast and Greater Brisbane areas are forecast to increase electricity demand and influence future transmission requirements across the CQ-SQ transmission backbone. The timing and scale of block load developments remain uncertain and will continue to be monitored through Powerlink's annual planning process.

Delivering market benefits through network development

Over the longer-term, changing generation and storage development patterns, load growth and evolving power transfer requirements may increase the need for additional transfer capability across the CQ-SQ transmission backbone. Potential network development options may include progressive rebuild of sections of the coastal 275kV transmission backbone, augmentation of the inland 275kV network, and targeted increases in transmission line thermal capacity.

Much of the coastal transmission backbone comprises single circuit 275kV transmission lines. As these assets approach replacement, opportunities may emerge to coordinate condition driven reinvestment with capability upgrades, including replacement with higher capacity double circuit network configurations where this delivers more economic investment outcomes.

8.3.3 CQ-SQ investment outlook

Figure 8.1 provides a geographic overview of potential investment opportunities across the CQ-SQ transmission corridor.

Table 8.1 summarises these opportunities and their indicative timing, with further detail provided in the sections that follow. The opportunities do not constitute committed projects and their scope, timing and implementation remain subject to further assessment and decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the investment profile tables following Table 8.1. The line refit works on the 275kV transmission line between Woolooga and Teebar Creek substations identified in the 10-year outlook is not profiled as the indicative need falls outside the five-year period.

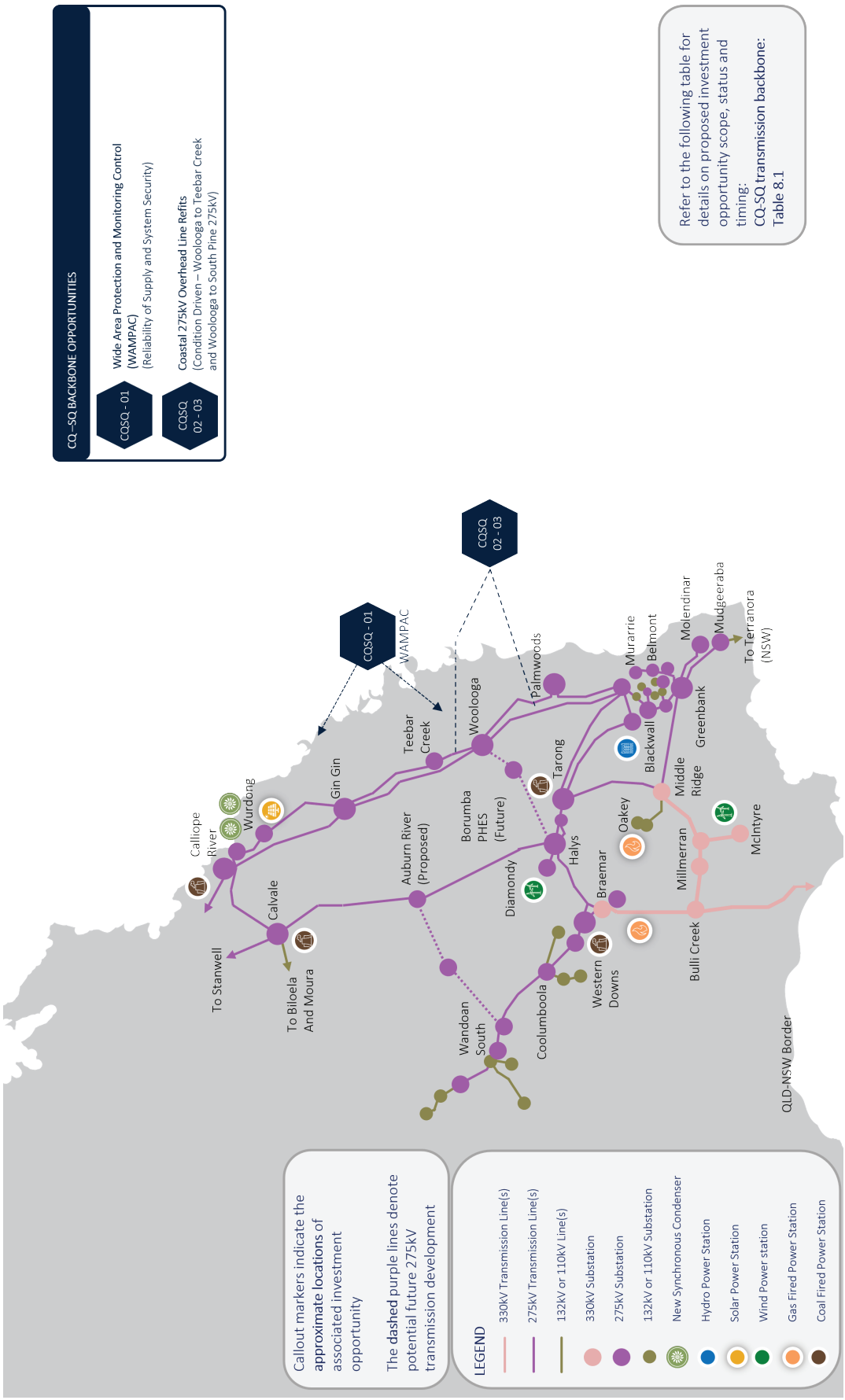


Figure 8.1 Future investment opportunities for the CQ-SQ transmission backbone

Table 8.1 CQ-SQ transmission backbone future investment opportunities

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
CQSQ-01	Wide Area Monitoring Protection and Control (WAMPAC) Tranche 2	Add functionality to the existing CQ-SQ WAMPAC scheme	Compliance obligations to meet system security	June 2028	No credible options have been identified	$8 million	Uncommitted
CQSQ-02	Line refit works on the 275kV transmission line between Woolooga and Teebar Creek substations	Target line refit of the existing 275kV line	Maintain supply reliability to the Wide Bay zone	June 2034	Rebuild the 275kV transmission line between Woolooga and Teebar Creek substations	$14 million	Uncommitted
CQSQ-03	Line refit works on the 275kV transmission line between Woolooga and South Pine substations	Target line refit of the existing 275kV line	Maintain supply reliability to the Moreton zone	June 2032	Rebuild the 275kV transmission line between Woolooga and South Pine substations	$50 million	Uncommitted

8.3.4 Five-year investment profiles

Powerlink anticipates two potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets and system security across the CQ-SQ transmission backbone within the next five years.

CQSQ-01 Wide Area Monitoring Protection and Control Tranche 2

Item	Description
Location	The inland component of the CQ-SQ transmission backbone
Asset details	The 275kV transmission network between Calvale and Halys substations
Investment context	AEMO's General Power System Risk Review (GPSRR) identified a gap between the capability of the existing CQ-SQ WAMPAC scheme and the current CQ-SQ transfer capability. While the existing scheme provides transient stability support following the non-credible loss of both Halys-Calvale 275kV circuits for transfer levels of approximately 1,700MW to 1,900MW, CQ-SQ transfers can reach approximately 2,100MW. CQ-SQ WAMPAC Tranche 2 extends the capability of the existing scheme to support higher transfer levels and reduce residual system security risks associated with high CQ-SQ power transfers
Investment driver	Addressing system security risks identified within AEMO's GPSRR
Indicative timing	June 2028
Status	Uncommitted
Proposed network solution	Expand the functionality of the existing CQ-SQ WAMPAC scheme through the implementation of additional generation, battery and load tripping capabilities to maintain transient stability following the non-credible loss of both Halys-Calvale 275kV circuits for CQ-SQ transfers of up to approximately 2,100MW at a cost of around $8 million
Other potential network solutions	Construction of third 275kV overhead transmission line between Central and Southern Queensland
Potential non-network solutions	Potential non-network solutions would need to provide equivalent system security services to address non-credible contingency events identified by AEMO within the GPSRR
Inter-network impact	No material inter-network impact identified

CQSQ-03 Maintain reliability of supply at Woolooga and South Pine

Item	Description
Location	The 275kV transmission line extends approximately 160km from the northern outskirts of Brisbane to north of Gympie
Asset details	Commissioned in 1972
Investment context	The Woolooga to South Pine 275kV transmission line was constructed as part of the Gladstone Power Station development connecting Central and Southern Queensland in the 1970s. The transmission line comprises a single circuit overhead 275kV transmission line comprising of 358 steel lattice structures. The transmission line operates mostly in relatively benign corrosion environments though some sections experience higher corrosion due to exposure to salt laden winds at elevation
Investment driver	Condition driven replacement to address emerging condition risks associated with 275kV transmission line
Indicative timing	June 2032
Status	Uncommitted
Proposed network solution	Line refit works on the 275kV transmission line between Woolooga and South Pine substations by 2032 at an estimated cost of $50 million
Other potential network solutions	Rebuild the 275kV transmission line between Woolooga and South Pine substations
Potential non-network solutions	There are material impacts on the transfer capability across the CQ-SQ grid section with unavailability of the existing South Pine to Woolooga 275kV line. Potential non-network solutions would need to provide equivalent capability to support efficient and economic market outcomes in place of the existing 275kV circuit. These market outcomes are associated with both dispatch cost difference and differential market expansion costs
Inter-network impact	No material inter-network impact identified

8.3.5 Other potential developments

Powerlink will continue to assess opportunities to establish an additional transmission pathway between South West Queensland and the inland CQ-SQ transmission backbone. This may include development of new transmission infrastructure between South West Queensland and the proposed Auburn River Substation (refer to Section 8.4.5). Over the longer-term, further reinforcement may include new transmission infrastructure between the Auburn River, Calvale and Halys substations along the inland CQ-SQ transmission backbone, dependent on load and generation developments in Central Queensland, South East Queensland and across the broader Queensland transmission network.

The increasing deployment of BESS and generation developments connected to the CQ-SQ transmission backbone may also create opportunities to increase transfer capability through operational and non-network solutions. Additional opportunities may include implementation of real-time ratings, and targeted increases in transmission line thermal ratings through ground clearance works and conductor re-tensioning across limiting line sections.

The viability and scale of these opportunities will be dependent on further technical analysis, economic assessments, and engagement with relevant proponents and stakeholders.

8.3.6 Possible asset retirements

Powerlink has not identified any potential asset retirements within the CQ-SQ transmission backbone within the 10-year outlook period.

8.4 South West to South East Queensland transmission backbone

The SWQ-SEQ transmission backbone supports power transfers between South West Queensland, the QNI and major load centres within South East Queensland. The backbone comprises the 330kV and 275kV transmission network connecting the Tarong, Halys, Braemar, Western Downs, Bulli Creek, Millmerran, Tummaville, Middle Ridge and Greenbank substations.

Future investment requirements will be dependent on changes in demand, generation and storage developments, emerging large-scale load developments, power transfer requirements, and emerging condition and obsolescence risks across the transmission network.

8.4.1 Existing and committed developments

Powerlink has completed the connection of Wambo Wind Farm Stage 2 in South West Queensland and is progressing network asset replacement works to maintain reliability of supply.

Powerlink is also implementing the WAMPAC scheme for the 275kV network supplying the Surat Basin and finalising inter-regional testing of the QNI upgrade.

Further information on these developments is provided in chapters 9 and 10.

8.4.2 Emerging and evolving investment drivers

Based on current demand forecasts, the existing transmission network is forecast to remain capable of supplying customer requirements over the 10-year outlook period.

Future investment drivers are expected to be primarily associated with asset condition and obsolescence risks across the existing 330kV, 275kV and 110kV network. Emerging condition risks have been identified on sections of the transmission network, together with associated primary plant, transformers and secondary systems.

Powerlink will continue to monitor these developments through our annual planning process and ongoing joint planning activities with Ergon Energy.

8.4.3 SWQ-SEQ investment outlook

Figure 8.2 provides a geographic overview of potential investment opportunities across the SWQ-SEQ transmission backbone.

Table 8.2 summarises these opportunities and their indicative timing with further detail provided in the sections that follow. The opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and decision-making processes.

Figure 8.2 Future investment opportunities for the SWQ-SEQ transmission backbone

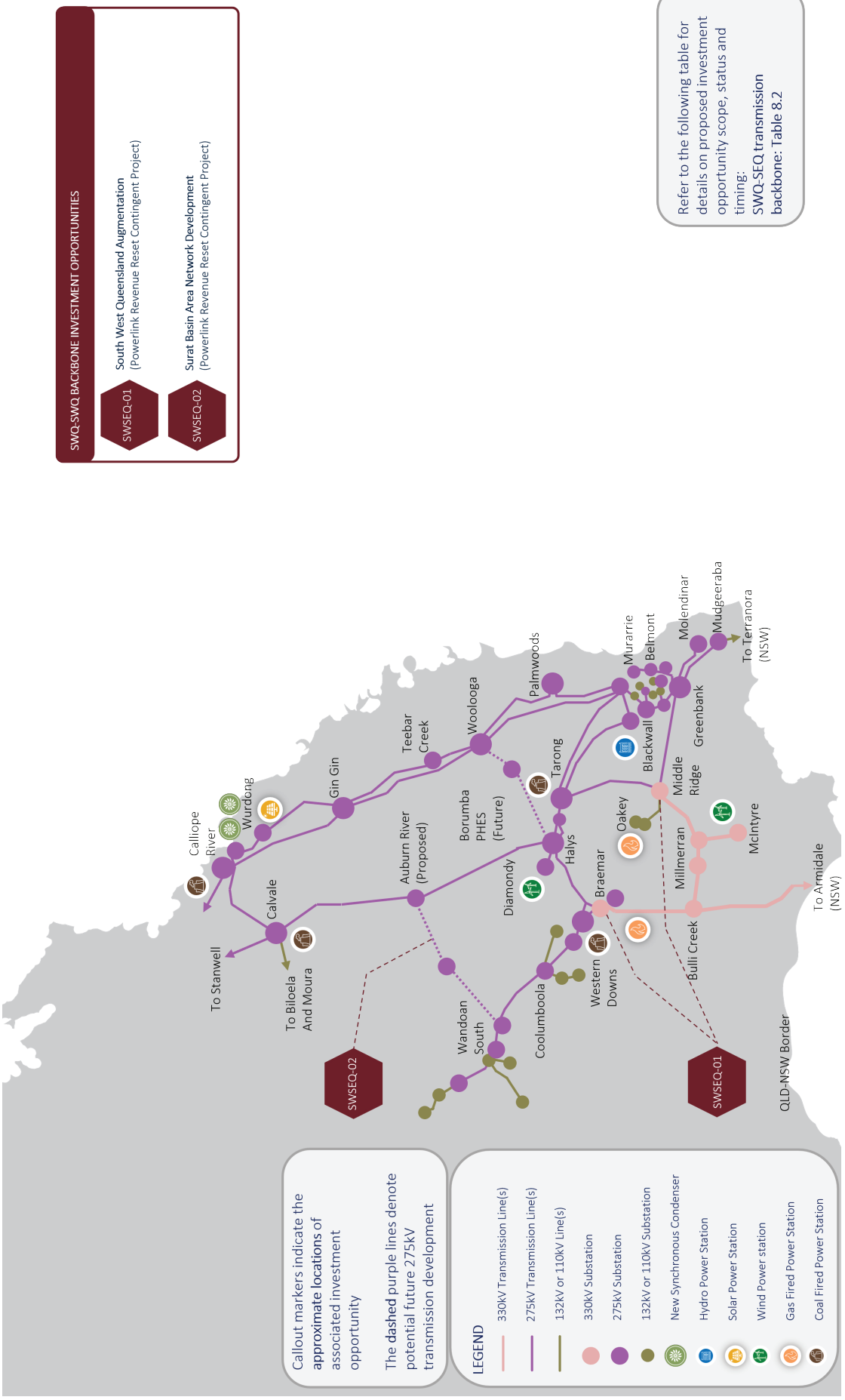


Table 8.2 SWQ-SEQ transmission backbone future investment opportunities

ID	Potential project	High-level scope	Purpose	Indicative timing	Alternatives	Status	Indicative cost
SWSEQ-01	South West Queensland Augmentation (1)	Replace an existing 330/275kV transformer at Middle Ridge with a higher-rated unit and install additional 330/275kV transformer capacity at Braemar	Increase transfer capability between SWQ and SEQ, and deliver net economic benefits by reducing generation expansion and whole of system costs	Subject to RIT-T outcomes and contingent project trigger events	Construction of new transmission network between SWQ and SEQ	Proposed contingent project in Powerlink's 2027–32 Revenue Proposal	$90 million
SWSEQ-02	Surat Basin Area Network Development (1)	Establish new 275kV substations in the Surat Basin and near Auburn River, connected by a new high-capacity double circuit 275kV transmission line	Increase generation hosting and export capability from the Surat Basin network and deliver net economic benefits by reducing generation expansion and whole of system costs	Subject to RIT-T outcomes and contingent project trigger events	Construction of new transmission network between the Surat Basin and SEQ	Proposed contingent project in Powerlink's 2027–32 Revenue Proposal	$732 million

Note:

(1) The final status of this project will be determined as part of the AER's Final Determination on Powerlink's 2027-32 Revenue Proposal to be published in April 2027.

8.4.4 Five-year investment profile

Powerlink does not currently anticipate any network investments above the RIT-T cost threshold being required to address asset condition risks across the SWQ-SEQ transmission backbone within the next five years.

8.4.5 Other potential developments

Powerlink is working with a number of proponents seeking to connect into the Wandoan South Substation. The Bungaban Wind Farm Connection Project continues to progress as part of the ongoing project development and investment process. Technical, commercial, land, approvals, delivery, and stakeholder engagement work remains ongoing, and Powerlink continues to work with proponents and various stakeholders to support future investment decisions and the ongoing development of the projects.

Future transmission requirements across the 275kV transmission backbone will be dependent on changes in generation, storage and load developments within South West Queensland and resulting transfer requirements across the broader Queensland power system. Potential future developments may include augmentations between Auburn River and Halys, or Auburn River and Calvale, to increase transfer capability between South West Queensland, Central Queensland and South East Queensland.

Emerging large-scale load developments, including large-scale data centres and advanced computing facilities within South West Queensland also have the potential to change future network requirements and power transfer flows across the transmission backbone.

The Borumba Pumped Hydro Energy Storage (PHES) Project continues to be progressed by the Queensland Government and Queensland Hydro, with planning, assessment and approvals activities continuing. The project is also subject to ongoing review by the Queensland Investment Corporation. The development of new 275kV transmission infrastructure will be required for the connection of this facility.

Powerlink will continue to monitor developments through our annual planning process to identify investment opportunities that address emerging network limitations and deliver net market benefits for consumers.

8.4.6 Potential asset retirements

Powerlink has not identified any potential asset retirements across the SWQ-SEQ transmission backbone within the 10-year outlook period.

8.5 Wide Bay, South West, Bulli and Surat zones investment outlook

Figure 8.3 provides a geographic overview of the Wide Bay, South West, Bulli and Surat zones, and the potential investment opportunities discussed in sections 8.6 to 8.7. The overview provides context for the zone-based discussion that follows with further information on the scope, timing and drivers for each opportunity provided in the relevant section.

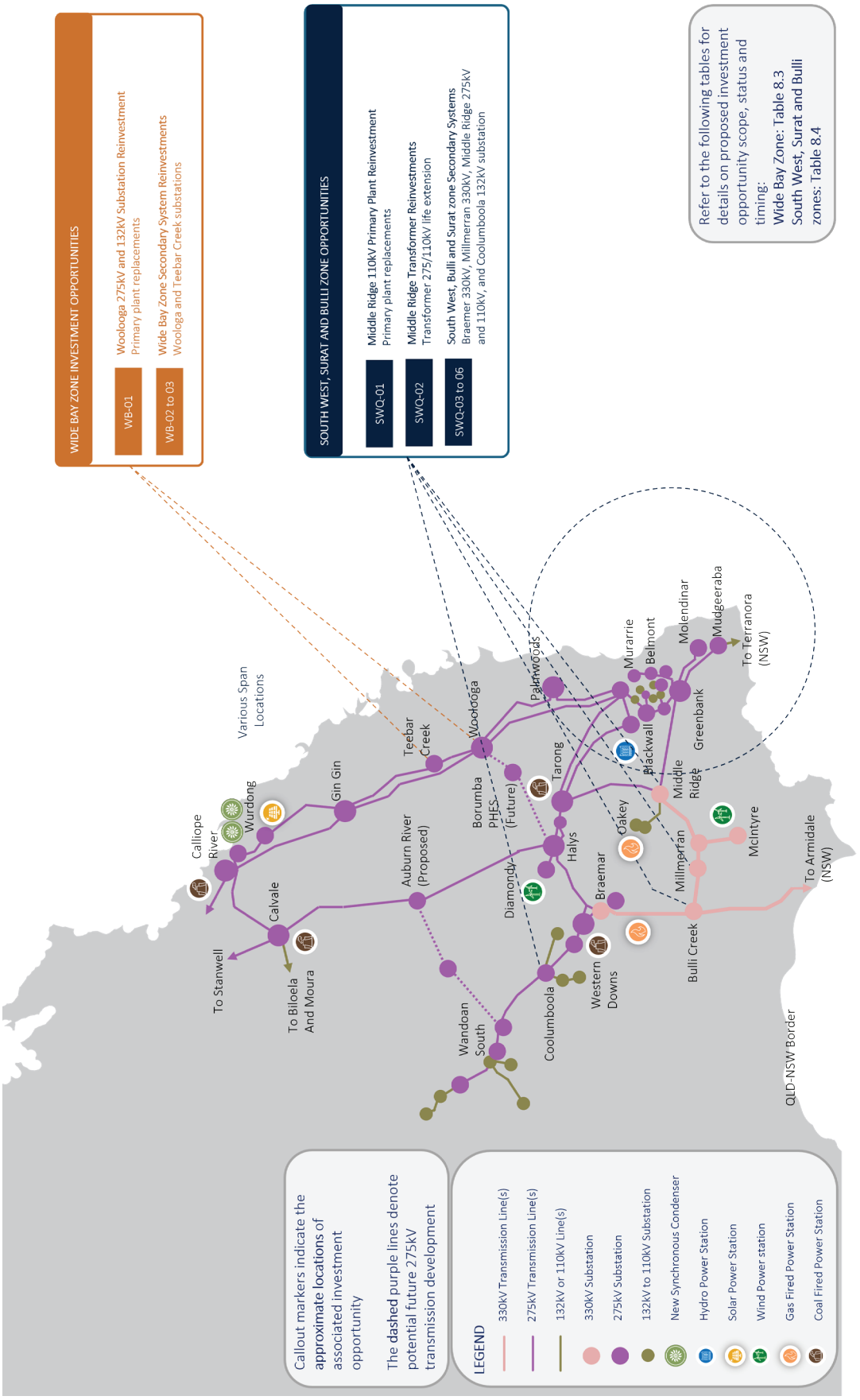


Figure 8.3 Future investment opportunities for the Wide Bay, South West, Surat and Bulli zones

8.6 Wide Bay zone

The Wide Bay zone supplies loads in Bundaberg, Maryborough, Hervey Bay, Gympie and surrounding regional areas and forms part of the coastal CQ-SQ transmission backbone. The zone includes key Powerlink transmission injection points at the Gin Gin, Teebar Creek, Woolooga and Palmwoods substations.

Local townships and agricultural loads within the Wide Bay zone are supplied via the Energy Queensland transmission and distribution network, comprising predominantly 132kV and lower voltage infrastructure that operates in parallel with Powerlink's 275kV transmission network. Planning assessments for the zone therefore need to consider both local supply requirements and power transfers across the coastal CQ-SQ transmission backbone.

8.6.1 Existing and committed network developments

Powerlink has recently completed the connection of large-scale BESS and hybrid solar and BESS facilities to the CQ-SQ transmission backbone.

Detailed information on completed and committed developments is provided in Chapter 10.

8.6.2 Emerging and evolving investment drivers

Future investment requirements within the Wide Bay zone are expected to be driven primarily by emerging asset condition and obsolescence risks.

8.6.3 Future network investments and opportunities

Powerlink has identified potential network investment opportunities required to address emerging network asset condition and obsolescence risks within the Wide Bay zone in the 10-year outlook.

Table 8.3 summarises these opportunities and their indicative timing with further details provided in the sections that follow. The opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the investment profile tables following Table 8.3. Other investment opportunities identified in the 10-year outlook are not profiled where their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Table 8.3 Wide Bay zone investment opportunities within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
WB-01	Woolooga 275kV and 132kV primary plant replacement	Selected replacement of 275kV and 132kV primary plant	Maintain supply reliability to the Wide Bay zone	June 2030 (1)	Full replacement of 275kV and 132kV primary plant	$9 million	Uncommitted
WB-02	Teebar Creek 275kV and 132kV secondary systems replacement	Full replacement of 275kV and 132kV secondary systems	Maintain supply reliability to the Wide Bay zone	June 2034	Selected replacement of the 275kV and 132kV substation bays, and reinforcement of the Wide Bay transmission system from adjacent substations	$39 million	Uncommitted
WB-03	Woolooga 275kV and 132kV secondary systems replacement	Selected replacement of 275kV and 132kV secondary systems	Maintain supply reliability to the Wide Bay zone	June 2035	Full replacement of 275kV and 132kV secondary systems	$65 million	Uncommitted

Note:

(1) The change in timing of the network solution from the 2025 TAPR is based upon updated information on the condition of assets.

8.6.4 Five-year investment profiles

Powerlink has identified one potential network investment above the RIT-T cost threshold that may be required to address the risks arising from the condition of assets within the Wide Bay zone within the next five years.

WB-01 Maintain reliability of supply to the Wide Bay zone

Item	Description
Location	Woolooga Substation is located approximately 165km north west of Brisbane
Asset details	The substation was commissioned in 1973
Investment context	Woolooga Substation was established to support development of the CQ-SQ transmission backbone. The substation comprises 275kV and 132kV switchyards and provides transformation capacity to the Wide Bay 132kV network.
Investment driver	Condition driven replacement to address emerging condition risks associated with 275kV and 132kV primary plant required to maintain reliability of supply
Indicative timing	June 2030
Status	Uncommitted
Proposed network solution	Selected replacement of 275kV and 132kV primary plant at an indicative cost of $9 million
Other potential network solutions	Full replacement of 275kV and 132kV primary plant
Potential non-network solutions	Potential non-network solutions would need to provide supply to the Woolooga area of up to 6MW and up to 35MWh per day. The non-network solution would be required to operate on a continuous basis to maintain supply to a Queensland Rail traction substation. The impacted primary plant also connects the 120MW Munna Creek Solar Farm
Inter-network impact	No material inter-network impact identified

8.6.5 Other potential developments

Continued population growth, urban expansion and development of strategic growth areas may influence future transmission and distribution network requirements over the longer-term. Powerlink will continue to monitor these developments through its annual planning process and ongoing joint planning activities with Energy Queensland.

8.6.6 Possible asset retirements

Powerlink has not identified any potential asset retirements in the Wide Bay area within the 10-year outlook period.

8.7 South West, Surat and Bulli zones

The South West, Surat and Bulli zones extend across southern Queensland, from the Surat Basin and Darling Downs to the Queensland-New South Wales (NSW) border.

8.7.1 Existing and committed network developments

Powerlink is progressing the Tangkam 110kV secondary systems replacement and reinvestment works at the Tarong and Chinchilla substations.

Further information on completed and committed developments is provided in Chapter 10.

8.7.2 Emerging and evolving investment drivers

The existing transmission network is expected to continue providing sufficient capacity to meet forecast electricity demand within the South West, Surat and Bulli zones. Future reinvestment needs are expected to be driven primarily by emerging condition and obsolescence risks.

Recently there has been interest in the connection of significant block load developments within South West Queensland associated with data centres and advanced computing facilities. These facilities, together with potential investment in new generation have the potential to change power flow transfers and transmission infrastructure requirements within these zones.

8.7.3 Future network investment and opportunities

Powerlink has identified potential network opportunities to address emerging network needs and asset condition risks in the South West, Surat and Bulli zones within the 10-year outlook period.

Table 8.4 summarises these opportunities and their indicative timing with further detail provided in the following sections. These opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the investment profile tables following Table 8.4. Other investment opportunities identified in the 10-year outlook are not profiled where their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Table 8.4 South West, Surat and Bulli zone investment opportunities within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
SWQ-01	Middle Ridge 110kV primary plant replacement	Selected replacement of 110kV primary plant	Maintain supply reliability in the South West zone	June 2032	Full replacement of 110kV primary plant	$15 million	Uncommitted
SWQ-02	Middle Ridge 275/110kV transformers life extension	Life extension of transformers 2 and 3	Maintain supply reliability in the South West zone	June 2032	Replacement of transformers 2 and 3	$6 million	Uncommitted
SWQ-03	Braemar 330kV secondary systems replacement non-IPASS	Selected replacement of 330kV secondary systems	Maintain supply reliability in the Bulli zone	June 2034	Full replacement of 330kV secondary systems	$23 million	Uncommitted
SWQ-04	Millmerran 330kV Air-Insulated Switchgear (AIS) secondary systems replacement	Selected replacement of 330kV secondary systems	Maintain supply reliability in the Bulli zone	December 2035	Full replacement of 330kV secondary systems	$14 million	Uncommitted
SWQ-05	Middle Ridge 275kV and 110kV secondary systems replacement	Selected replacement of 275/110kV secondary systems equipment	Maintain supply reliability in the South West zone	June 2032	Full replacement of 275kV and 110kV secondary systems	$63 million	Uncommitted
SWQ-06	Columboola 132kV secondary systems replacement	Selected replacement of 132kV secondary systems	Maintain supply reliability in the Surat zone	June 2035	Full replacement of 132kV secondary systems	$17 million	Uncommitted

8.7.4 Five-year investment profiles

Powerlink anticipates two potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets in the South West, Bulli and Surat zones within the next five years.

There is also potential for the Middle Ridge Substation network needs (SWQ-01 and SWQ-05) to be consolidated under one RIT-T.

SWQ-01 Maintaining reliability of supply at Middle Ridge

Item	Description
Location	Approximately 130km west of Brisbane
Asset details	Established in 1965
Investment context	Middle Ridge 275/110kV Substation is a transmission connection point for the Toowoomba and Darling Downs area supplying local townships, agricultural loads, and providing connections for gas fired generation facilities
Investment driver	Condition driven replacement to address emerging condition risks associated with the 110kV primary plant
Indicative timing	June 2032
Status	Uncommitted
Proposed network solution	Selected replacement of 110kV primary plant at Middle Ridge Substation at an estimated cost of $15 million
Other potential network solutions	Full replacement of 110kV primary plant
Potential non-network solutions	Potential non-network solutions would need to provide supply to the Middle Ridge 110kV network of up to 120MW and 2,300MWh per day
Inter-network impact	This network development is not anticipated to have material inter-network impacts

SWQ-05 Addressing secondary systems condition risks at Middle Ridge

Item	Description
Location	Approximately 130km west of Brisbane
Asset details	Established in 1965. Extensions with load growth have resulted in a mixture of secondary systems from 2002 through to 2011
Investment context	Middle Ridge 275/110kV Substation is a transmission connection point for the Toowoomba and Darling Downs area supplying local townships, agricultural loads, and providing connections for gas fired generation facilities
Network need	Condition driven replacement to address emerging condition and obsolescence risks associated with the 275kV and 110kV secondary systems
Indicative timing	June 2032
Status	Uncommitted
Proposed network Solution	Selected replacement of the 275kV and 110kV secondary systems at Middle Ridge Substation at an estimated cost of $63 million
Other potential network solutions	Full replacement of the 275kV and 110kV secondary systems
Potential non-network solutions	Potential non-network solutions would need to provide supply to the 110kV network of up to 120MW and 2,300MWh per day
Inter-network Impact	This network development is not anticipated to have material inter-network impacts

8.7.5 Other potential developments

No major committed developments have been identified within the South West, Surat and Bulli zones that are expected to materially alter transmission requirements over the 10-year outlook period.

Powerlink will continue to monitor emerging large-scale load proposals, including data centre and advanced computing developments, and assess any implications for future network requirements.

8.7.6 Possible asset retirements

Powerlink has not identified any potential asset retirements in the South West, Surat and Bulli zones within the 10-year outlook period.

8.8 Moreton and Gold Coast zones investment outlook

Figure 8.4 provides a geographic overview of the Moreton and Gold Coast zones and the potential investment opportunities discussed in sections 8.9 and 8.10. The overview provides context for the zone-based discussion that follows with further information on the scope, timing and drivers for each opportunity provided in the relevant sections.

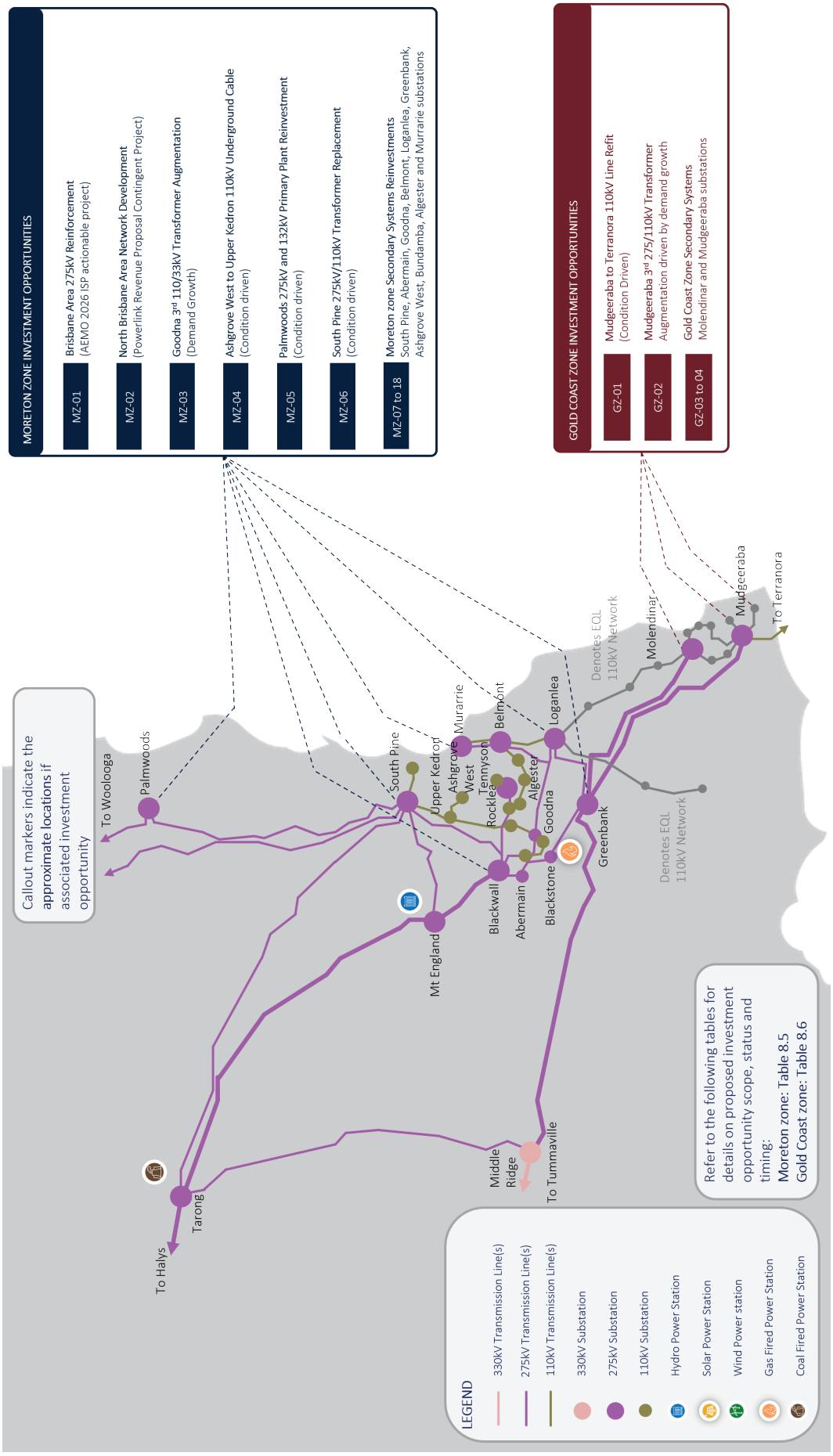


Figure 8.4 Future investment opportunities for the Moreton and Gold Coast zones

8.9 Moreton zone

The Moreton zone comprises the 275kV and 110kV transmission networks supplying major load centres across South East Queensland, including Brisbane, Ipswich, the Sunshine Coast and the Logan region. The zone contains Queensland's highest concentration of electricity demand, supporting significant residential, commercial, industrial, transport and logistics activities, while also providing key transmission interconnections within South East Queensland.

The 110kV network was progressively developed from the 1960s with the 275kV network established and expanded from the early 1980s to support sustained load growth. The main generation sources are Wivenhoe Pumped Storage Hydro Power Station and Swanbank E gas-fired power station located within the Ipswich area.

8.9.1 Existing and committed network developments

Powerlink has completed reinvestment works across the Moreton zone to address condition and obsolescence related risks associated with aged network assets, including target line refits, primary plant and transformer replacements, and secondary systems reinvestments.

Powerlink has also completed connection of the Supernode BESS Stages 1 and 2 at South Pine Substation, and commissioned Swanbank BESS.

Further information on completed and committed developments is provided in Chapter 10.

8.9.2 Emerging and evolving investment drivers

Future network requirements within the Moreton zone are expected to be influenced by population growth, urban expansion, industrial development, increasing electrification, large customer connections, and emerging asset condition, obsolescence and compliance requirements.

Large block loads within Brisbane have the potential to drive significant block load growth and influence future transmission investment requirements.

While no specific transmission upgrades have currently been identified to support the Brisbane 2032 Olympic and Paralympic Games, the development of venues, supporting infrastructure and associated growth may influence future transmission network requirements. The extent of any impacts will depend on the location, scale and timing of these developments, and will be assessed as part of continued joint planning with Energex.

8.9.3 Future network investment and opportunities

Powerlink has identified network investments to address emerging transmission network limitations and condition related risks associated with ageing network assets within the Moreton zone within the 10-year outlook. AEMO has also identified the Brisbane Area 275kV Reinforcement as an actionable project within the 2026 ISP.

Table 8.5 summarises these opportunities and their indicative timing with further detail provided in the following sections. These opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the investment profile tables following Table 8.5. Other investment opportunities identified in the 10-year outlook are not profiled where their indicative need falls outside the five-year period and are at earlier stages of planning and assessment.

Table 8.5 Moreton zone investment opportunities within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
MZ-01	Brisbane Area 275kV Reinforcement	Construction of new 275kV double circuit line between Blackwall and Karana Downs and reconfiguring the existing network	Increase transfer capability for market benefits	June 2032	Construction of new 275kV double circuit line between Blackwall and South Pine substations	$65 million	AEMO 2026 ISP Actionable Project. Currently undergoing RIT-T with PADR required to be published by June 2028
MZ-02	North Brisbane Area Network Development (1)	Establishment of new 275kV double circuit line between South Pine Substation and Banyo in northern Brisbane, including a new 275/110kV substation at Banyo	Development of new loads exceeding the capability of the existing 110kV network	Subject to the scale, pace and timing of new load developments	Establishment of new cross river 275kV cable from Murarrie to a new 275/110kV substation in northern Brisbane	$248 million	Proposed contingent project in Powerlink's 2027–32 Revenue Proposal
MZ-03	Goodna third 110/33kV transformer augmentation	Install third Goodna 110/33kV transformer	Maintain supply reliability to the Goodna area	June 2030	Replace the existing Goodna 110/33kV transformers with larger capacity units	$15 million	Uncommitted
MZ-04	Replacement of the 110kV underground cable between Upper Kedron and Ashgrove West	Replace the 110kV underground cable between Upper Kedron and Ashgrove West substations along an alternate easement	Maintain supply reliability in the Moreton zone	December 2032	In-situ replacement of the 110kV cable between Upper Kedron and Ashgrove West substations	$100 million (3)	Uncommitted
MZ-05	Palmwoods 275kV and 132kV selected primary plant replacement	Selected replacement of 275kV and 132kV primary plant	Maintain supply reliability to the Wide Bay zone	June 2034	Full replacement of 275kV and 132kV primary plant	$18 million	Uncommitted
MZ-06	South Pine 275/110kV transformer replacement	Replacement of the existing 275/110kV transformer	Maintain supply reliability in the Moreton zone	December 2030	Increasing 110kV network capacity into central business district (CBD) west from Rocklea Substation	$16 million	Uncommitted
MZ-07	South Pine 275kV secondary systems replacement	Selected 275kV secondary systems replacement	Maintain supply reliability in the Moreton zone	December 2031	Full 275kV secondary systems replacement	$45 million (3)	Uncommitted

Table 8.5 Moreton zone investment opportunities within the 10-year outlook period *(continued)*

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
MZ-08	Abermain 275kV and 110kV secondary systems replacement	Full replacement of 275kV and 110kV secondary systems	Maintain supply reliability in the Moreton zone	June 2036	Staged replacement of 275kV and 110kV secondary systems	$10 million	Uncommitted
MZ-09	Goodna 275kV and 110kV secondary systems replacement	Full replacement of 275kV and 110kV secondary systems	Maintain supply reliability in the Moreton zone	December 2029	Selected replacement of 275kV and 110kV secondary systems and 110kV reinforcement from Blackstone Substation	$39 million	Uncommitted
MZ-10	Belmont 275kV and 110kV secondary systems replacement	Full replacement of 275kV and 110kV secondary systems	Maintain supply reliability in the Moreton zone	June 2034	Selected replacement of 275kV and 110kV secondary systems and new 275kV transmission from adjacent substations	$24 million	Uncommitted
MZ-11	Loganlea 275kV secondary systems replacement	Selective replacement of 275kV secondary systems	Maintain supply reliability in the Moreton zone	December 2034	Full replacement of 275kV secondary systems	$8 million (3)	Uncommitted
MZ-12	Greenbank 275kV secondary systems replacement	Full replacement of 275kV secondary systems	Maintain supply reliability in the Moreton zone	June 2034	Selected replacement of 275kV secondary systems and new 275kV transmission from adjacent substations	$71 million	Uncommitted
MZ-13	South Pine 110kV secondary systems replacement	Full replacement of 110kV secondary systems	Maintain supply reliability in the Moreton zone	June 2031	Selected replacement of 110kV secondary systems and new 110kV transmission from adjacent substations	$55 million (3)	Uncommitted
MZ-14	Ashgrove West 110kV secondary systems replacement	Full replacement of 110kV secondary systems and selected metering capacity voltage transformer (CVT) replacements	Maintain reliability of supply in the Moreton zone	December 2029	Selected replacement of 110kV secondary systems and new 110kV transmission from adjacent substations	$19 million	Current RIT-T

Table 8.5 Moreton zone investment opportunities within the 10-year outlook period *(continued)*

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
MZ-15	Bundamba 110kV secondary systems replacement	Full replacement of 110kV secondary systems	Maintain supply reliability in the Moreton zone	June 2035	Selected replacement of 110kV secondary systems and new 110kV transmission from adjacent substations	$17 million	Uncommitted
MZ-16	West Darra 110kV secondary systems replacement	Full replacement of 110kV secondary systems	Maintain supply reliability in the Moreton zone	June 2032	Selected replacement of 110kV secondary systems and new 110kV transmission from adjacent substations	$12 million	Uncommitted
MZ-17	Algester 110kV secondary systems replacement	Full replacement of 110kV secondary systems	Maintain supply reliability in the Moreton zone	June 2035	Selected replacement of 110kV secondary systems and new 110kV transmission from adjacent substations	$31 million	Uncommitted
MZ-18	Murarrie 110kV secondary systems replacement	Full replacement of 110kV secondary systems	Maintain reliability of supply in the Moreton zone	June 2031 (2)	Selected replacement of 110kV secondary systems and new 110kV transmission from Belmont substation	$58 million	Uncommitted

Notes:

(1) The final status of this project will be determined as part of the AER's Final Determination on Powerlink's 2027-32 Revenue Proposal to be published in April 2027.

(2) The change in timing of the network solution from the 2025 TAPR is based upon updated information on the condition of assets.

(3) Compared to the 2025 TAPR, the change in the estimated cost of the proposed network solution is based upon updated information on the condition of the assets and scope of work.

8.9.4 Five-year investment profiles

Powerlink anticipates several potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets within the Moreton zone within the next five years.

Greater North Brisbane

The greater north Brisbane five-year outlook comprises reinvestment works at the South Pine and Ashgrove West substations, and the Brisbane Area 275kV Reinforcement actionable ISP project.

MZ-01 Brisbane Area 275kV Reinforcement

Item	Description
Location	Between Blackwall, Rocklea and South Pine substations approximately 20km west and north of the Brisbane CBD
Asset details	The Blackwall to Rocklea and South Pine 275kV network forms a three-way mesh via the Karana Downs location. The circuits from Karana Downs to South Pine and Rocklea were constructed in the 1970s. They were connected into Blackwall substation via establishment of a short 275kV double circuit line section in the late 1990s
Investment context	Thermal limitation between the Blackwall and South Pine substations has the potential to significantly impact the efficient market development and dispatch by limiting the ability of generation in South Queensland to support Moreton North, Sunshine Coast, Wide Bay and areas further north.
Investment driver	Market benefits
Status	Identified as an actionable project within the AEMO 2026 ISP. Currently undergoing a RIT-T with the PADR required to be published by June 2028
Indicative timing	2032
Proposed network solution	Construct a new high-capacity double circuit 275kV line between Blackwall and Karana Downs and reconfigure the existing network to form dedicated double circuits between Blackwall and Rocklea and between Blackwall and South Pine substations
Other potential network solutions	1. Reconfigure the existing 275kV arrangement at Karana Downs as double tee mesh. This involves establishing a new double tee connection at Karana Downs connecting Blackwall to South Pine and Rocklea substations 2. Establish dedicated double circuit connections to South Pine and Rocklea as per the proposed network solution together with reconductoring the reconfigured Karana Downs to South Pine 275kV double circuit line with high temperature conductor to enable higher levels of power transfer across this transmission corridor
Potential non-network solutions	Possible non-network solutions will be assessed as part of the RIT-T process
Inter-network impact	No material inter-network impact is anticipated but will be assessed as part of the RIT-T process

MZ-02 North Brisbane area network development

Item	Description
Location	North Brisbane approximately 18km north of the Brisbane CBD
Asset details	South Pine Substation is one of the supply hubs supplying the greater north Brisbane area. Residential and industrial load east of South Pine substation is currently supplied via the Energex 110kV network to Sandgate Substation. There is increasing load growth in the area due to urban expansion and residential development
Investment context	The development of load growth and block load developments above current load forecasts are likely to exceed the thermal capability of the South Pine to Sandgate 110kV transmission network which will require network reinforcement to maintain reliability of supply
Investment driver	Potential network limitations associated with load growth and block load developments in the north Brisbane area
Status	Included as a contingent project within Powerlink's 2027–32 Revenue Proposal
Indicative timing	Dependent on load growth and/or block load development
Proposed network solution	Establishment of a new 275kV double circuit line between South Pine Substation and Banyo in northern Brisbane, including a new 275/110kV substation at Banyo. The scope involves uprating an existing transmission line between South Pine Substation and Sandgate to 275kV operation, constructing a new section of double circuit 275kV line between Sandgate and Banyo and establishing a new 275/110kV substation at Banyo to connect to the existing 110kV circuits to Nudgee Substation
Other potential network solutions	Potential future network developments may include either a new Brisbane River cable crossing between Murarrie Substation and a proposed North Brisbane 275/110kV Substation, or incremental augmentation of the existing 110kV network within the Energex distribution network for lower levels of load growth. Powerlink and Energex will continue joint planning to identify the most economic and efficient solution to address future demand growth above forecast levels
Potential non-network solutions	Possible non-network solutions will be assessed as part of the RIT-T process
Inter-network impact	No material inter-network impact identified

MZ-06 Maintain reliability of supply and transfer capability at South Pine

Item	Description
Location	Approximately 20km north of the Brisbane CBD
Asset details	South Pine Transformer 5 (T5) was commissioned in 1981
Investment context	South Pine Substation provides essential switching and injection of power from Central and SWQ to SEQ loads. In the mid-2000s a series of major equipment replacement projects were undertaken to address both primary plant and secondary systems equipment condition. South Pine 275/110kV Transformers T4 and T5 act as a bulk supply point for suburbs in north-west Brisbane as well as parts of Brisbane CBD. Detailed condition assessments have determined there are emerging condition risks associated with Transformer T5 which need to be addressed to maintain reliability of supply.
Investment driver	Condition driven replacement to address emerging condition and reliability of supply risks associated with the existing South Pine 275/110kV transformer
Indicative timing	December 2030
Status	Uncommitted
Proposed network solution	Replacement of the existing South Pine 275/110kV transformer at an estimated cost of $16 million
Other potential network solutions	Increasing network capacity into the CBD West from Rocklea Substation
Potential non-network solutions	Potential non-network solutions would need to supply approximately 165MW and 1,350MWh per day under network contingency conditions. The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages.
Inter-network impact	No material inter-network impact identified

MZ-07 Addressing the 275kV secondary systems condition risks at South Pine

Item	Description
Location	Approximately 20km north of the Brisbane CBD
Asset details	Established in 1964 and later expanded to include 275/110kV transformation
Investment context	South Pine Substation provides essential switching and injection of power from Central and SWQ to SEQ loads. In the mid-2000s a series of major equipment replacement projects were undertaken to address both primary plant and secondary systems equipment condition. Recent condition assessments have identified additional 275kV secondary systems components that have emerging condition and obsolescence related risks that need to be addressed to maintain reliability of supply
Investment driver	Condition driven replacement to address emerging condition and obsolescence risks associated with the 275kV secondary systems
Indicative timing	December 2031
Status	Uncommitted. Note it is likely that a RIT-T consultation will combine MZ-06 and MZ-07
Proposed network solution	Selected replacement of 275kV secondary systems within their existing control building and full replacement of the remaining 275kV secondary systems in a new control building at an estimated cost of $45 million
Other potential network solutions	Full replacement of selected 275kV secondary systems, decommissioning of selected functionality, additional 110kV cable capacity from Rocklea Substation into the CBD West 110kV ring, and additional 110kV capacity between the Sunshine Coast and South Pine Substation
Potential non-network solutions	Potential non-network solutions would need to supply approximately 390MW and 2,960 MWh per day. The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	No material inter-network impact identified

MZ-13 Addressing the 110kV secondary systems condition risks at South Pine

Item	Description
Location	Approximately 20km north of the Brisbane CBD
Asset details	Established in 1964 and later expanded to include 275/110kV transformation
Investment context	South Pine Substation provides essential switching and injection of power from Central and SWQ to SEQ loads. In the mid-2000s a series of major equipment replacement projects were undertaken to address both primary plant and secondary systems equipment condition. Recent condition assessments have identified additional 110kV secondary systems components that have emerging condition and obsolescence related risks that need to be addressed to maintain reliability of supply
Investment driver	Condition driven replacement to address emerging condition and obsolescence risks associated with the 110kV secondary systems
Indicative timing	June 2031
Status	Uncommitted. Note it is likely that a RIT-T consultation will combine MZ-06 and MZ-07
Proposed network solution	Full replacement of 110kV secondary systems and buildings at an estimated cost of $55 million
Other potential network solutions	In-situ replacement of 110kV secondary systems, decommissioning of selected functionality, and additional 110kV cable capacity from Rocklea Substation into the CBD West 110kV ring
Potential non-network solutions	Potential non-network solutions would need to supply approximately 165MW and 1,350MWh per day (western 110kV bus) and 380MW and 3,330MWh per day (eastern 110kV bus). The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	No material inter-network impact identified

MZ-14 Maintain reliability of supply and address condition risks at Ashgrove West

Item	Description
Location	Approximately 5km west of the Brisbane CBD
Asset details	Established in 1979
Investment context	Ashgrove West Substation provides an injection point into the Energex distribution network supplying power to the north west Brisbane area. There are emerging condition and obsolescence risks associated with the 110kV secondary systems that need to be addressed to maintain reliability of supply
Investment driver	Condition driven replacement to address emerging condition and obsolescence risks on the 110kV secondary systems and capacitive voltage transformers
Indicative timing	December 2029
Status	Current RIT-T. Submissions to the PSCR closed on 30 June 2026
Proposed preferred solution	Replace all secondary systems within the existing panels (in situ) located in the existing control building by 2029, and replace selected capacitive voltage transformers and metering equipment at an estimated cost of $19 million
Other potential network solutions	Replace all secondary systems in new panels in new building by 2029, and replace selected capacitive voltage transformers and metering equipment
Potential non-network solutions	A non-network option would need to provide supply to the 33kV network of up to 220MW and up to 2,400MWh per day on a continuous basis
Inter-network Impact	No material inter-network impact identified

Western Brisbane corridor

The western Brisbane corridor extends from inner Brisbane west through to the Ipswich area. Investments that may be required within the five-year outlook comprise transformer augmentations at Goodna Substation, and condition related works to address emerging condition and obsolescence risks required to maintain reliability of supply.

MZ-03 Maintain reliability of supply at Goodna

Item	Description
Location	Approximately 22km south west of the Brisbane CBD
Asset details	Established in 2006
Investment context	Goodna 110/33kV Substation is a bulk supply point for the south west Brisbane and Ipswich areas. The substation also supports 275kV and 110kV network switching in the greater Brisbane meshed network
Investment driver	Power system assessments and joint planning activities have identified emerging transformer capacity limitations that need to be addressed to maintain reliability of supply
Indicative timing	June 2030
Status	Uncommitted
Proposed network solution	Installation of third Goodna 110/33kV transformer at an estimated cost of $15 million
Other potential network solutions	A new 33kV feeder comprising of overhead and underground sections to permanently transfer loads to the Redbank zone Substation
Potential non-network solutions	Potential non-network solutions would need to supply approximately 75MW and 820MWh per day within the Goodna load area. The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	No material inter-network impact identified

MZ-09 Maintain reliability of supply and address condition risks at Goodna

Item	Description
Location	Approximately 22km south west of the Brisbane CBD
Asset details	Established in 2006
Investment context	Goodna 275/110kV Substation is a bulk supply point for the south west Brisbane and Ipswich areas. The substation also supports 275kV and 110kV network switching in the greater Brisbane meshed network
Investment driver	Condition driven reinvestments to address emerging condition and obsolescence risks on the 275kV and 110kV secondary systems
Indicative timing	December 2029
Status	Uncommitted. This may be combined as a single RIT-T consultation with MZ-03
Proposed network solution	Full replacement of all 275kV and 110kV secondary systems within the existing control buildings at an estimated cost of $39 million
Other potential network solutions	Replacement of selected secondary systems, additional transformer capacity at Blackstone Substation, and additional 110kV network capacity between Blackstone and Goodna substations
Potential non-network solutions	Potential non-network solutions would need to supply approximately 510MW and 7,800MWh per day within the Goodna load area. The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	No material inter-network impact identified

MZ-16 Address secondary systems condition risks at West Darra

Item	Description
Location	Approximately 18km south west of the Brisbane CBD
Asset details	Established in 1983. Contains secondary systems progressively installed between 2007 and 2016
Investment context	West Darra 110kV Substation functions as a local switching substation within the SEQ transmission network. The substation plays an integral role in the 110kV network providing bulk supply to suburbs within the south west Brisbane
Investment driver	Condition driven reinvestment to address emerging condition and obsolescence risks on the 110kV secondary systems
Indicative timing	June 2032
Status	Uncommitted
Proposed network solution	Full replacement of the 110kV secondary systems at West Darra Substation at an estimated cost of $12 million
Other potential network solutions	Staged replacement of 110kV secondary systems
Potential non-network solutions	Potential non-network solutions would need to supply approximately 165MW and 1,350MWh per day within transmission network supplied through West Darra Substation. The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	No material inter-network impact identified

Greater South Brisbane area

Investments that may be required in the greater south Brisbane area comprise condition related works to address emerging condition and obsolescence risks required to maintain reliability of supply.

MZ-18 Addressing secondary systems condition risks at Murarrie

Item	Description
Location	Approximately 8km east of Brisbane CBD
Asset details	Established in 2003
Investment context	Murarrie Substation is a major 275/110kV substation supplying the eastern part of Brisbane, Brisbane Trade Coast precinct and Port of Brisbane. The substation is supplied primarily through 275kV and 110kV circuits from Belmont Substation
Network driver	Condition driven reinvestment to address emerging condition and obsolescence risks on the 110kV secondary systems
Indicative timing	June 2031
Status	Uncommitted
Proposed network solution	Full secondary systems replacement at Murarrie Substation at an estimated cost of $58 million
Other potential network options	Replacement of selected secondary systems, decommission selected functionality, installation of additional network capacity at Belmont, and establish additional 110kV network capacity between Belmont and Murarrie substations
Potential non-network solutions	Potential non-network solutions would need to supply approximately 165MW and 1,350MWh per day within the Murarrie supply area. The non-network solution would be required under contingency events and be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	No material inter-network impact identified

8.9.5 Other potential developments

The Sunshine Coast continues to experience strong population growth and urban development. Increasing demand across the region is expected to increase power transfers on the 132kV and 110kV transmission network. Over the medium to longer-term, additional capacity at Palmwoods Substation and reinforcement of the 132kV and 110kV network may be required to maintain reliable supply and support continued regional growth.

Across Brisbane's northern growth corridor, significant residential and urban greenfield development is planned within the greater North Brisbane and Caboolture West area. The Queensland Government has designated the Waraba Priority Development Area (PDA) for future urban and community development, which may require network reinforcement if load growth is higher than current forecasts. The potential development of large-scale load connections within North Brisbane may also require network augmentations to maintain reliability of supply.

Within Brisbane's western growth corridor, ongoing development in areas including Springfield and the greater Ipswich area, and the establishment of Ripley Valley PDA over the medium to longer-term are expected to increase loadings within the 275kV and 110kV transmission networks.

In the south of the zone, development within the Greater Flagstone and Logan areas is expected to drive future network requirements over the medium to longer-term. The Bromelton State Development Area has the potential to accommodate large-scale industrial, logistics, warehousing and manufacturing activities and may require new transmission supply as development progresses.

Future load growth may also arise from expansion of strategic industrial and employment precincts, including the Australia Trade Coast, which continues to attract logistics, freight, aviation and advanced manufacturing developments. While these developments remain uncertain, they may require transmission reinforcement works should they proceed.

Powerlink will continue to monitor these developments through its annual planning process and ongoing joint planning activities with Energex.

8.9.6 Possible asset retirements

Powerlink has not identified any potential asset retirements in the Moreton zone within the 10-year outlook period.

8.10 Gold Coast zone

The Gold Coast zone supplies a diverse range of residential, commercial, tourism and urban development areas, including major coastal centres such as Surfers Paradise, Broadbeach and Burleigh Heads, together with rapidly growing communities across the northern Gold Coast corridor. The network also supports major economic and social infrastructure, including hospitals, universities, transport infrastructure, the Gold Coast Airport and tourism-related developments. Continued population growth and urban expansion across the region are expected to influence future network requirements.

The southern portion of the zone interfaces with the northern NSW network through the Terranora Interconnector. This link supports power transfers between Queensland and NSW, and plays an important role in maintaining reliable supply across the southern Gold Coast and Tweed regions under a range of operating conditions.

8.10.1 Existing and committed network developments

Powerlink has completed a range of transmission line and substation reinvestment works over the past decade in the Gold Coast zone to address emerging condition related risks and maintain reliability of supply.

8.10.2 Emerging and evolving investment drivers

Within the 10-year outlook, additional transformer capacity at Mudgeeraba Substation may be required to maintain reliability of supply to support load growth within the southern Gold Coast and northern NSW Tweed area.

Future reinvestment needs are primarily related to addressing emerging condition risks within the older overhead lines and substations.

8.10.3 Future network investment and opportunities

Powerlink has identified potential network investment opportunities required to address emerging network asset condition and obsolescence risks within the Gold Coast zone in the 10-year outlook.

Table 8.6 summarises these opportunities and their indicative timing with further details provided in the sections that follow. The opportunities do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

Investment profiles for projects Powerlink anticipates will be required within five years are included in the investment profile tables following Table 8.6. The Mudgeeraba primary and secondary systems replacement identified in the 10-year outlook is not profiled as the indicative need falls outside the five-year period.

Table 8.6 Gold Coast zone investment opportunities within the 10-year outlook period

ID	Potential project	High level scope	Purpose	Indicative timing	Alternatives	Indicative cost	Status
GCZ-01	Line refit works on the 110kV transmission line between Mudgeeraba Substation and Terranora	Targeted line refit works on steel lattice towers	Maintain supply reliability from Queensland to New South Wales Interconnector	June 2028	Rebuild of the existing Mudgeeraba to Terranora 110kV double circuit line (to the Queensland to NSW border)	$10 million	Uncommitted
GCZ-02	Mudgeeraba 275/110kV transformer augmentation	Installation of third 275/110kV transformer at Mudgeeraba Substation	Maintain supply reliability to the southern Gold Coast and northern NSW Tweed area	December 2032	Installation of third 275/110kV transformer at Molendinar Substation, and reinforcement of the Molendinar to Mudgeeraba 110kV network	$35 million	Uncommitted
GCZ-03	Mudgeeraba 275/110kV primary plant and 110kV secondary systems replacement	Selected 275kV and 110kV primary plant replacement and replacement of 110kV secondary systems in the existing building including in-panel replacement	Maintain supply reliability to the southern Gold Coast and northern NSW Tweed area	June 2033	Full replacement of 275/110kV primary plant and full replacement of 110kV secondary systems and replacement of the transformer	$51 million	Uncommitted
GCZ-04	Molendinar 275kV secondary systems replacement	Full replacement of 275kV secondary systems	Maintain supply reliability in the Gold Coast zone	June 2031	Selected 275kV secondary systems replacement, and 110kV reinforcement of Molendinar from the adjacent Loganlea 275kV Substation	$53 million	Uncommitted

8.10.4 Five-year investment profiles

Powerlink anticipates three potential network investments above the RIT-T cost threshold may be required to address the risks arising from the condition of assets and load growth within the Gold Coast zone within the next five years.

GCZ-01 Addressing Terranora Interconnector capability

The greater Gold Coast five-year outlook comprises reinvestment works at Terranora, Mudgeeraba and Molendinar area.

Item	Description
Location	From the Tweed Valley New South Wales into Queensland
Asset details	Constructed in 1976
Investment context	The Mudgeeraba to Terranora 110kV transmission line was first established to augment electricity supply to the Tweed Valley in New South Wales from Queensland. It is a double circuit 110kV steel tower transmission line which consists of 58 structures with the ownership of the asset split between Powerlink and Essential Energy. Powerlink maintains the feeders from Mudgeeraba Substation up to and including structure 1731 along a 13.5km corridor comprising of 18 tension and 14 suspension structures. The line operates in a coastal environment with elevated sections exposed to marine pollutants and is now nearly 50 years old
Investment driver	Emerging condition risks with the Powerlink section of the Terranora Interconnector due to structural corrosion
Indicative timing	June 2028
Status	Uncommitted
Proposed network solution	Refit of the Powerlink portion of the existing Mudgeeraba to Terranora 110kV double circuit transmission line at an estimated cost of $10 million
Other potential network solutions	Staged refit of selected structures on the Mudgeeraba to Terranora line with the first stage to be completed by 2028 and the second stage by 2033
Potential non-network solutions	Potential non-network solutions would need to maintain up to 110MW and 1,500MWh per day to the northern NSW Tweed area, and facilitate inter-regional power transfers
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact, noting there may be potential for inter-network impacts to occur during construction outage periods. Potential impacts will be analysed closer to the identified need timing and as part of the RIT-T consultation process

GCZ-02 Addressing reliability of supply to the southern Gold Coast and Tweed area

Item	Description
Location	Located within the southern part of the Gold Coast area
Asset details	Mudgeeraba substation was constructed in 1972
Investment context	Mudgeeraba 275/110kV Substation is one of two major injection points into the Gold Coast area and is supplied from Greenbank Substation by two 275kV single circuit transmission lines. The substation was established in the early 1970s to support growing demand in the southern Gold Coast and has two 275/110kV, 250MVA transformers. These transformers provide the primary interface between Powerlink's 275kV transmission network and the 110kV network supplying the southern Gold Coast, Terranora and parts of northern NSW, while also supporting power transfers via Directlink. Continued regional demand growth has created an emerging need for a third transformer to maintain reliability of supply.
Investment driver	Load growth and development within the southern Gold Coast and northern NSW Tweed area
Indicative timing	December 2032
Status	Uncommitted
Proposed network solution	Installation of third 275/110kV transformer at Mudgeeraba Substation
Other potential network solutions	Installation of 275kV bus and third 275/110kV transformer at Molendinar Substation, and reinforcement of the 110kV network from Molendinar to Mudgeeraba substations
Potential non-network solutions	Potential non-network solutions would need to provide supply of up to 180MW and up to 1,100 MWh per day to the southern Gold Coast area. The non-network solution would be required for a contingency and to be able to operate on a continuous basis until normal supply is restored. Supply would also be required for planned outages
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact, noting there may be the potential for inter-network impacts to occur during construction outage periods. Potential impacts will be analysed closer to the identified need timing and as part of the RIT-T consultation process

GCZ-04 Maintain reliability of supply and address condition risks at Molendinar

Item	Description
Location	Located within the northern part of the Gold Coast area
Asset details	Established in 2003
Investment context	Molendinar 275/110kV Substation is one of two major injection points into the Gold Coast area and is supplied from Greenbank Substation by a 275kV double circuit transmission line. The Energy Queensland 110kV network from Molendinar to Mudgeeraba links the coastal bulk supply points at Southport, Surfers Paradise, Broadbeach and Merrimac via an underground cable network. An inland overhead 110kV network supplies Robina and Nerang substations to the south and Cades County Substation to the north. A condition assessment of the Molendinar Substation secondary systems identified various secondary systems components that require replacement. The proposed network solution is based on the complexity of in-situ replacement and network constraints
Investment driver	Condition driven replacement to address emerging condition and obsolescence risks on the 275kV secondary systems
Indicative timing	June 2031
Status	Uncommitted
Proposed network solution	Full replacement of 275kV secondary systems at Molendinar Substation at an estimated cost of $53 million
Other potential network solutions	Replacement of selected 275kV secondary systems at Molendinar substation, and reinforcement of the 110kV network from Loganlea to Molendinar, and Mudgeeraba to Molendinar substations
Potential non-network solutions	Potential non-network solutions would need to provide up to 530MW at peak demand times and up to 7,000MWh per day. The non-network solution would be required to operate on a continuous basis.
Inter-network impact	No material inter-network impact identified

8.10.5 Other potential developments

Continued population growth, urban expansion, and the development of strategic growth areas may influence future transmission and distribution network requirements over the medium to longer-term.

Powerlink will continue to monitor these developments through its annual planning process and ongoing joint planning activities with Energex.

8.10.6 Possible asset retirements

Powerlink has not identified any potential asset retirements in the Gold Coast zone within the 10-year outlook period.

8.11 Southern Region line refit program

Where smaller transmission line refit requirements have been identified within the Southern Region, these may be grouped into regional programs as part of Powerlink's Geographic Line Refit Program. This approach is intended to improve delivery efficiency and reduce costs by coordinating geographically proximate transmission line refit requirements that might otherwise be addressed separately. Transmission lines currently identified for potential inclusion in the Southern Region line refit program are summarised in Table 8.7.

Table 8.7 Transmission lines under consideration for inclusion in the Southern Region line refit program in the 10-year outlook period

Transmission line	Zone	Potential line refit program
Line refit works on the 275kV transmission line between Palmwoods and Woolooga substations	Wide Bay	Southern
Line refit works on the 275kV transmission line between South Pine and Palmwoods substations	Wide Bay	Southern
Line refit works on the 275kV transmission lines between Woolooga and Gin Gin substations	Wide Bay	Southern
Line refit works on the 275kV transmission line between Goodna and Belmont substations	Moreton	Southern
Line refit works on the 275kV transmission line between Blackwall and Goodna substations	Moreton	Southern
Line refit works on the 110kV transmission line between Blackstone and Abermain substations	Moreton	Southern
Line refit works on the 110kV transmission line between Belmont and Loganlea substations	Moreton	Southern
Line refit works on the 110kV transmission line between West Darra and Sumner substations	Moreton	Southern
Line refit works on the two 275kV transmission lines between Greenbank and Mudgeeraba substations	Gold Coast	Southern

8.12 Southern Region transmission lines approaching end of technical service life

Table 8.8 provides a consolidated outlook of transmission lines in the Southern Region expected to approach end of technical service life within the 10-year outlook period. These include transmission lines identified within Powerlink's Geographic Line Refit Program, transmission lines associated with investment opportunities identified in this chapter, and other assets subject to ongoing asset management, planning and network assessments.

The response for each transmission line will depend on its enduring network need and may include continued operation through operational management strategies, life extension, refit, replacement, reconfiguration or retirement.

Transmission lines that may require future intervention or investment responses beyond the 2026 TAPR outlook period, in the next 10 to 20 years, are identified in Appendix F.

Table 8.8 Southern Region transmission lines approaching end of technical service: 10-year outlook

Zone	Feeder	Voltage	General location
Wide Bay	807	275kV	Between South Pine and Woolooga substations
Wide Bay	808	275kV	Between South Pine and Palmwoods substations
Wide Bay	810	275kV	Between Palmwoods and Woolooga substations
Wide Bay	813/1, 813/2 814/1, 814/2	275kV	Between Calliope River and Woolooga tee Gin Gin substations
Wide Bay	819	275kV	Between Teebar Creek and Wurdong substations
Moreton	809	275kV	Between Rocklea and South Pine substations
Moreton	838	275kV	Between Blackwall and South Pine substations
Moreton	8819	275kV	Between Blackwall and Goodna substations
Moreton	8842	275kV	Between Goodna and Belmont substations
Moreton	708	110kV	Between West Darra and Sumner substations
Moreton	709	110kV	Between Richlands and Algester substations
Moreton	710	110kV	Between Rocklea and Richlands substations
Moreton	715	110kV	Between Blackstone and Abermain substations
Moreton	716	110kV	Between Bundamba and Abermain substations
Moreton	717	110kV	Between Blackstone and Redbank Plains substations
Moreton	718	110kV	Between Blackstone and Goodna substations
Moreton	721, 722	110kV	Between South Pine and Upper Kedron substations
Moreton	751, 792	110kV	Between Belmont and Loganlea substations
Moreton	776	110kV	Between West Darra and Upper Kedron substations
Moreton	7256, 7257	110kV	Between Upper Kedron and Ashgrove West substations
Moreton	7258	110kV	Between Upper Kedron and Abermain substations
Moreton	7294	110kV	Between Algester and Richlands substations
Moreton	7324	110kV	Between Blackstone and Bundamba substations
Gold Coast	835	275kV	Between Greenbank and Mudgeeraba substations
Gold Coast	836	275kV	Between Greenbank and Mudgeeraba substations
Gold Coast	757, 758	110kV	Between Mudgeeraba and Terranora substations

Network Capability and Performance

9.1 Introduction
9.2 Changing generation and storage capacity
9.3 Zonal supply and demand changes
9.4 Network transfer capability and constraints
9.5 Maximising network capability and maintaining security
9.6 Existing high voltage network configuration

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Queensland's power system continues to evolve through the rapid growth of new generation, battery storage and hybrid developments. These changes are altering the location, timing and direction of electricity flows across the transmission network, while declining minimum demand is creating new operational and planning challenges. Maintaining a secure and efficient transmission network requires a detailed understanding of how these changes affect network utilisation, transfer capability and system performance. This chapter examines the changing generation, storage and demand landscape in Queensland, the implications for transmission network performance during 2025/26, and the measures Powerlink is implementing to maximise network capability and maintain system security.

Key highlights

- During 2025/26, new committed projects added 1,767 megawatts (MW) of semi-scheduled generation capacity and 2,880MW of transmission connected Battery Energy Storage System (BESS) capacity. This will increase Queensland's semi-scheduled generation capacity to 9,863MW and total BESS capacity to 5,855MW.
- Queensland's generation portfolio continues to diversify through new generation, battery storage and hybrid developments, with seven hybrid generation projects and five standalone BESS projects committed during the year.
- Connected and committed energy storage capacity now exceeds 25 gigawatt hours (GWh), including over 17GWh of transmission connected battery storage. Battery storage commitments made during 2025/26 alone exceed the storage capacity of the existing Wivenhoe Pumped Storage Hydro Power Station.
- Growth in generation and storage is changing energy flows across the transmission network, with increased generation in the Bulli and Central West zones.
- Maximum demand across Queensland's transmission zones remained broadly unchanged during 2025/26; however, seven of Powerlink's 11 zones recorded new minimum demand records, continuing the trend of declining daytime transmission-delivered demand.
- The Queensland to New South Wales Interconnector (QNI) Minor project is complete, resulting in increased transfer capability in both northerly and southerly directions. Final testing activities are ongoing at these high transfer levels.
- Network constraint performance in 2025/26 remained broadly consistent with historical levels. The Gladstone grid section experienced more than 500 hours of constrained operation due to thermal limitations, while constrained operation in the Gold Coast and Tarong grid sections was primarily associated with maintenance activities.
- Powerlink continues to maximise network capability and maintain system security through advanced network monitoring and control schemes, real-time transmission line rating trials and initiatives to manage priority power system risks.
- Powerlink has published a new supplementary data workbook, and one-page overviews on zone and grid performance, to enhance accessibility and engagement with this chapter.

9.1 Introduction

The capability and performance of Queensland's transmission network are central to the reliable and efficient operation of the power system and the integration of new generation, storage and load. Network capability is not fixed. It varies according to prevailing system conditions, including weather, generation dispatch, demand, interconnector flows and the availability of transmission equipment.

Queensland's transmission network is generally more heavily utilised during summer, when demand is typically higher and elevated temperatures can reduce the power-carrying capability of transmission equipment. Power flows also vary with the location and output of generation and with planned or unplanned outages of network elements. Local maximum demand and reduced embedded generation output can further increase flows on parts of the transmission network.

This chapter explains how changes in generation, storage and demand are affecting the utilisation and performance of Powerlink's transmission network. It provides:

- an overview of existing and committed generation and storage capacity
- analysis of changes to zonal supply and demand
- an explanation of how network transfer capability is assessed
- a summary of material network constraints during 2025/26
- an overview of measures used to maximise network capability and manage power system risks
- diagrams of Powerlink's existing high voltage transmission network.

9.2 Changing generation and storage capacity

9.2.1 Generation mix and project commitments

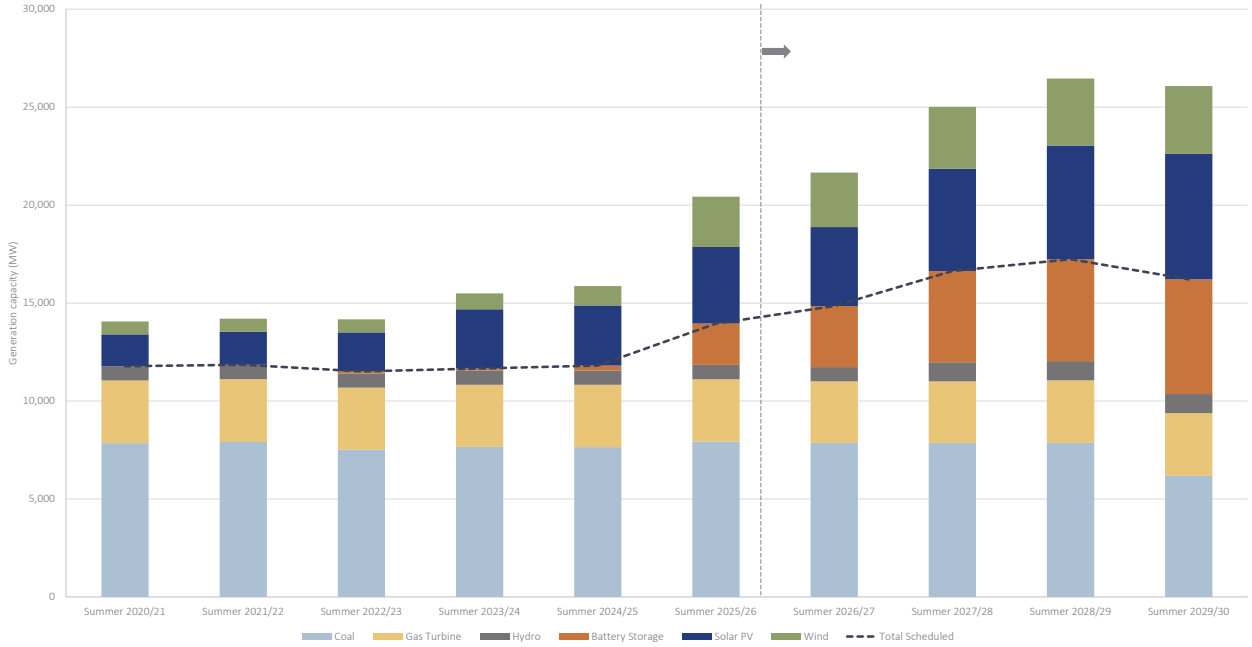
Scheduled generation in Queensland comprises predominantly coal-fired, gas turbine and hydro-electric generation, with an increasing contribution from transmission connected BESS and pumped hydro energy storage (PHES) systems. Semi-scheduled generation comprises wind and solar generation.

For this chapter, Powerlink applies the Australian Energy Market Operator's (AEMO) definition of a committed project under the System Strength Impact Assessment Guidelines (Version 2.2). This includes AEMO being satisfied that the project meets the relevant National Electricity Rules requirements, a connection agreement being in place and any required system strength remediation scheme having been finalised.

9.2.2 Outlook for generation capacity and growth in energy storage

During 2025/26, new commitments added 1,767MW of semi-scheduled generation capacity. This will increase Queensland's semi-scheduled summer capacity to 9,863MW by 2030. Figure 9.1 shows actual and expected large-scale generation capacity in Queensland from summer 2020/21 to summer 2029/30. It includes relevant generation connected or committed to Powerlink's network, Powerlink's directly connected customers and scheduled and semi-scheduled generation connected to Queensland's distribution networks. Non-scheduled, semi-scheduled and scheduled generators are treated differently in AEMO's central dispatch process.

Figure 9.1 Summer available generation capacity by energy source



Energy storage supports the integration of variable renewable generation by shifting electricity from periods of surplus production to periods of higher demand. Until 2022, Wivenhoe Pumped Storage Hydro Power Station was Queensland's only transmission-connected energy storage facility. Since then, a growing number of transmission-connected BESS have been commissioned or committed, alongside the committed Kidston Pumped Storage Hydro Project and other pumped hydro developments in the planning pipeline.

Queensland's generation portfolio continues to expand and diversify, driven by new generation, transmission-connected BESS and hybrid developments. During 2025/26, new committed projects included the Fraser Coast Solar Park, Ganymirra Solar Power Station, Gawara Baya, Guthrie's Gap Solar Power Station, Lower Wonga Hybrid, Major's Creek Solar Power Station and Smoky Creek Solar Power Station hybrid generation projects. Together, these projects contributed 1,767MW of additional semi-scheduled generation capacity, with all facilities incorporating integrated battery storage.

In some cases, the maximum output capacity of a hybrid facility is less than the combined nameplate capacity of the generation and battery components, reflecting connection and operational design considerations.

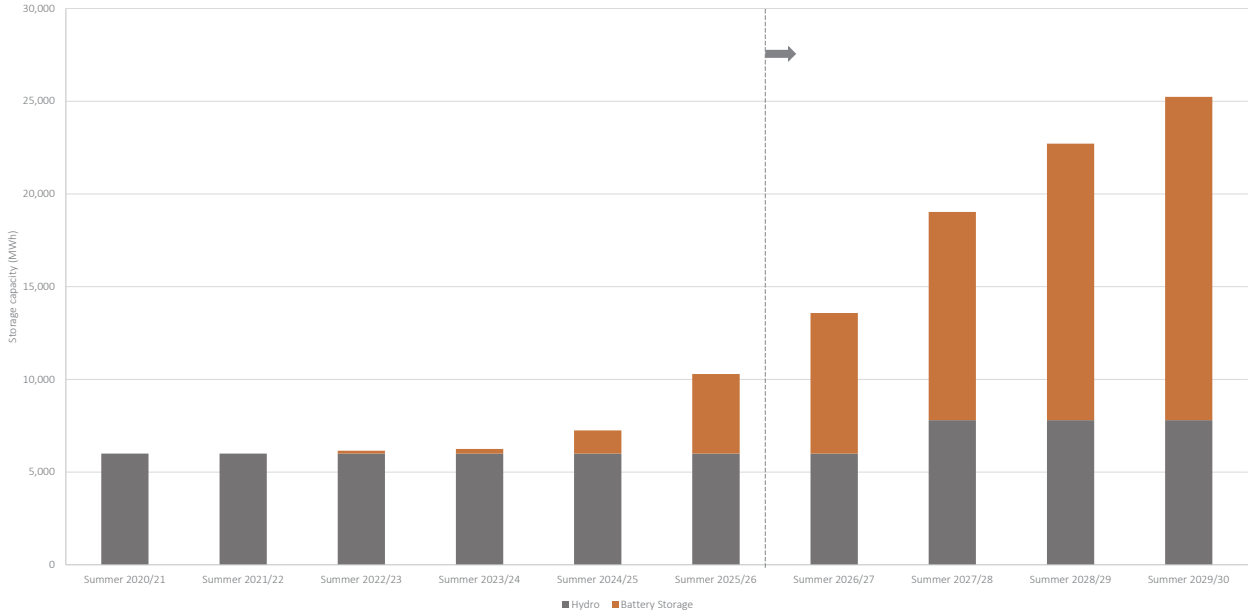
Transmission-connected BESS commitments were also significant, with Stanwell BESS, Supernode BESS Stage 3, Tangkam BESS, Teebar BESS and Yabulu BESS committed during the year. The existing Ulinda Park BESS has committed to increasing generation and storage capacity. In addition, Blue Grass Solar Farm and Broadsound Solar Farm were modified to include battery storage, becoming Blue Grass Hybrid Facility and Broadsound Energy Park respectively.

These developments are driving continued growth in Queensland's scheduled generation capacity and reinforcing the increasing role of transmission-connected BESS as a source of dispatchable capacity. Based on current commitments, total scheduled capacity is expected to continue to grow over the outlook period, despite the potential closure of Gladstone Power Station in March 2029. Transmission connected BESS now provide more generation capacity than wind generation and are approaching the capacity of solar generation.

The increasing prevalence of hybrid facilities reflects a broader shift in project design, with co-located transmission-connected battery storage becoming a standard feature of new renewable developments. This trend is contributing to rapid growth in Queensland's energy storage portfolio while supporting system reliability, network utilisation and the integration of variable renewable energy.

In 2025/26, a total of 2,880MW of transmission-connected BESS capacity was committed, increasing total committed and available transmission-connected BESS to 5,855MW. Connected and committed energy storage capacity now exceeds 25GWh, including over 17GWh of transmission-connected BESS (see Figure 9.2). Transmission-connected BESS commitments made during 2025/26 alone exceed the energy storage capacity of the existing Wivenhoe facility and, based on current commitments, total transmission-connected BESS capacity is expected to surpass existing and committed PHES in the coming years.

Figure 9.2 Available storage capacity by type



Details of the generators and storage facilities included in this chapter are provided in the supplementary data workbook for this chapter.

9.3 Zonal supply and demand changes

Growth in generation and storage is changing the location, timing and direction of electricity flows across Powerlink's transmission network. At the same time, increasing embedded generation is reducing transmission-delivered demand during parts of the day in several zones.

9.3.1 Changes in zonal energy flows

Figures 9.3 to 9.5 compare zonal electricity generation, transmission-delivered energy and transfers between Powerlink's grid sections in 2024/25 and 2025/26. The figures include transmission-connected generation, major embedded generation, energy delivered to distribution network service providers and directly connected customers, and energy transferred between zones. A detailed breakdown of transmission-connected generation by technology and zone is provided in the supplementary data workbook, and detail on the areas covered in each grid section is in Appendix H.

Total transmission-connected generation increased during 2025/26, offsetting an increase in energy flows to New South Wales. Generation increased significantly in the Bulli and Central West zones due to output from newly commissioned wind farms.

Total generation in the South West zone declined. Increased wind generation was more than offset by reduced coal-fired generation. Generation in the other zones was not materially different from 2024/25, although the Gladstone zone experienced a significant shift in its generation mix from coal to solar while total production remained broadly unchanged.

These changes in generation output affected the volume and direction of electricity transferred between zones and contributed to increased utilisation of particular transmission circuits and grid sections.

Note that in figures 9.3 to 9.5 there may be an energy imbalance in some zones due to transmission losses, generator auxiliary loads and use of multiple data sources.

Figure 9.3 Zonal electricity transfers (GWh), 2024/25

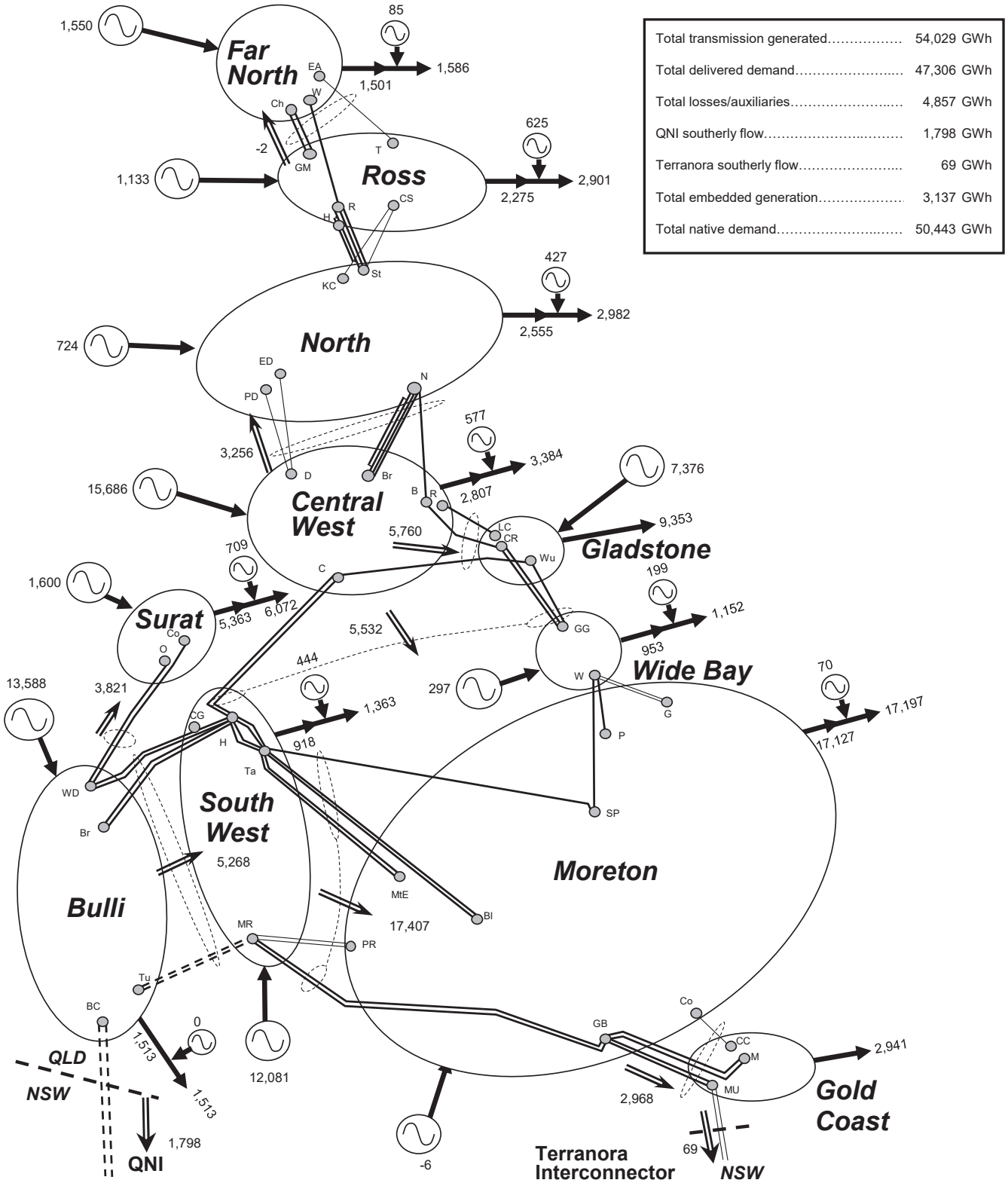


Figure 9.4 Zonal electricity transfers (GWh), 2025/26

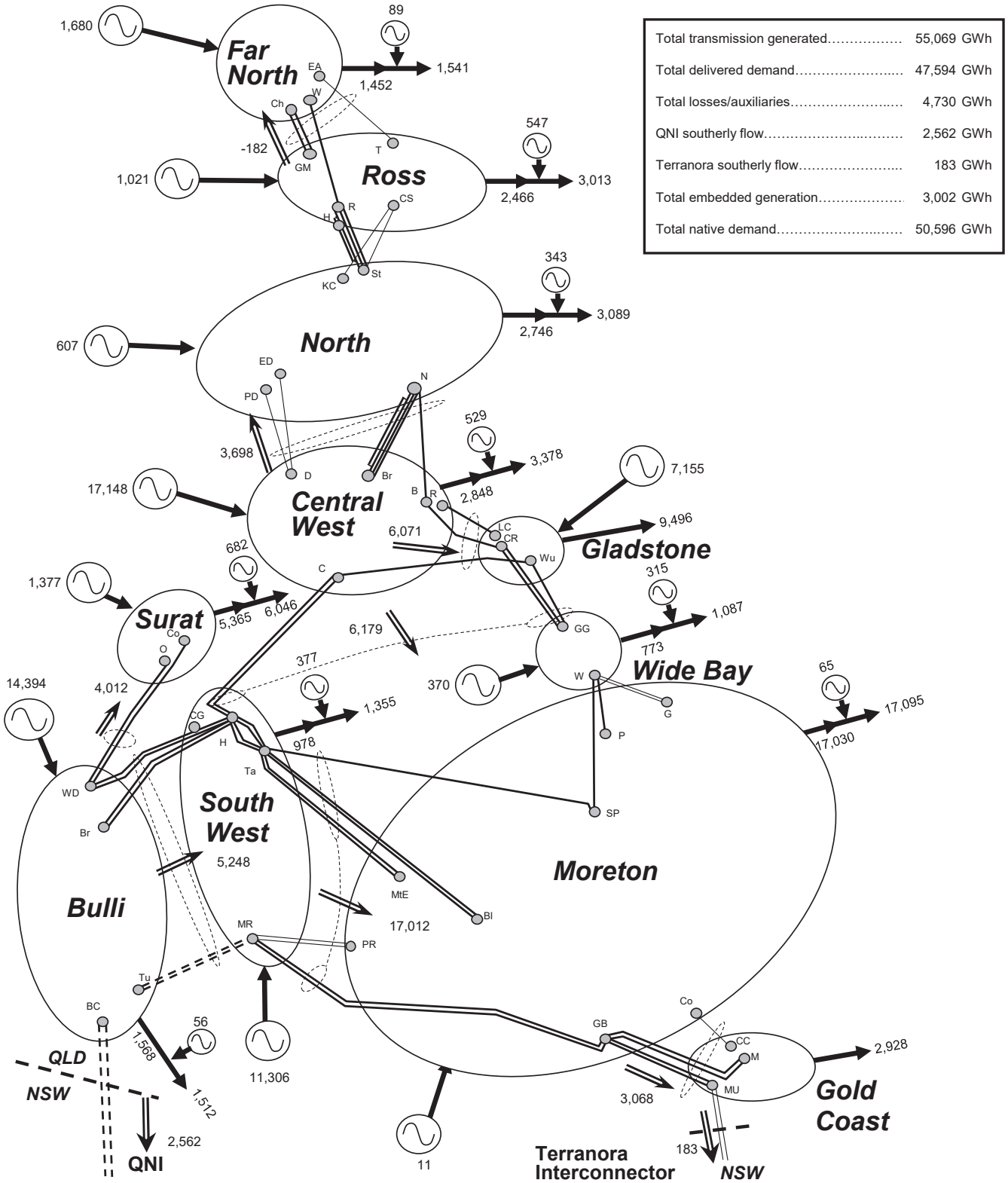
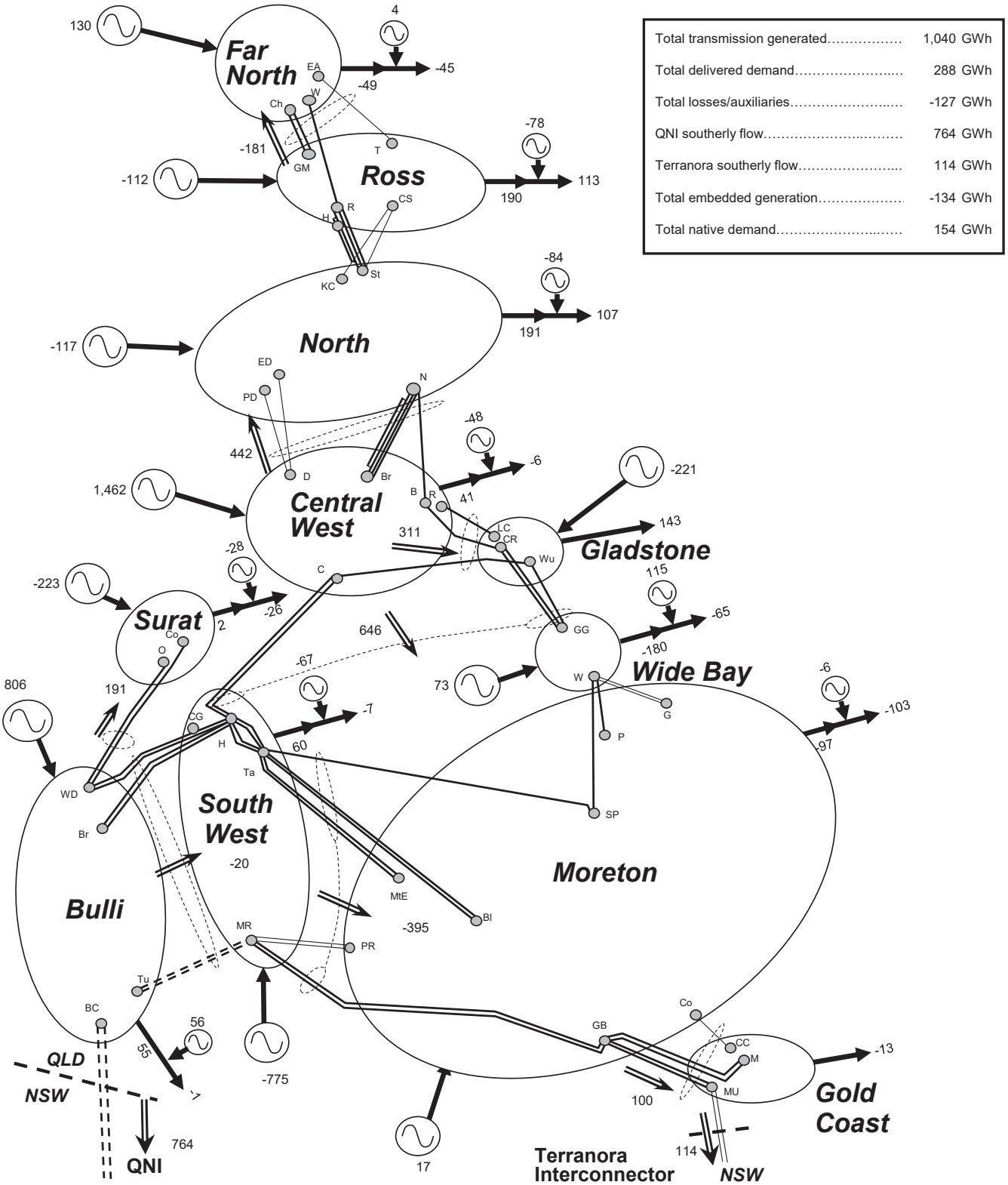


Figure 9.5 Change in zonal electricity transfers (GWh), 2024/25 to 2025/26



9.3.2 Changing daily demand profiles

Declining minimum demand is changing the daily profile of electricity supplied from Powerlink's transmission network. The effect is particularly evident in the Far North and Wide Bay zones, where daytime transmission-delivered demand has reduced materially over the past five years.

Figure 9.6 compares the daily demand profiles recorded on minimum-demand days in the Far North zone. The profiles show a progressively deeper daytime reduction, including periods where the zone is a net generator, during the 2025/26 minimum-demand day.

Figure 9.6 Far North daily profile of minimum demand days over the last five years

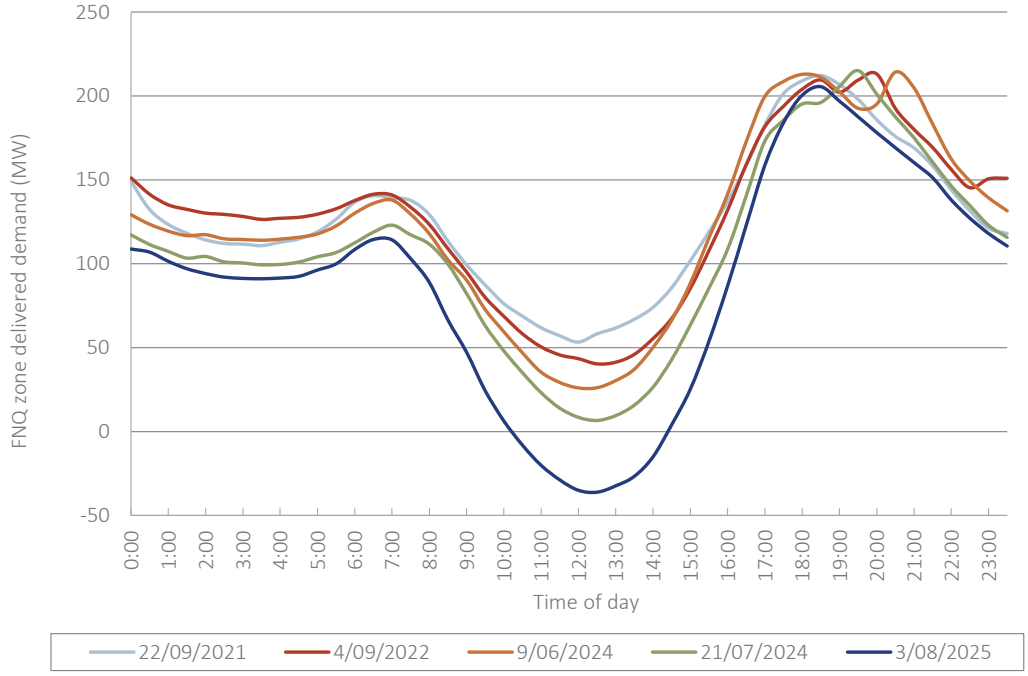
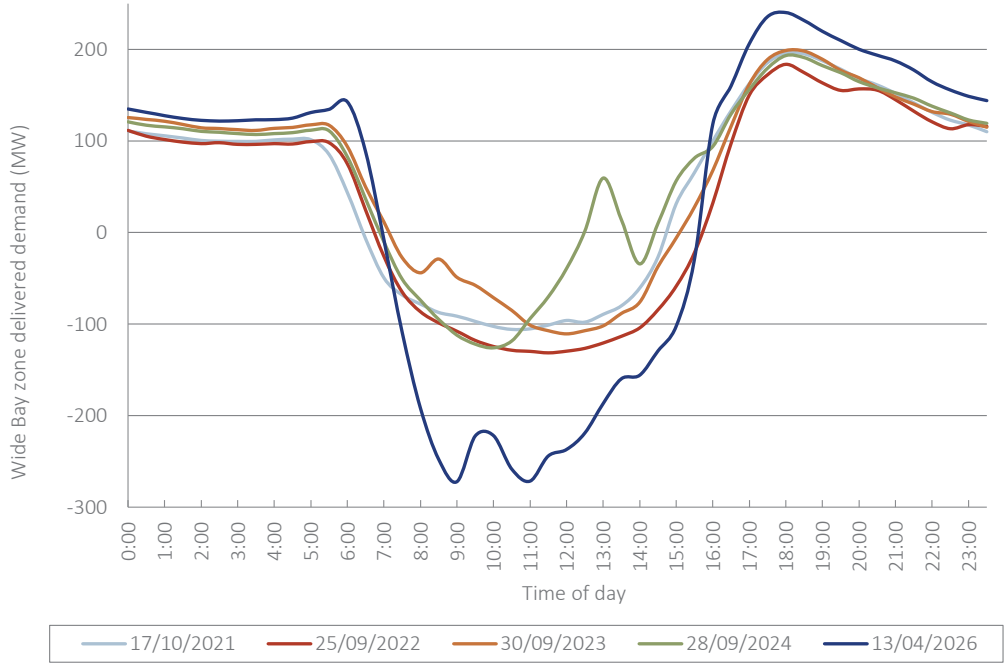


Figure 9.7 presents the equivalent comparison for the Wide Bay zone. The profiles show a substantial deepening of negative daytime transmission-delivered demand in 2025/26.

The minimum demand in the Wide Bay zone is largely driven by the combined output of the embedded solar generation. The sudden variations in the demand profile shown in Figure 9.7 (at 10am on 13 April 2026 for example) are not in fact changes in the underlying demand but rather the solar farms responding to weather conditions (cloud cover reducing available solar generation) or market conditions (negative spot prices resulting in the solar farms not being dispatched).

The significant reduction in the past year is due to the Bundaberg and Munna Creek solar farms being commissioned. This embedded generation further lowers the daytime transmission-delivered demand of the Wide Bay zone.

Figure 9.7 Wide Bay daily profile of minimum demand days over the last five years



9.3.3 Changes in maximum and minimum demand

Maximum demand across Powerlink's zones was broadly consistent with the previous year. Marginal increases occurred in the Central West, Gladstone, Bulli and Surat zones, with Surat being the only zone to record a new maximum demand.

Minimum demand continued to decline, with seven of Powerlink's 11 zones recording new minimum-demand levels during 2025/26. Significant reductions occurred in the Wide Bay and Moreton zones with less significant reductions in Far North, Ross, Central West, South West and Gold Coast zones.

Changes in demand, generation capacity and storage capacity for each zone is summarised in Table 9.1. Future committed generation and storage capacities are also included for reference. A detailed breakdown of existing and committed generation and storage is provided in the supplementary data workbook for this chapter.

Table 9.1 Demand, generation and storage changes since the 2025 TAPR alongside details of committed changes to generation and storage for each zone in the Powerlink network

Zone	Changes Since 2025 TAPR					Future Commitments		
	Maximum Demand (MW)	Minimum Demand (MW)	Existing Generation (MW)	Existing Storage (MW)	Existing Storage Capacity (MWh)	Generation (MW)	Storage (MW)	Storage Capacity (MWh)
Far North	-15	-43	-	-	-	-	-	-
Ross	+12	-16	-	-	-	+ 596	+ 855	+ 3,629
North	-14	+8	-	-	-	-	-	-
Central West	-11	-8	-	+ 480	+1,560	+ 991	+ 600	+ 2,262
Gladstone	-25	-1	+ 387	-	-	-1,680	-	-
Wide Bay	-3	-146	+ 198	-	-	+ 828	+ 580	+ 1,916
South West	-54	-33	+ 247	-	-	-	+ 100	+ 200
Moreton	-251	-176	-	-	-	-	+260	+ 755
Gold Coast	-56	-15	-	-	-	-	-	-
Surat	+2	-111	-	+ 60	+120	+ 293	-	-
Bulli	+2	+83	+ 94	+ 255	+510	+ 399	+ 594	+ 2,380

9.4 Network transfer capability and constraints

Changing generation, storage and demand patterns within zones affect the volume and direction of transfers between zones and the system conditions under which transmission limits may bind.

9.4.1 Grid sections and transfer capability

Powerlink defines grid sections on the main transmission system to measure electricity transfers between zones and assess the maximum secure transfer capability of the network. The grid sections provide a consistent basis for assessing current capability and identifying potential future limitations. Their locations are shown in Figure H.1 and Table H.2 of Appendix H.

The transfer capability of a grid section may be limited by transient stability, voltage stability, or the thermal ratings of transmission equipment. Powerlink develops limit equations that reflect these factors, and AEMO incorporates the equations into constraints used by the National Electricity Market Dispatch Engine (NEMDE).

9.4.2 How transfer capability is determined

Transfer capability varies with prevailing power system conditions and generally cannot be represented by a single fixed value. Transmission network service providers therefore use multi-term equations to describe the relationship between operating conditions and allowable power flows.

In Queensland, transfer capability can be highly dependent on which generators are operating, their output, demand levels, network configuration and the availability of transmission equipment. Following AEMO's due diligence, the relevant equations are implemented in NEMDE to support secure dispatch while maximising network capability under prevailing conditions.

Powerlink's limit equations are provided in Appendix I. They reflect network conditions at the time of publication and are progressively updated in response to changes in demand, generation, network development and network configuration. Expected capability improvements arising from committed network works are incorporated into future planning assessments. For example, commissioning of the third 275kV circuit into Cairns in 2023 resulted in an update to the Far North Queensland grid section voltage stability equation, reflecting the improved transfer capability of the network.

9.4.3 Queensland to New South Wales interconnectors

The transfer capability of the QNI varies with demand, generation dispatch, transmission equipment availability and broader network operating conditions. Transfer limits may be determined by voltage stability, transient stability, oscillatory stability or thermal rating considerations.

For intact system operation, southerly transfers on QNI are most likely to be limited by:

- voltage stability associated with a fault on the Sapphire to Armidale 330kV transmission line in New South Wales or
- the thermal capability of the 330kV transmission network between Dumaresq and Liddell in New South Wales.

For intact system operation, combined northerly transfers across QNI and the Terranora Interconnector are most likely to be limited by:

- transient or voltage stability associated with transmission line faults in New South Wales
- transient or voltage stability associated with the loss of the largest generating unit in Queensland or
- the thermal capability of the 330kV and 132kV transmission networks in northern New South Wales.

The QNI Minor project is complete and inter-network testing activities, required under Clause 5.7.7 of the National Electricity Rules (NER), are in their final stages. The project has increased transfer capability in both northerly and southerly directions with the final transfer tests awaiting favourable market conditions.

AEMO's 2026 Integrated System Plan (ISP) reclassified QNI Connect from an actionable project to a future project. Consequently, Powerlink and Transgrid will not progress QNI Connect to the Regulatory Investment Test for Transmission (RIT-T) process at this stage.

AEMO publishes Monthly Constraint Reports, which include information on the duration of constrained operation for the NEM interconnectors, including QNI and the Terranora Interconnector. Trends in interconnector flows are also reported in AEMO's Quarterly Energy Dynamics reports.

9.4.4 Network constraint performance in 2025/26

Binding network constraints during 2025/26 were broadly consistent with historical levels. The most notable instances occurred in the Gladstone, Gold Coast and Tarong grid sections. The Gold Coast and Tarong constraints were associated with maintenance activities, while Gladstone experienced significantly longer periods of constrained operation, predominantly under system-normal conditions.

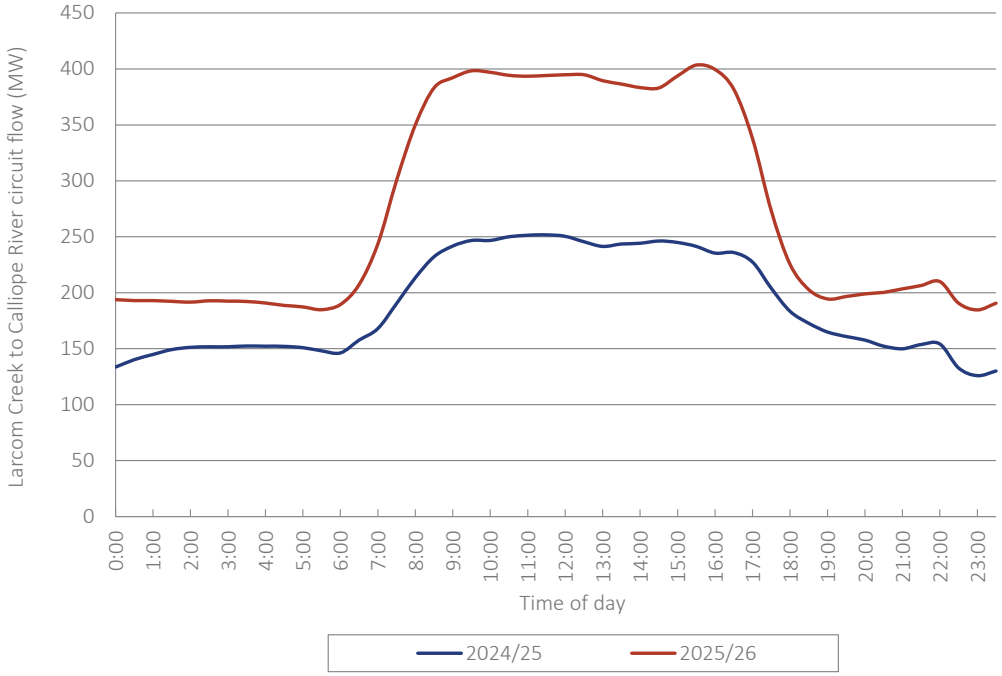
Gladstone Grid Section

The Gladstone grid section experienced approximately 500 hours of constrained operation during 2025/26. This is a large increase from previous years where the section was typically only constrained during outage conditions. The primary cause of the constraint was the thermal limit of the circuit between the Larcom Creek and Calliope River substations.

Increased output from Aldoga Solar Farm increased flows on this circuit during the daytime. Average power flows across the Gladstone grid section into the Gladstone region were also generally higher even without Aldoga Solar Farm due to reduced output from Gladstone Power Station. The combination of these two factors resulted in constrained operation during the daytime.

Figure 9.8 shows the large average increase in flows between Larcom Creek and Calliope River between 2024/25 and 2025/26 which caused the Gladstone grid section to be constrained.

Figure 9.8 Comparison of average daily load on Larcom Creek to Calliope River Circuit



Gold Coast and Tarong Grid Section

The Gold Coast grid section experienced 30 hours of constrained operation during extended maintenance of one of the Greenbank to Mudgeeraba 275kV circuits.

The Tarong grid section experienced 16 hours of constrained operation during maintenance activities that required multiple circuits around Tarong Substation to be out of service.

9.5 Maximising network capability and maintaining security

Powerlink continues to develop operational technologies and network control measures that increase the usable capability of the transmission network while maintaining secure and resilient operation. These measures include advanced wide-area schemes, real-time equipment ratings and facilities designed to manage the consequences of non-credible events.

9.5.1 Advanced measures to increase network capability

Powerlink is continuing to develop its Wide Area Monitoring Protection and Control platform to maximise network capability and provide an additional layer of protection against power system disturbances.

Wide Area Monitoring Protection and Control schemes use information from geographically dispersed transmission assets to rapidly detect abnormal system conditions and initiate an appropriate response. Depending on the event, this may include changing the network configuration or altering generation or load. The schemes can operate within sub-second timeframes, helping to minimise disruption and reduce the likelihood of cascading failure.

Powerlink is also undertaking field trials of equipment that enables overhead line ratings to be determined in real time using weather conditions on critical transmission spans. The trials are intended to identify opportunities to increase thermal capability during favourable conditions, including periods of elevated wind speed, lower ambient temperature or reduced solar irradiation. The Bureau of Meteorology has provided advice and weather data to inform the scope of the trial.

9.5.2 Managing priority risks from non-credible events

Powerlink participated in AEMO's 2026 General Power System Risk Review and continues to work with AEMO to progress priority risks identified through that process.

Work is continuing on measures identified through current and previous reviews, including:

- expanding the Wide Area Monitoring Protection and Control scheme for the non-credible loss of both Calvale to Halys 275kV circuits, including improvements to manage higher flows across the Central Queensland to Southern Queensland grid section
- implementing the Queensland Over Frequency Generator Shedding scheme with participating generators and
- improving the adequacy of the under frequency load-shedding schemes following AEMO's UFLS Adequacy Review.

9.5.3 Network control facilities

Powerlink owns network control facilities that may disconnect load following a non-credible contingency to reduce or manage the consequences of the event. Table 9.2 identifies the relevant facilities and their purpose under system-normal conditions.

Table 9.2 Powerlink-owned network control facilities configured to disconnect load as a consequence of non-credible events during system normal conditions

Scheme	Purpose
Far North Queensland Under Voltage Load Shed (UVLS) Scheme	Manage risk of voltage collapse in Far North Queensland
North Goonyella Under Frequency Load Shed (UFLS) relay	Raise system frequency
Dysart UVLS	Minimise risk of voltage collapse in Dysart area
Eagle Downs UVLS	Minimise risk of voltage collapse in Eagle Downs area
Boyne Island UFLS relay	Raise system frequency
Queensland UFLS inhibit scheme	Minimise risk of Queensland to New South Wales Interconnector (QNI) separation for an UFLS event for moderate to high southern transfers on QNI compared to Queensland demand
CQ-SQ N-2 WAMPAC scheme	Minimise risk of CQ-SQ separation for a non-credible loss of the Calvale to Halys 275kV double circuit transmission line
Surat N-2 WAMPAC scheme	Minimise the risk of losing Surat load for a non-credible loss of two lines between Western Downs and Columboola
Tarong UFLS relay	Raise system frequency
Middle Ridge UFLS relays	Raise system frequency
Mudgeeraba Emergency Control Scheme (ECS)	Minimise risk of voltage collapse in the Gold Coast zone

9.6 Existing high voltage network configuration

Figures 9.9 to 9.12 show Powerlink's system-intact high voltage network configuration across North, Central, South West and South East Queensland at July 2026.

Figure 9.9 Existing high voltage network, July 2026 – North Queensland

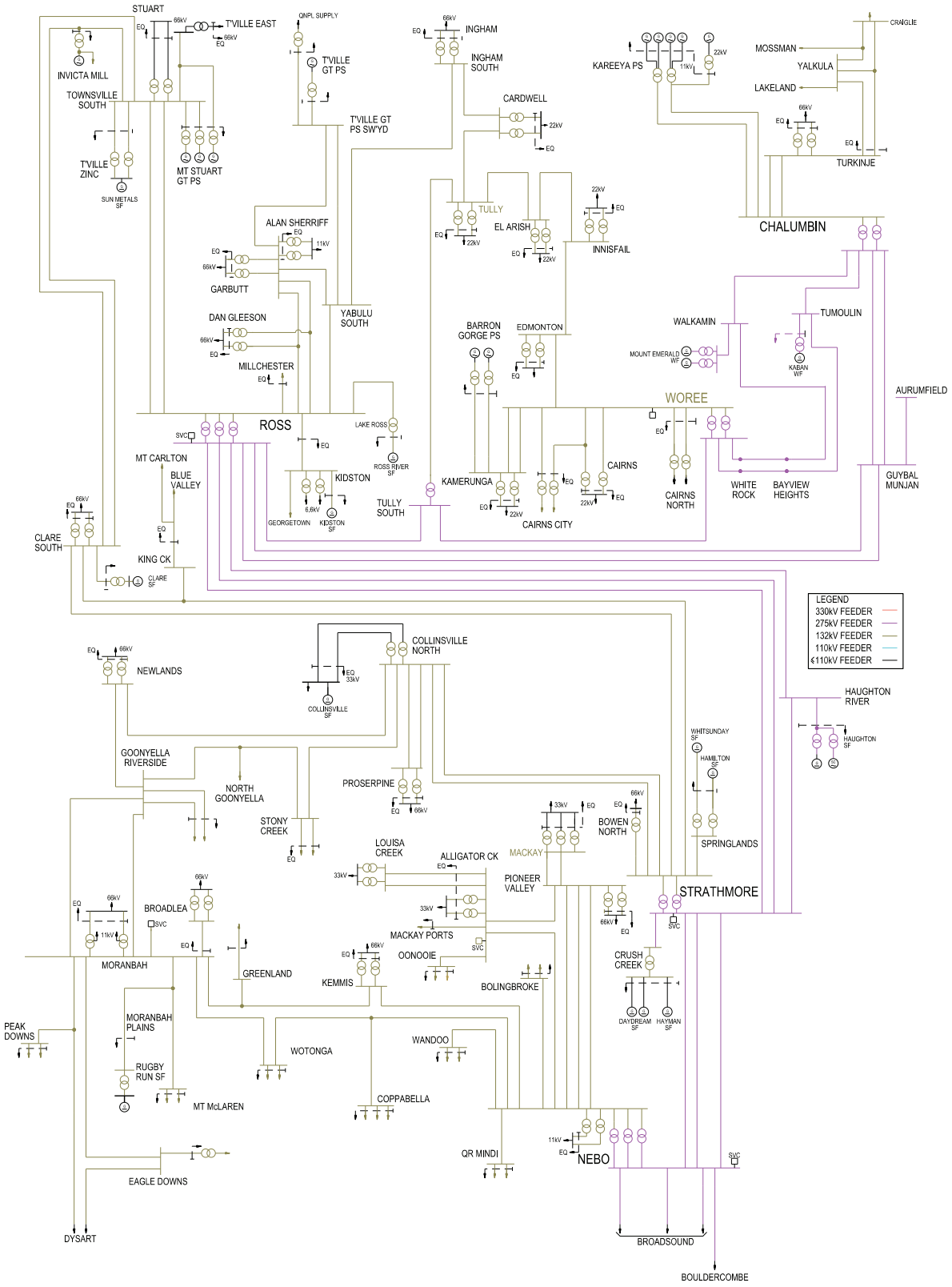


Figure 9.10 Existing high voltage network, July 2026 – Central Queensland

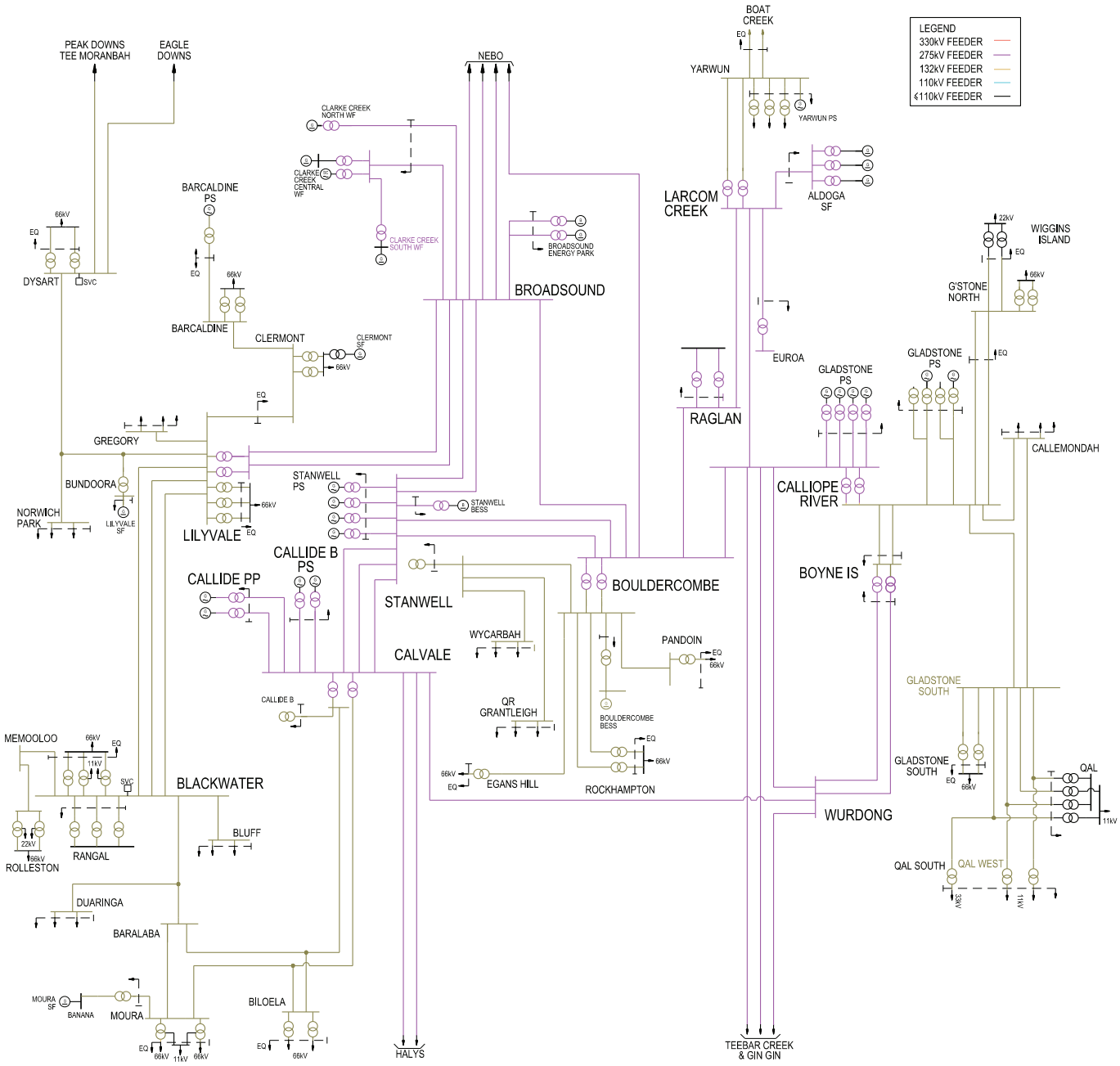


Figure 9.11 Existing high voltage network, July 2026 – South West Queensland

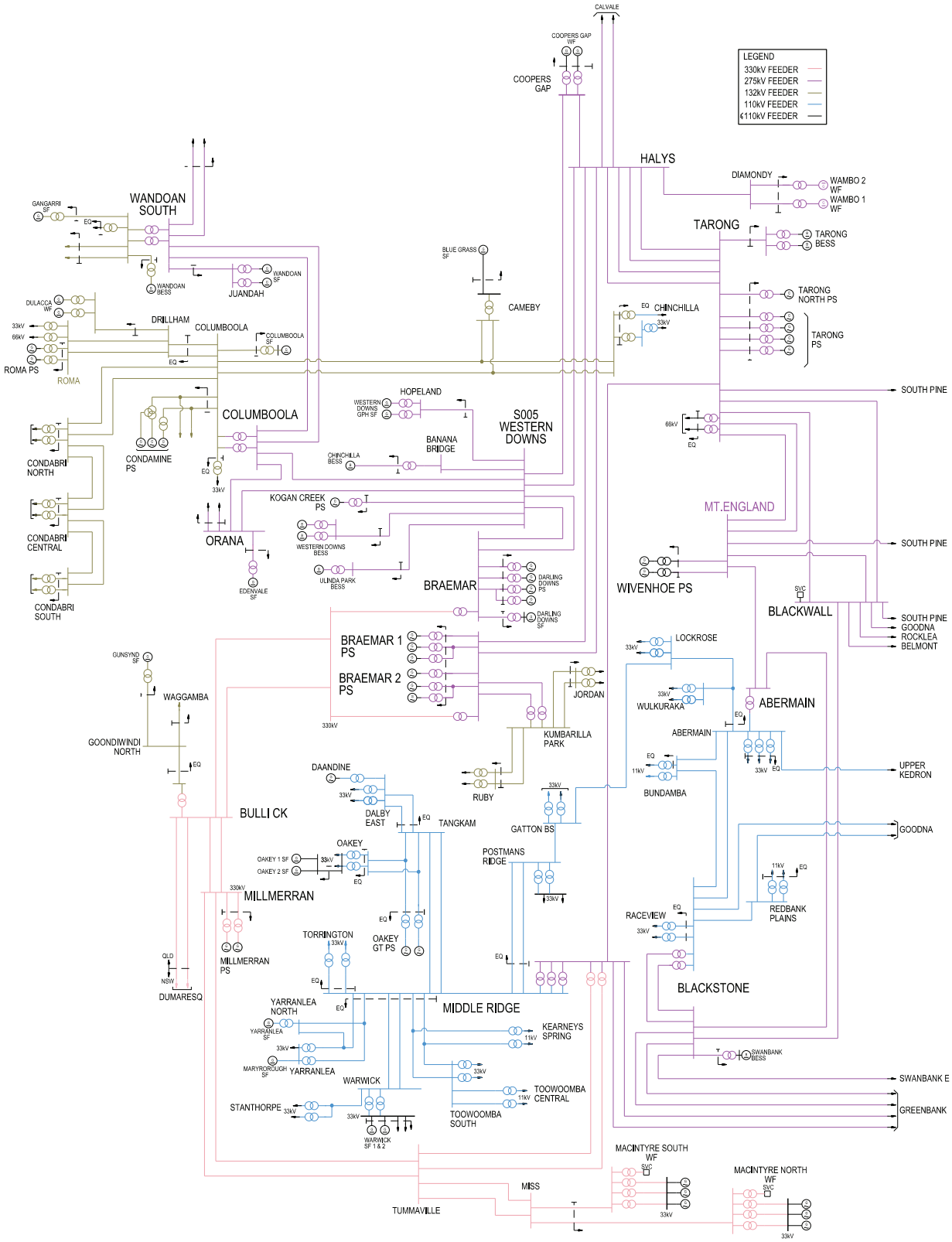
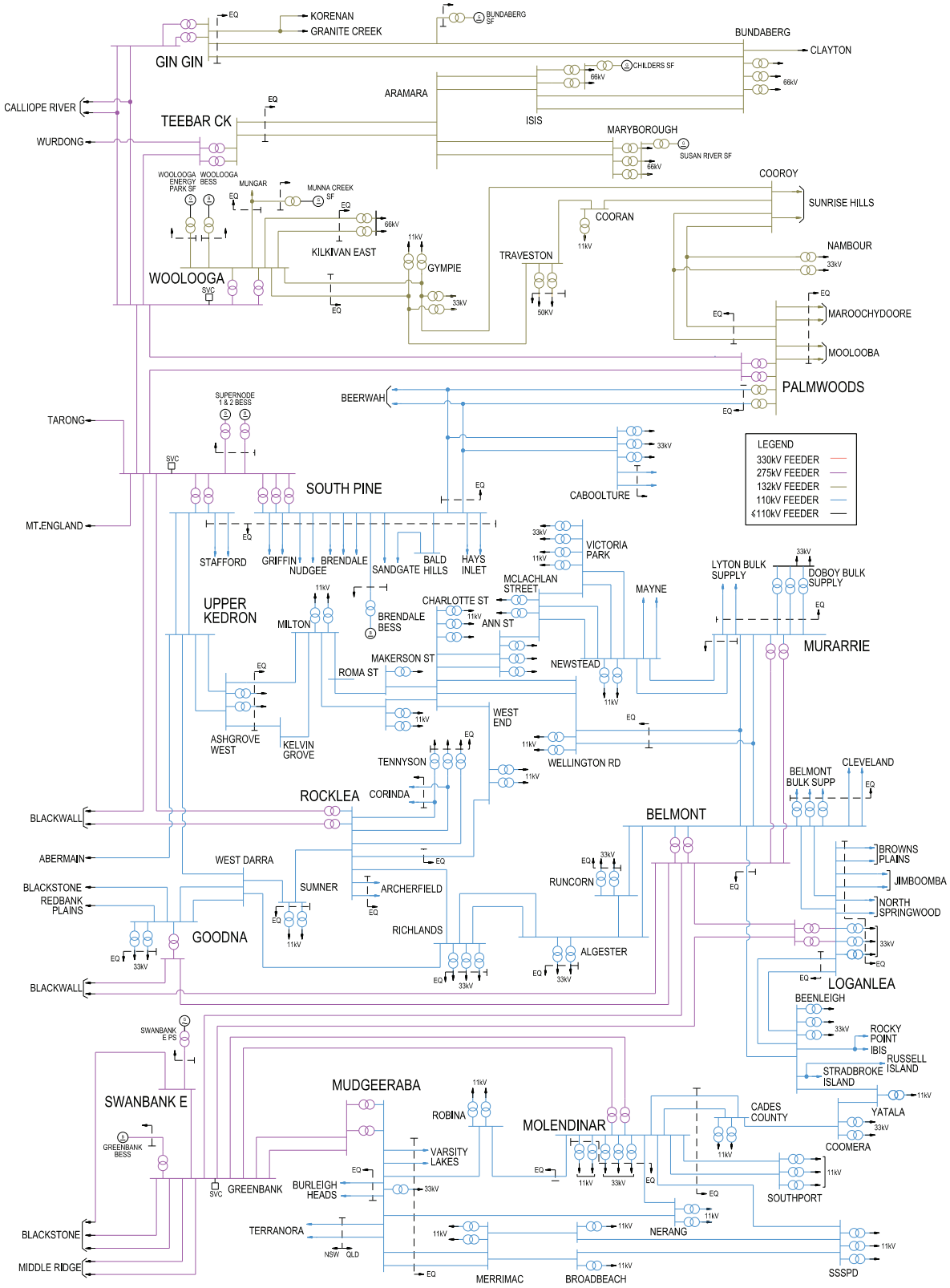


Figure 9.12 Existing high voltage network, July 2026 – South East Queensland



Recently Commissioned and Committed Network Developments

10.1 Connection works
10.2 Network developments
10.3 Network reinvestments
10.4 Uncommitted network investments
10.5 The Gladstone Project
10.6 Asset retirement works

10

10. Recently commissioned and committed network developments

Powerlink continues to support the development of energy projects in Queensland. Since publication of the 2025 Transmission Annual Planning Report (TAPR) one network augmentation, 12 reinvestment projects, and seven connection projects have been completed, including four battery energy storage system (BESS) connections. This chapter also presents a snapshot of recently commissioned projects and projects that are committed or awaiting commencement since completion of the Regulatory Investment Test for Transmission (RIT-T) or Priority Transmission Investment (PTI) process.

Key highlights

- During 2025/26, Powerlink's delivery efforts remained predominantly directed towards connecting generation and reinvestment in transmission lines and substations across Powerlink's network.
- Powerlink's regulated investment program focuses on reducing the identified risks arising from assets reaching the end of technical service life and maintaining network resilience, while continuing to deliver safe, reliable and cost-effective transmission services to our customers.
- Powerlink has completed one augmentation and 12 reinvestment projects since the publication of the 2025 TAPR.
- Powerlink continues to support the development of all types of energy projects requiring connection to the transmission network in Queensland.
- Three connection projects were completed, enabling an additional 973 megawatts (MW) of generation.
- Additionally, four standalone BESS connections have been completed since publication of the 2025 TAPR, adding 4,063 megawatt hours (MWh) of storage capacity to the network.
- The status of projects reported in this chapter is as at 30 September 2026.

10.1 Connection works

Table 10.1 lists connection works commissioned since the 2025 TAPR was published.

Table 10.1 Commissioned connection works since October 2025

Project (1) (2)	Purpose	Zone	Date commissioned (3)
Kidston Pumped Storage Hydro	New PHES	Ross	Quarter 2 FY2026
Swanbank BESS	New BESS	Moreton	Quarter 2 FY2026
Supernode (South Pine) BESS 1 and 2	New BESS	Moreton	Quarter 3 FY2026
Woolooga BESS	New BESS	Wide Bay	Quarter 4 FY2026
Stanwell BESS	New BESS	Central West	Quarter 4 FY2026
Wambo Wind Farm Stage 2	New Wind Farm	South West	Quarter 3 FY2026
Broadsound Energy Park	New Hybrid Solar / BESS	Central West	Quarter 2 FY2026

Notes:

(1) When Powerlink constructs a new line or substation as a non-regulated customer connection (e.g. generator, renewable generator, mine or industrial development), the costs of acquiring easements, constructing and operating the transmission line and/or substation are paid for by the company making the connection request.

(2) Powerlink has completed the scope of works for this project. Remaining works associated with generation connection are being coordinated with the customer.

(3) Commissioning dates reflect the financial year quarter in which they occurred.

(4) Refer to the 'Generation Commitments' sheet of the Chapter 9 Network Capability and Performance Data Workbook for information on the available MW capacity of generators connected or committed to be connected to Powerlink's transmission network.

Table 10.2 lists new transmission connection works for generating systems that are committed and under construction as at October 2026. These connection projects resulted from agreements reached with relevant connected customers, generators or Distribution Network Service Providers (DNSPs) as applicable.

Table 10.2 Committed and under construction connection works as at October 2026

Project (1) (2)	Purpose	Zone	Proposed commissioning date (3)
Lotus Creek Wind Farm	New Wind Farm	Central West	Quarter 3 FY2027
Boulder Creek Wind Farm	New Wind Farm	Central West	Quarter 1 FY2028
Punchs Creek Solar Farm	New Solar Farm	Bulli	Quarter 1 FY2029
Yabulu BESS	New BESS	Ross	Quarter 1 FY2028
Gawara Baya	New Hybrid Wind / BESS	Ross	Quarter 1 FY2029
Ganymirra Solar Power Station	New Hybrid Solar / BESS	Ross	Quarter 2 FY2029
Majors Creek Solar Power Station	New Hybrid Solar / BESS	Ross	Quarter 2 FY2029
Smoky Creek Solar Power Station	New Hybrid Solar / BESS	Central West	Quarter 4 FY2028
Guthrie's Gap Solar Power Station	New Hybrid Solar / BESS	Central West	Quarter 4 FY2028
Fraser Coast Solar Park	New Hybrid Solar / BESS	Wide Bay	Quarter 1 FY2028
Lower Wonga Hybrid	New Hybrid Solar / BESS	Wide Bay	Quarter 2 FY2028
Supernode BESS Stage 3	New BESS	Moreton	Quarter 1 FY2028
Tangkam BESS	New BESS	South West	Quarter 4 FY2027
Teebar BESS	New BESS	Wide Bay	Quarter 2 FY2028

Notes:

(1) When Powerlink constructs a new line or substation as a non-regulated customer connection (e.g. generator, renewable generator, industrial development or mine), the costs of acquiring easements, constructing and operating the transmission line and/or substation are paid for by the company making the connection request.

(2) Refer to the 'Generation Commitments' sheet of the Chapter 9 Network Capability and Performance Data Workbook for information on the available MW capacity of generators connected or committed to be connected to Powerlink's transmission network.

(3) Proposed commissioning dates reflect the financial year quarter in which projects are anticipated to be commissioned at the time of 2026 TAPR publication.

10.2 Network developments

Table 10.3 lists network developments that have been commissioned since October 2025.

Table 10.3 Commissioned network developments since October 2025

Project	Purpose	Zone	Date commissioned
Establishment of a 3rd 275kV connection into Woree	Maintain supply reliability in the Far North zone	Far North	January 2026

10.3 Network reinvestments

Table 10.4 lists network reinvestments commissioned since the 2025 TAPR was published.

10. Recently commissioned and committed network developments

Table 10.4 Commissioned network reinvestments since October 2025

Project	Purpose	Zone	Date commissioned
Cairns secondary systems replacement	Maintain supply reliability in the Far North zone	Far North	June 2026
Line refit works on the 275kV transmission lines between Chalumbin and Woree substations (section between Davies Creek and Bayview Heights)	Maintain supply reliability to the Far North and Ross zones	Far North	November 2025
Woree secondary systems replacement	Maintain supply reliability in the Far North zone	Far North	February 2026
Line refit works on the 132kV transmission line between Townsville South and Clare South substations	Maintain supply reliability in the Ross zone	Ross	March 2026
Nebo 132/11kV transformers replacement	Maintain supply reliability in the North zone	North	January 2026
Line refit works on the 132kV transmission line between Eton tee and Alligator Creek substations	Maintain supply reliability in the North zone (1)	North	September 2026
Blackwater 66kV current transformer and voltage transformer replacement	Maintain supply reliability in the Central West zone (1)	Central West	August 2025
Dysart 132/66kV transformers replacement	Maintain supply reliability in the Central West zone (1)(2)	Central West	May 2025
Egans Hill secondary systems replacement	Maintain supply reliability in the Gladstone zone	Gladstone	August 2025
Belmont 11kV underground cable and transformers replacement	Maintain supply reliability in the Moreton zone	Moreton	July 2026
Redbank Plains 110/11kV transformers and selected primary plant replacement	Maintain supply reliability in the Moreton zone	Moreton	August 2026
Sumner 110kV secondary systems replacement	Maintain reliability in the Moreton zone	Moreton	January 2026

Notes:

(1) Project Commissioning Notice issued subsequent to 2025 TAPR publication.

(2) Project identified under the RIT-T transitional arrangements in place for committed projects between 18 September 2017 and 30 January 2018.

Table 10.5 lists network reinvestments which are committed as at October 2026.

10. Recently commissioned and committed network developments

Table 10.5 Committed network reinvestments as at October 2026

Project	Purpose	Zone	Proposed commissioning date
Chalumbin secondary systems replacement	Maintain supply reliability in the Far North zone	Far North	July 2027
Structural replacement of two transmission towers between Chalumbin and Turkinje	Maintain supply reliability in the Far North zone	Far North	December 2026
Innisfail 132kV secondary systems replacement	Maintain supply reliability in the Far North zone	Far North	June 2027
Garbutt configuration change	Maintain supply reliability in the Ross zone	Ross	December 2026
Ingham South Substation reinvestment	Maintain supply reliability in the Ross zone	Ross	November 2028
Townsville South secondary systems replacement Stage 1	Maintain supply reliability in the Ross zone	Ross	December 2027
Townsville South 132kV primary plant replacement	Maintain supply reliability in the Ross zone	Ross	December 2027
Ross 132kV primary plant replacement	Maintain supply reliability in the Ross zone	Ross	December 2027
Ross 275kV primary plant replacement	Maintain supply reliability in the Ross zone	Ross	December 2027
Current transformer replacements Northern Region	Maintain supply reliability in the Far North, Ross and North zones	Far North, Ross and North	December 2026
Blackwater 132/66kV transformers replacement	Maintain supply reliability in the Central West zone	Central West	October 2027
Lilyvale 275kV and 132kV primary plant replacement	Maintain supply reliability in the Central West zone (1)	Central West	June 2027
Gladstone South secondary systems replacement	Maintain supply reliability in the Gladstone zone	Gladstone	October 2027
QAL West secondary systems replacement	Maintain supply reliability in the Gladstone zone	Gladstone	October 2027
Current transformer replacements Central Region	Maintain supply reliability in the Central West and Gladstone zones	Central West and Gladstone	June 2027
Current transformer replacement Surat area	Maintain supply reliability in the Surat, Bulli and South West zones	Surat, Bulli and South West	June 2029
Tangkam 110kV secondary systems replacement	Maintain supply reliability in the South West zone	South West	August 2027
Mt England 275kV secondary systems replacement	Maintain supply reliability in the Moreton zone	Moreton	December 2026
Current transformer replacements Metropolitan area	Maintain supply reliability in the Moreton zone	Moreton	December 2028
Phasor measurement units installation program Tranche 1	Maintain supply reliability in the Queensland network	N/A	October 2026
Phasor measurement units installation program Tranche 2	Maintain supply reliability in the Queensland network	N/A	December 2026
Phasor measurement units installation program Tranche 3	Maintain supply reliability in the Queensland network	N/A	June 2027
Direct current battery replacement program 2026	Maintain supply reliability in the Queensland transmission network	N/A	December 2026
Direct current battery replacement program 2026/27	Maintain supply reliability in the Queensland transmission network	N/A	June 2027

Note:

(1) Project identified under the RIT-T transitional arrangements in place for committed projects between 18 September 2017 and 30 January 2018.

10.4 Uncommitted network investments

Table 10.6 lists network investments which have undergone the Regulatory Investment Test for Transmission (RIT-T) or Priority Transmission Investment process and are not fully committed as at October 2026.

Table 10.6 Uncommitted network investments as at October 2026

Project	Purpose	Zone	Proposed commissioning date
Rebuild the 132kV transmission line between Woree and Kamerunga substations	Maintain supply reliability in the Far North zone	Far North	December 2030
Establish greenfield Air Insulated Switchgear substation at Kamerunga Substation	Maintain supply reliability in the Far North zone	Far North	December 2030
Kemmis 132/66kV transformer replacement	Maintain supply reliability in the North zone (1)	North	October 2028
Central Queensland synchronous condensers	Maintain supply reliability in the Gladstone and Central West zones (2)	Gladstone and Central West	March 2029 (3)
Tarong 275/66kV transformers and selected primary plant replacement	Maintain supply reliability in the South West zone (1)	South West	June 2028
Chinchilla 132kV primary plant and secondary systems replacement	Maintain supply reliability in the South West zone (1)	South West	July 2028
Tennyson 110/33kV transformer replacement	Maintain reliability in the Moreton zone	Moreton	October 2027

Notes:

(1) Capital expenditure in relation to network asset replacement.

(2) Capital expenditure in relation to system services.

(3) Refer to Powerlink's draft Material Change in Circumstances Assessment, which confirms the near-term need for synchronous condensers in Central Queensland by 2029, remains unchanged.

10.5 The Gladstone Project

Table 10.7 lists the status of Stages 1 and 2 of the Gladstone Project as at October 2026.

Table 10.7 Gladstone Project Status

Project	Purpose	Zone	Proposed commissioning date	Status
Gladstone Project Stage 1: Calvale to Calliope River Transmission Line Project	Maintain reliability of supply in the Gladstone and Central West zones	Gladstone and Central West	March 2029	Committed
Gladstone Project Stage 2: Gladstone West Substation and Boulderombe to Gladstone West Transmission Line	Maintain reliability of supply in the Gladstone and Central West zones	Gladstone and Central West	June 2029 for Gladstone West Substation August 2030 for Boulderombe to Gladstone West Transmission Line	Powerlink has received the direction to construct Stage 2 of the Gladstone Project under the PTI framework. The project will achieve committed status when planning and environmental approvals are completed

See Section 7.3.2 for further information on the Gladstone Project.

10.6 Asset retirement works

Table 10.8 lists completed asset retirement works since the 2025 TAPR was published.

Table 10.8 Completed asset retirements since October 2025

Project	Purpose	Zone	Retirement date
Tarong 275/132kV transformers retirement	Removal of assets at the end of technical life	South West	June 2026

Note:

(1) Following retirement of the Tarong 275/132kV transformers, the associated 132kV network has been reconfigured, with Chinchilla Substation transformer ended from Columboola Substation. The remaining 132kV transmission line between Diamondy and Chinchilla is mothballed, with its longer-term treatment to be determined as part of future network planning.

Table 10.9 lists asset retirement works as at October 2026.

Table 10.9 Asset retirement works as at October 2026 (1)

Project	Purpose	Zone	Proposed retirement date
132kV transmission line retirement between Woree and Kamerunga substations	Removal of asset at the end of technical life	Far North	June 2032
Cairns 132/22kV Transformer 4 retirement	Removal of asset at the end of technical life	Far North	December 2027
Lilyvale 132/66kV transformer retirement	Removal of asset at the end of technical life	Central West	December 2027

Note:

(1) Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Appendices

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Appendix A Planning responsibilities, criteria and processes

This appendix provides an overview of Powerlink's planning criteria, responsibilities and processes.

A.1 Powerlink's asset planning criteria

The Queensland Government amended Powerlink's N-1 criterion in 2014 to allow for increased flexibility. The planning standard permits Powerlink to plan and develop the transmission network on the basis that load may be interrupted during a single network contingency event. The following limits are placed on the maximum load and energy that may be at risk of not being supplied during a critical contingency:

- will not exceed 50 megawatts at any one time
- will not be more than 600 megawatt hours in aggregate.

The risk limits can be varied by:

- a connection or other agreement made by the transmission entity with a person who receives or wishes to receive transmission services, in relation to those services, or
- agreement with the Queensland Energy Regulator.

Powerlink is required to implement appropriate network or non-network solutions in circumstances where the limits set out above are exceeded or when the probability weighted economic cost of load at risk of not being supplied justifies the cost of the investment. Therefore, the planning standard has the effect of deferring or reducing the extent of investment in network or non-network solutions required. Powerlink will continue to maintain and operate our transmission network to maximise reliability to customers.

Powerlink's transmission network planning and development responsibilities include developing recommendations to address emerging network limitations, including the risks arising from ageing network assets remaining in-service. These responsibilities also extend to joint planning with other Network Service Providers (NSPs) to determine the most cost-effective solution regardless of the asset boundaries.

Energex and Ergon Energy (part of the Energy Queensland Group) are the two major Distribution Network Service Providers (DNSPs) in Queensland and were issued amended Distribution Authorities from July 2014. The service levels defined in the Distribution Authorities differ from those defined in Powerlink's authority. Joint planning accommodates these different planning standards by applying the most limiting planning standard to limitations that emerge on a supply network[1] during a contingency event.

Powerlink has established policy frameworks and methodologies to support its planning standard. These are being applied in various parts of the Powerlink network where possible emerging limitations are being monitored.

A.2 Planning processes

Powerlink has obligations that govern how it should address forecast network limitations. These obligations are prescribed by the *Electricity Act 1994* (Electricity Act), the National Electricity Rules (NER) and Powerlink's Transmission Authority.

Section 34(2) of the Electricity Act requires that Powerlink ensure as far as technically and economically practicable, that the transmission grid is operated with enough capacity (and if necessary, augmented or extended to provide enough capacity) to provide network services to persons authorised to connect to the grid or take electricity from the grid.

It is a condition of Powerlink's Transmission Authority that we meet licence and NER requirements relating to technical performance standards during intact and contingency conditions. The NER sets out minimum performance requirements of the network and connections and requires that reliability standards at each connection point be included in the relevant connection agreement.

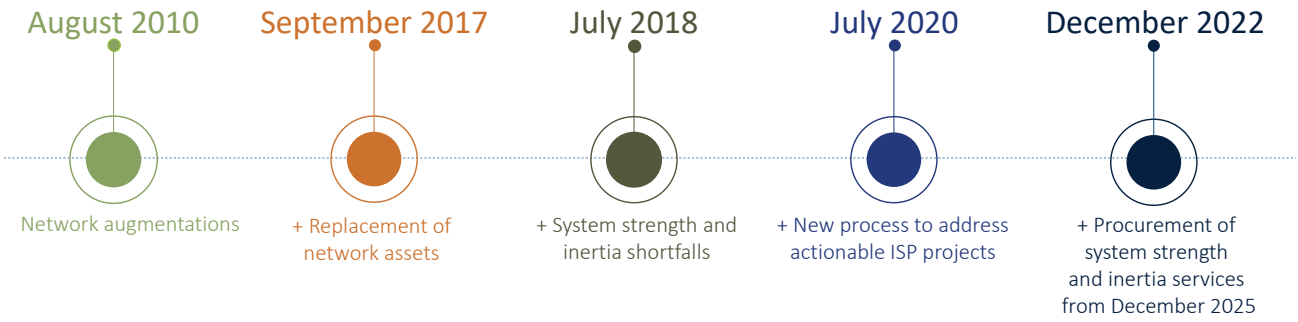
The requirements for initiating solutions to meet forecast network limitations, procurement of system strength or inertia services, or the need to address the risks arising from ageing network assets remaining in-service, including new regulated network developments or non-network solutions, are set out in the NER. Planning processes require consultation with Australian Energy Market Operator (AEMO), Registered Participants and interested parties, including customers, generators, DNSPs and other Transmission Network Service Providers (TNSPs).

[1] A supply network is a system, or part of a system, of electric lines, substations and associated equipment, other than a transmission grid, for distributing electricity to customers, whether or not generating plant is connected to it; see *Electricity Act 1994*, Section 8.

New network developments and reinvestments are proposed to meet these legislative and NER obligations. Each of these clauses prescribes a slightly different consultation process. The Regulatory Investment Test for Transmission (RIT-T) is the most common NER consultation process undertaken by Powerlink. Powerlink continues to publish information and consult with potential providers of non-network solutions for the provision of system security service needs as forecasted by AEMO.

Since the RIT-T process commenced in 2010, the requirements to call for proposals for transmission investments over the RIT-T cost threshold (currently $8 million) have extended from augmentations to the network to address a range of other transmission investment needs, including for system strength and inertia services.

Figure A.1 Expansion of the application of the RIT-T for proposed transmission network investments



The majority of RIT-T consultations undertaken by Powerlink relate to projects that are not actionable Integrated System Plan (ISP) projects.

Figure A.2 RIT-T consultation process for projects that are not actionable ISP projects



A.3 Integrated planning of the shared network

Significant inputs to Powerlink's network planning process are the:

- forecast of customer electricity demand, including demand side management (DSM), and its location
- location, capacity and arrangement of existing, new and retiring generation (including embedded generation)
- condition and performance of assets and an assessment of risks arising from ageing network assets remaining in-service
- assessment of future network capacity to meet the required planning criteria and efficient market outcomes, including system strength and the potential to facilitate future storage requirements to firm intermittent renewable generation and help address minimum demand.

Powerlink uses 10-year forecasts of electrical demand and energy across Queensland, together with forecast generation patterns, to determine potential flows on transmission network elements. The location and capacity of existing, retiring and committed generation in Queensland is sourced from AEMO, unless modified following advice from relevant market participants. Information about existing and committed embedded generation and demand management within distribution networks is provided by DNSPs and AEMO.

Powerlink examines the capability of its existing network and the future capability following any changes resulting from:

- committed network projects (for both augmentation and to address the risks arising from ageing network assets remaining in-service)
- the impact of generation retirements on transmission network power flows, system strength and reactive power capability
- existing and future generation developments
- variances in Powerlink's operating environment or changes in technical characteristics such as minimum demand, inertia and system strength.

This includes consultation with the relevant DNSP in situations where the performance of the transmission network may impact on, or be impacted by, the distribution network, such as where the two networks operate in parallel.

Where potential flows could exceed network capability, Powerlink notifies market participants of these forecast emerging network limitations. If the capability violation exceeds the required reliability standard, joint planning investigations are carried out with DNSPs (or other TNSPs if relevant) in accordance with the NER. The objective of this joint planning is to identify the most cost-effective solution, regardless of asset boundaries, including potential non-network solutions.

Powerlink maintains its network to manage risks associated with asset condition and performance. A program of asset condition assessments helps identify emerging risks.

As assets approach the end of their technical service life, Powerlink evaluates a range of reinvestment strategies, using a flexible, integrated approach. This considers network topography and capacity, current and future needs, including future generation developments, electrification and emerging industries.

Changing power system flows and patterns require ongoing reassessment of network capacity. Reinvestment decisions are made in context – not in isolation or on a like-for-like basis. Strategies reflect enduring need, the role of transmission in the energy system and the interconnected nature of the high voltage (HV) system across regions or corridors. Non-network solutions are also considered as part of this integrated planning.

By combining asset condition, demand limitations and energy transition goals, Powerlink delivers cost-effective solutions that support reliability and address risks from aging infrastructure.

The planning process includes evaluating a broad range of options, as outlined in Table A.1, and considers future capacity needs and opportunities to adopt new, cost-effective and technically feasible technologies.

Table A.1 Examples of planning options

Option	Description
Non-network alternatives	Non-network solutions are not limited to but may include network support and system services from existing and/or new generation, DSM initiatives (either from individual providers or aggregators), and other forms of technologies (such as battery installations). These solutions may reduce, negate or defer the need for network investments.
Network reconfiguration	The assessment of future network requirements may identify the reconfiguration of existing assets as the most economical option. This may involve asset retirement coupled with the installation of plant or equipment at an alternative location that offers a lower cost substitute for the required network functionality.
Asset de-rating or retirement	May include strategies to de-rate, decommission and/or demolish an asset and is considered in cases where needs have diminished in order to achieve long-term economic benefits.
Augmentation	Increases the capacity of the existing transmission network; for example, the establishment of a new substation, installation of additional plant at existing substations or construction of new transmission lines. This is driven by the need to meet prevailing network limitations and customer supply requirements, or where there may be net economic benefits to customers.
System Services	The assessment of future network requirements to meet overall power system performance standards and support the secure operation of the power system. This includes the provision of system strength, inertia and reactive power services.
Reinvestment	Asset reinvestment planning ensures that existing network assets are assessed for their enduring network requirements in a manner that is economic, safe and reliable. This may result in like-for-like replacement, network reconfiguration, asset retirement, line refit or replacement with an asset of lower capacity. Condition and risk assessment of individual components may also result in the staged replacement of an asset where it is technically and economically feasible.
Line Refit	Powerlink utilises a line refit strategy to extend the service life of a transmission line and provide cost benefits through the deferral of future transmission line rebuilds. Line refit may include structural repairs, foundation works, replacement of line components and hardware, abrasive blasting and painting.
Transformer Life Extension	Powerlink utilises a transformer life extension strategy to extend the service life of a transformer to provide cost benefits through the deferral of the timing for a future transformer replacement. Transformer life extension may include replacement of components such as high voltage bushings, tap changers and instruments, addressing sources of oil leaks such as replacement of gaskets and main lid sealing, replacement of transformer oil, and addressing radiator corrosion.
Operational measures	Network constraints may be managed during specific periods using short-term operational measures; for example, switching of transmission lines or redispatch of generation in order to defer or negate network investment.

A.4 Powerlink's reinvestment criteria

Powerlink is committed to ensuring the sustainable long-term performance of its assets to deliver safe, reliable and cost-effective transmission services to customers, stakeholders and communities across Queensland. Powerlink demonstrates this by adopting a proactive approach to asset management that optimises whole of life cycle costs, benefits and risks, while ensuring compliance with applicable legislation, regulations, standards, statutory requirements, and other relevant instruments.

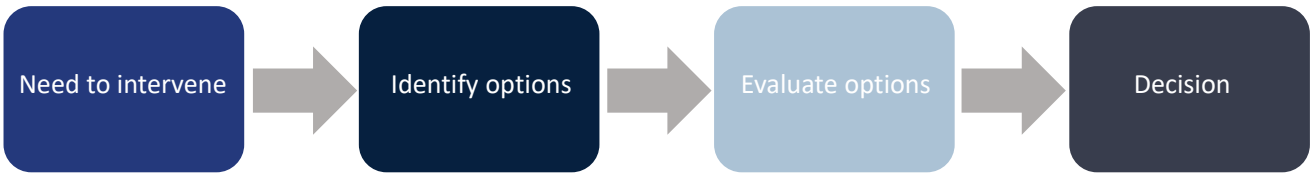
A.4.1 Reinvestment criteria framework

The reinvestment criteria framework defines the methodology that Powerlink uses to assess the need and timing for intervention on network assets to ensure industry compliance obligations are met. The methodology aims to improve transparency and consistency within the asset reinvestment process, enabling Powerlink's customers and stakeholders to better understand the criteria to determine the need and timing for asset intervention. The reinvestment criteria framework is relevant where the asset condition changes so it no longer meets its level of service or complies with a regulatory requirement.

The trigger to intervene needs to be identified early enough to provide an appropriate lead time for the asset reinvestment planning and assessment process. The need and timing for intervention is defined when business as usual activities (including routine inspections, minor condition based and corrective maintenance and operational refurbishment projects) no longer enable the network asset to meet prescribed standards of service due to deteriorated asset condition.

Powerlink's asset reinvestment process (refer to Figure A.3) enables timely, informed and prudent investment decisions to be made that consider all economically and technically feasible options including non-network alternatives or opportunities to remove assets where they are no longer required. An assessment of the need and timing for intervention is the first stage of this process.

Figure A.3 Asset Reinvestment Process



A.4.2 Asset Reinvestment Review

In 2023 Powerlink completed a review of its approach to network asset reinvestment, with a focus on overhead transmission lines, to ensure consistency with contemporary asset management and risk-based decision frameworks. In particular, the review considered Powerlink's approach to line refit work that aims to achieve a life extension of a nominal 15 years across an entire asset, bundled in a single upfront intervention.

The Asset Reinvestment Review Working Group was established to ensure customers and the Australian Energy Regulator were actively involved in the review and its recommendations. The Asset Reinvestment Review Working Group Report was published in May 2023. A key recommendation in the report was for Powerlink to model existing and alternative bundling approaches for future transmission line refit investment decisions, and to progress the most cost-effective solution based on detailed condition and cost information, while allowing for developing network needs. It was also recommended that compliance works are only undertaken on structures where condition-based work is to be performed, and that Powerlink retain the existing asset definition for transmission lines.

Powerlink's implementation of outcomes of the review is outlined in chapters 6 to 8.

Appendix B Powering data centres - A guide to Queensland grid integration

The purpose of this appendix is to help prospective data centre developers make informed decisions during the early stages of project development, including site selection, connection pathways, and key technical and planning considerations. It provides practical guidance on connecting large-scale data centre load to Queensland's transmission network and highlights information that can support a more efficient connection assessment process.

All developers seeking to connect to the transmission network are required to follow the connection process prescribed under Chapter 5 of the National Electricity Rules (NER). This appendix does not replace or modify the requirements of the NER. Rather, it is intended to assist developers in understanding the connection process, the information required at each stage, and opportunities to engage early with Powerlink to help facilitate a more efficient connection process.

B.1 General advice

One of the factors that can have the greatest influence on the efficient progression of a connection project is the experience level of the technical advisers engaged by the proponent. Data centre developers are encouraged to engage suitably qualified power system engineers with experience in the National Electricity Market (NEM), and preferably with an understanding of Queensland's power system and the Powerlink transmission network.

Experienced advisers can assist developers in navigating the connection process, developing realistic connection strategies, and undertaking the technical studies required to support a connection application. Early identification of potential network constraints, technical issues, or compliance requirements can reduce the risk of costly redesigns and project delays later in the development process.

Consultants with a strong understanding of transmission network planning, system strength, power system security, and local network conditions can also assist developers in identifying suitable connection locations and in assessing the relative advantages and challenges of different connection options. This can help streamline the connection process and improve project outcomes.

B.2 Important upfront information

Providing comprehensive information to Powerlink as early as possible in the connection process enables more effective early engagement and assessment. Early information sharing can help identify potential technical, regulatory, or network-related constraints, allowing issues to be addressed before they affect project timelines. The key information that supports an efficient and informed assessment is outlined below.

B.2.1 Proposed data centre substation layout

A single-line diagram showing the proposed customer electrical system behind the connection point, including the major plant and equipment to be installed, should be provided. This enables Powerlink to better understand the intended network configuration and assess any connection-related technical considerations at an early stage. Understanding the type and characteristics of the proposed plant also allows Powerlink to provide more targeted advice on connection requirements, technical studies, and the overall connection process.

The customer should identify any credible common-mode failures within the data centre that could cause a large and sudden loss of load and describe the proposed approach for managing this risk. This should include relevant design, protection, operational and load-recovery measures. For example, a loss of a common auxiliary supply, cooling system, control system, busbar section, or transformer could result in a large proportion of the data centre load disconnecting simultaneously. Where such events are credible, developers should outline how the facility has been designed to minimise the amount of load that can be lost from a single failure and how demand would be restored in a controlled manner following the event.

B.2.2 Load forecast and profiles

A key aspect of the connection assessment is determining whether the proposed demand can be supplied using existing network capacity or whether network augmentation will be required. To support this assessment, developers should provide detailed forecasts of the data centre's demand and energy requirements, including proposed staging and commissioning timelines.

Understanding when demand is expected to materialise is critical. Information on whether the full load is required from the outset or will be progressively deployed over time enables Powerlink to assess the ability of the network to reliably supply the required capacity and identify any augmentation, investment, or operational measures that may be necessary to support the connection.

For each increment in the load forecast, it is also important to understand the expected daily load profile. Network planning assessments consider a range of system operating conditions that can occur throughout the day. These conditions are influenced by factors such as generator dispatch, renewable energy output and network outages. Understanding the expected demand profile enables Powerlink to assess network capability under these varying operating conditions and identify any potential constraints or connection requirements.

Where limitations are identified it is important to understand whether the load must be supplied continuously or can be managed with some level of operational flexibility.

B.3 Location matters

B.3.1 Proximity to generation

Data centres are generally advantaged when located in areas with strong access to existing and future generation resources. Connecting demand closer to generation can reduce power transfer requirements across the transmission network, helping to alleviate congestion, improve access to available network capacity, and potentially accelerate connection timeframes. This can also increase speed to market whilst reducing the need for network augmentation, lower overall system costs, and minimise the social and environmental impacts associated with additional network infrastructure.

Connection locations with strong network interconnection are also advantageous. Substations that are connected to multiple transmission pathways can provide access to a broader range of generation sources and may offer greater flexibility in meeting the connection's power requirements.

Powerlink's Transmission Annual Planning Report (TAPR), TAPR Portal, and other publicly available information sources can assist developers in identifying existing, committed, and anticipated generation developments when considering potential connection locations.

B.3.2 Network capacity and location considerations

Available transmission network capacity is not a fixed value and can be difficult to quantify using simple metrics. Network capability varies over time due to changing generation dispatch patterns, demand levels, network outages, and weather conditions. As a result, the amount of additional load that can be accommodated at a particular location can differ significantly between operating scenarios.

Detailed power system modelling provides developers with information on the capability of the network to support a proposed data centre connection and determine whether any network augmentation may be required.

To assist developers with their preliminary site selection activities, Powerlink publishes a range of planning information, including the TAPR and the TAPR Portal. Powerlink will also be providing feeder flow time-series data through the TAPR Portal, giving developers greater insight into transmission line utilisation and network loading patterns across the system.

When evaluating potential connection locations, developers should engage with experienced consultants who can provide market modelling advice on likely generation output and potential congestion over time. Locations with strong access to generation and a well-developed transmission network may offer connection advantages, while substations connected through multiple transmission feeders and supply pathways may provide greater operational flexibility and a broader range of potential connection configurations. These factors can materially influence connection feasibility, costs and the need for future network augmentation, subject to available network capacity and detailed assessment.

B.4 Connection arrangement

B.4.1 Proposed connection point

Large-scale loads will generally require a direct connection to a Powerlink substation. Connection locations that are well interconnected to the broader transmission network are often advantageous, as they can provide access to multiple supply pathways and improve supply flexibility.

As part of the early engagement process, developers should nominate their preferred connection point to enable an initial assessment of network capability and connection feasibility.

Substation configuration can also affect connection outcomes. Substations with spare bay capacity may offer a simpler and potentially faster connection pathway, while locations requiring significant substation modifications or expansion works are likely to involve additional complexity, cost, and delivery time.

B.4.2 Suitable voltage level

Selecting an appropriate connection voltage is a key consideration for large load developments. The most suitable voltage will depend on the load's size and characteristics, available network capacity, connection costs and anticipated future growth.

As a general guide, Powerlink encourages loads greater than approximately 300MW to connect to the 275kV transmission network. Loads below 300MW may be suitable for connection at 132 or 110kV. Smaller loads, particularly those below approximately 100MW, may also have opportunities to connect to the Energy Queensland distribution network. All connection options remain subject to network capability and applicable connection requirements.

Developers should consider both the initial and longer-term implications of the connection voltage. While a lower-voltage connection may reduce initial connection costs, it may also consume available capacity, bring forward network constraints or require additional transformation capacity as the load grows. A higher-voltage connection may provide greater capacity and scalability for large or expanding loads.

The preferred connection voltage should therefore provide the most efficient overall solution, balancing cost, network impacts, available capacity and future development requirements.

B.4.3 Reliability requirements

Developers should clearly communicate their reliability requirements as part of the early engagement and connection assessment process. This information assists Powerlink in determining the appropriate connection configuration and identifying any reliability or network augmentation requirements.

Unless otherwise agreed, the default transmission connection arrangement will typically be designed to satisfy N-1 reliability criteria, such that the loss of a single network element does not result in an interruption to supply.

Where a proponent is willing to accept a lower level of reliability, this should be explicitly identified during the connection process. In some circumstances, accepting a reduced reliability standard may provide additional flexibility in connection design, reduce infrastructure requirements, or improve connection timeframes. However, the appropriateness of such arrangements will be assessed on a case-by-case basis.

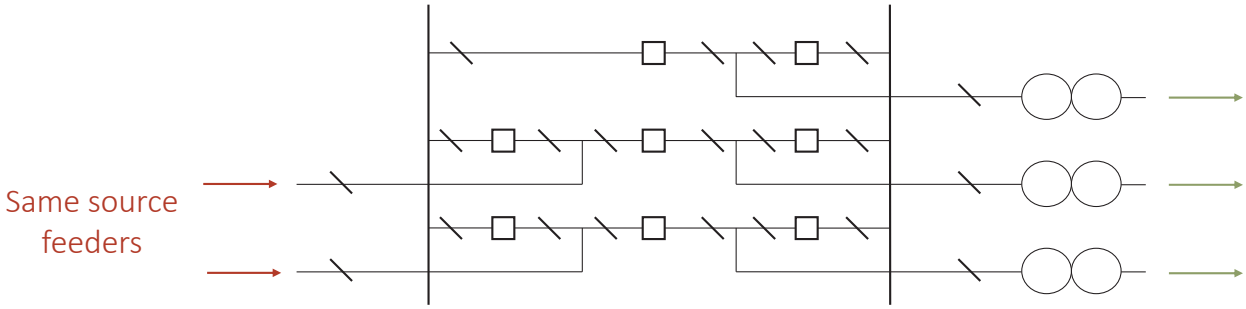
B.4.4 Number of feeders and substation diameters required for load size

Power system security considerations can influence the maximum load that can be supplied via a single feeder or connection point. Large, sudden changes in demand as a result of a credible contingency can result in significant system impacts. Therefore, the size and configuration of the connection must be assessed as part of the connection process.

As a general guide, loads in excess of approximately 500MW on a single feeder may warrant additional assessment, although the acceptable limit will depend on the characteristics of the network, local system conditions, the location of the connection and the impact on the mechanism to manage power-system security.

The design of the connection arrangement should also consider N-1 contingency conditions. Following the loss of a feeder, the remaining connection infrastructure must be capable of supplying the load without creating unacceptable power system security risks. For example, a 1,000MW data centre would generally require more than two feeders as the loss of one feeder would result in the full 1,000MW load being transferred onto the remaining feeder. This would generally be unacceptable, unless the load is flexible and contracted to reduce post-contingent to an acceptable level. As illustrated in Figure B.1, a 1,000MW load that is not flexible may require the demand to be distributed across multiple feeders and diameters. This helps ensure that, following the loss of a single feeder or other credible contingency, the remaining feeder is not required to carry load in excess of 500MW. By spreading demand across multiple supply feeders, the connection can better satisfy power system security and reliability requirements while reducing the risk of losing a large load under a single contingency.

Figure B.1 Typical 1½ CB (Breaker and a Half) bus configuration – radial supply



Connection arrangements should also consider substation reliability. To minimise the risk of a single substation busbar fault interrupting the entire load, feeders are typically expected to be supplied from separate busbar sections or diameters where practicable. This ensures that a single busbar-related contingency or circuit breaker fail event does not result in the loss of all supply to the data centre and supports compliance with reliability and security requirements.

The number of feeders and the configuration of those feeders will therefore depend on the size of the load, the required level of supply reliability, and the specific network conditions and substation arrangements at the proposed connection location.

B.4.5 Connection options

Data centre developers have several options when considering how to connect to the Queensland transmission network. The preferred option will depend on the size of the load, project timing, network capability, access to generation, and the proponent's operational requirements.

Early engagement with Powerlink is recommended to assess the viability of each connection approach. Powerlink's Network Configuration Document – Selection for New Substations – Framework, available from the Network Connections webpage, provides guidance on the preferred arrangements for new transmission-connected developments.

The document outlines the circumstances where a connection may be achieved through a cut-in to an existing transmission line versus a direct connection to an existing substation. The preferred solution is influenced by a range of factors, including the distance from existing substations, network configuration, reliability requirements, and the scale of the proposed connection.

Developers should review this framework during site selection and connection planning, as the chosen connection approach can have a significant impact on project costs, delivery timeframes, land requirements, and the extent of network infrastructure required to support the connection.

Early consideration of these factors can help identify suitable connection locations and reduce the risk of pursuing sites that may require more complex or costly network solutions.

Direct connection into substation

For large-scale data centre developments, the preferred connection option is typically a direct connection to an existing Powerlink transmission substation. This arrangement provides direct access to the transmission network and is generally best suited to large loads with long-term growth requirements.

Direct transmission connections can provide access to multiple supply pathways, support higher levels of reliability, and offer greater scalability as demand increases over time. They also enable more flexibility in connection design and can provide access to a broader range of generation sources across the transmission network.

Where suitable network capacity and substation infrastructure exist, a direct substation connection will often provide the most straightforward and robust long-term solution for large data centre developments. However, the suitability of a particular substation will depend on factors such as available network capacity, bay availability, reliability requirements, and the potential need for future network augmentation.

Cut into existing feeders

Creating a new connection by cutting into an existing transmission line and establishing a new substation is only feasible where the proposed arrangement satisfies the requirements outlined in Powerlink's Network Configuration Document. As a general principle, feeder cut-in substations (at 275kV) are typically only considered where an existing Powerlink substation is located more than 15km from the proposed connection point. This approach is consistent with the Network Configuration Framework, which seeks to balance connection efficiency, network reliability, and the long-term development of the transmission network.

The suitability of a feeder cut-in arrangement depends on a number of factors, including the distance from existing substations, network configuration, reliability requirements, and the impact of credible contingency events.

Powerlink will assess the impact of the proposed connection on network performance under both normal and contingency conditions. This includes consideration of bidirectional power flows, the transfer of power following a network outage, and the ability of the network to continue meeting reliability and security standards following the loss of a transmission line, transformer, or other network element.

Where a feeder cut-in arrangement cannot satisfy these requirements, a direct connection to an existing substation or an alternative network solution may be required.

Behind the meter

A data centre may also be co-located with a generating system or Battery Energy Storage System (BESS) and connect behind the generator's connection point. In this arrangement, some or all of the data centre's demand is supplied directly from the adjacent energy source rather than wholly through the transmission connection. Depending on the configuration, this approach may reduce the need for network infrastructure; however, it introduces additional technical, commercial, and regulatory considerations that need to be assessed. A grid forming BESS can also provide system strength further simplifying the connection analysis.

Each connection model presents different opportunities and constraints. Developers are encouraged to discuss potential connection arrangements with Powerlink during the early stages of project development to identify the most appropriate solution for their project objectives.

B.5 Connection process/timeline

Powerlink has developed services further to the Chapter 5 NER obligations to support developers to expedite suitable projects connecting to the Transmission Network.

Visit our website for further information on these processes.

B.5.1 Early engagement

Powerlink can undertake an early engagement assessment that is aimed at identifying any immediate challenges or red flags for the potential connection of a project. It is not an exhaustive assessment and is aimed at sanity checking a project's details before committing to a connection enquiry, and the associated fees.

There remains the potential for further connection challenges to be identified during the connection enquiry process, as early engagement does not cover all detailed studies that the enquiry process does. Including all information identified in Section B.2 of this document will assist in expediting and delivering the greatest value from the early engagement process.

B.5.2 Connection Enquiry

A Connection Enquiry is typically the first formal step in the Chapter 5A connection process under the NER. At this stage, it is important for developers to identify their preferred connection point to the Powerlink network, as the enquiry response will be based on the information provided in the submission.

The Connection Enquiry response provided to developers may provide information on:

- the network's ability to supply the requested load on a firm basis
- Where applicable, indicative system strength charges if system strength services are to be provided by Powerlink
- fault level information at the proposed connection location
- proposed connection arrangements and configuration options
- indicative operating and maintenance cost information associated with any required Dedicated Connection Assets, Dedicated Network Assets, or Identified User Shared Assets.

Where the network is unable to supply the full requested load on a firm basis, alternative connection arrangements may be available. In some circumstances, a staged or non-firm connection may be feasible until network augmentation can be completed. Such arrangements would typically require the customer to provide operational flexibility, including the ability to curtail load under defined network conditions or following specified contingencies.

Early identification of these requirements can assist developers in evaluating project timelines, connection costs, and the potential benefits of incorporating flexible operating capability into the data centre design.

B.5.3 Connection Application

As part of the process for establishing a new connection under Chapter 5.3 of NER, and following the submission of a Connection Enquiry, a proponent is required to lodge a Connection Application. A Connection Application is considered formally complete when it includes all information required under the NER and satisfies Australian Energy Market Operator's (AEMO) Connection Application Checklist. The typical package required from developers includes, but is not limited to:

- Customer Performance Standards (CPS) document
- Plant simulation models, model adequacy demonstration, user manuals, OEM documentation, and Releasable User Guides (RUGs)
- Benchmarking report demonstrating alignment between the submitted simulation models
- Power system study report, including sufficient supporting evidence to demonstrate compliance with each relevant CPS clause
- Single Line Diagram (SLD).

To support an efficient assessment process and minimise the time required to progress to an Offer to Connect, including completion of the Full Impact Assessment (FIA), CPS due diligence studies, and agreement of performance standards (including the issuance of the NER 5.3.4A letter), Powerlink's preferred approach is to stage the delivery of technical studies across the following three phases:

- Preliminary Design Package
- FIA Package
- Full Package.

However, the project proponent has the option to submit the Full Package as its initial submission. Alternatively, the Preliminary Design Package and FIA Package may be submitted together, should the proponent choose to do so.

Prior to commencing detailed studies, developers are strongly encouraged to engage with Powerlink and undertake sufficient high-level technical discussions to establish a common understanding of the proposed connection arrangement, study scope, modelling requirements, and assessment expectations.

B.6 Technical considerations

B.6.1 Customer Performance Standards

The NER require customer loads to comply with the performance requirements specified in Schedule 5.3 (S5.3). Under the NER, a load is classified as an Inverter-Based Load (IBL) where it is supplied through power electronic devices and may be susceptible to converter control instability.

As modern data centres typically incorporate significant power electronic equipment and inverter-based technologies, Powerlink considers it essential that their performance be assessed against the requirements of S5.3.

Accordingly, all data centre developers are required to develop, document and negotiate Customer Performance Standards (CPS) demonstrating compliance with all S5.3 clauses. The CPS and associated documentation should clearly describe the technical capability of the facility and demonstrate that the connection will not adversely impact the security, reliability or stability of the power system.

Developers should also be aware that the Australian Energy Market Commission (AEMC) is currently progressing the 'Improving the NEM Access Standards – Package 2' rule change process. The Draft Determination proposes several enhancements to the customer access standards in S5.3, including requirements relating to ride-through capability during frequency and voltage disturbances (S5.3.12 and S5.3.13), as well as instability monitoring and detection capability (S5.3.14).

Pending finalisation of the rule change process, Powerlink's current position is that data centre applicants should demonstrate compliance with the proposed draft requirements to the extent reasonably practicable, to support an efficient assessment process and minimise the risk of future redesign or remediation.

B.6.2 Inverter based load requirements

Powerlink's 'Technical Requirements for Inverter-Based Load Connections document, establishes the connection requirements applicable to IBLs, including data centre facilities. Applicants should refer to the latest version of the document when developing their connection application and supporting studies. The guideline provides additional detail on applicable technical requirements, performance standard expectations, modelling and simulation requirements, and the evidence required to demonstrate compliance with the NER and Powerlink's connection requirements.

B.6.3 System strength

Under the current system strength framework, IBLs are required to either provide a self-remediation solution to manage their system strength impact or elect to pay system strength charges to the relevant System Strength Service Provider (SSSP). During the Connection Enquiry stage, Powerlink will provide developers with information on the applicable system strength node, system strength locational factor and prevailing system strength unit price.

The framework requires technical assessments to evaluate the impact of the proposed connection on power system stability and system strength. Depending on the chosen compliance pathway, this may involve a Full Impact Assessment (FIA) in accordance with NER Clause 5.3.4B and the applicable System Strength Impact Assessment Guidelines, or a Stability Assessment. Both assessment types require detailed wide-area Power Systems Computer Aided Design (PSCAD) studies using an accurate PSCAD model of the proposed facility. Where an applicant elects to pay system strength charges, a Stability Assessment remains necessary to demonstrate that the facility can operate satisfactorily and maintain stable performance under the expected system conditions.

B.7 Operational considerations

B.7.1 Flexible vs Firm and associated benefits

Data centres that can provide demand flexibility by reducing or shifting load during periods of network congestion or system stress can deliver benefits to both the power system and the project. Flexible load capability can help defer or avoid network augmentation, improve utilisation of existing network infrastructure and potentially reduce the overall costs associated with supplying large loads.

For developers, demand flexibility may create opportunities to access connection arrangements that would otherwise require significant network investment or result in longer delivery timeframes. For the broader power system, flexibility can reduce the need for network augmentation and help minimise the costs that are ultimately recovered from all consumers through network charges.

Powerlink is currently developing a Flexible Load Framework aimed at recognising and valuing load flexibility which can reliably support network operations including helping to manage network congestion and improving overall network utilisation. The objective is to support more efficient use of existing infrastructure, reduce the need for augmentation, and place downward pressure on long-term electricity costs.

In parallel, policy and regulatory reforms are being considered across the NEM that may alter how augmentation costs are allocated to large transmission-connected loads. These reforms include consideration of mechanisms that would increase the extent to which developers fund the network investments required to support their connections, rather than recovering these costs from all network users.

Where the existing network cannot supply the full requested load on a firm basis, Powerlink may determine the maximum firm capacity available and assess whether additional load could be accommodated through a non-firm connection arrangement.

This approach may enable a project to proceed earlier than would otherwise be possible, with the non-firm component transitioning to firm supply once the required network augmentation is commissioned. Any such arrangement would need to clearly define the operating conditions under which load curtailment may be required, together with the associated risks, obligations, and performance requirements.

Data centre developers are encouraged to consider demand flexibility during the initial design phase of their projects. As network conditions, load forecasts, and connection requirements evolve over time, the ability to modulate demand may provide significant benefits to both the proponent and the broader power system.

The capability to reduce, shift, or temporarily curtail demand during periods of peak network utilisation or under defined operating conditions, may improve connection outcomes and reduce the need for network augmentation. This may become increasingly important where future regulatory frameworks may require large loads to bear a greater share of the costs associated with network investments needed to support their connection.

Developers that incorporate flexibility into their operational design from the outset may be better positioned to take advantage of these evolving frameworks while supporting more efficient development of the electricity system and potentially reducing overall connection and network-related costs.

B.7.2 Ramp rates

Developers should provide information on the expected ramp rates of the data centre, including how quickly demand may increase or decrease during normal operations and under foreseeable operating scenarios.

While data centres are often considered continuous loads, demand can vary over time depending on workload scheduling, commissioning activities, AI training cycles, cooling requirements, and operational practices. Understanding these characteristics assists Powerlink and AEMO in assessing the impact of the load on both the transmission network and the broader power system.

Large and rapid changes in demand can influence network loading, power system operation, generation dispatch, and market outcomes. As a result, developers may be requested to provide information on maximum expected ramp rates, load step changes, commissioning schedules, and the operational flexibility of the facility.

Data centres that can manage or limit demand ramp rates, either through operational controls or battery energy storage systems, may be better positioned to support efficient network and system operation while reducing potential impacts on other network users. It should be noted that regulatory requirements relating to load ramp rates are currently under consideration for inclusion in the NER.

B.8 Annual forecast updates

Under the NER, all transmission-connected customers are required to provide Powerlink with an updated 10-year demand and energy forecast each year. Powerlink will typically issue a formal request during the first quarter of each year seeking the latest forecast outlook. However, customers are encouraged to advise Powerlink of any material changes to their demand forecasts as soon as they become known, rather than waiting for the annual forecasting cycle.

Early engagement with Powerlink is particularly important where significant increases in demand are being considered. Capacity is not reserved on the transmission network and is continually reassessed based on the latest demand forecasts, network utilisation, and connection activity. Consequently, historic demand levels and demonstrated utilisation of existing capacity may influence future network planning assessments.

Where new network infrastructure is required, delivery timeframes can be substantial. Easement investigations, planning approvals, land acquisition, environmental assessments, procurement activities, and construction works can result in augmentation lead times of five years or more, depending on the scale and complexity of the project.

For this reason, developers are encouraged to provide timely updates on forecast demand growth and to consider opportunities to stage or flex demand where practical. Accurate forecasts and realistic deployment schedules are critical inputs to network planning, helping ensure that network investments are only progressed where there is a genuine and demonstrated need for additional capacity. This supports more efficient outcomes for both developers and electricity consumers while reducing the risk of project delays associated with network augmentation.

B.9 How to improve speed to market

B.9.1 Engage with Powerlink early

Project developers intending to connect to Powerlink's transmission network are encouraged to engage experienced power system consultants and commence discussions with Powerlink as early as possible. Early engagement can help identify suitable connection options, understand network and regulatory requirements, and highlight potential constraints before significant project commitments are made. This can improve the efficiency of the connection process and reduce the risk of avoidable delays later in project development. Initial contact with Powerlink can be made via the Powerlink Queensland **website**. A prospective project developer can leave brief information and contact details. A member of the Market Development team will respond to the enquiry. An initial conversation will take place to better understand the development aspirations and to outline expectations on progressing the project along the connection pathway.

If it is deemed the project may be viable to progress through the connection process, and the project developer wishes to seek further clarity or information, an Early Engagement Assessment may be recommended.

Further detail on this process is outlined via the Powerlink Queensland website.

B.9.2 Early and ongoing community engagement

Best-practice community engagement should be embedded throughout data centre project development and assessment to understand local priorities, identify and address potential social impacts, and build and maintain social licence in host communities. This is particularly important given large facilities require significant land, electricity, water and supporting infrastructure, and may create construction, traffic and noise impacts for surrounding communities. Experience demonstrates that early, transparent and ongoing engagement is critical to building trust, managing concerns and ensuring communities can meaningfully inform project planning and share in long-term benefits.

B.9.3 Prioritise connection pathways that support network and social licence outcomes

While speed to market is often a key project objective, experience has shown that the fastest connection outcomes are typically achieved through disciplined project selection and robust early planning. Connection pathways that are technically credible, minimise community and landholder impacts, enable efficient shared network investment, and avoid unnecessarily complex or bespoke arrangements are generally more straightforward to assess and deliver.

Projects that align with these principles have historically progressed through the connection process more efficiently and with lower overall project risk.

Appendix C Asset management overview

This appendix provides an overview of Powerlink's approach to asset management.

C.1 Introduction

Powerlink's Asset Management System forms part of Powerlink's Business Strategy, and is integral to managing and monitoring assets across the asset life cycle and captures key internal and external drivers and initiatives for the business.

Factors that influence network development, such as energy and demand forecasts, generation development, emerging industry trends and technology, and risks arising from the condition and performance of the existing asset base, are analysed collectively to support integrated network planning over a 10-year period.

C.2 Overview of approach to asset management

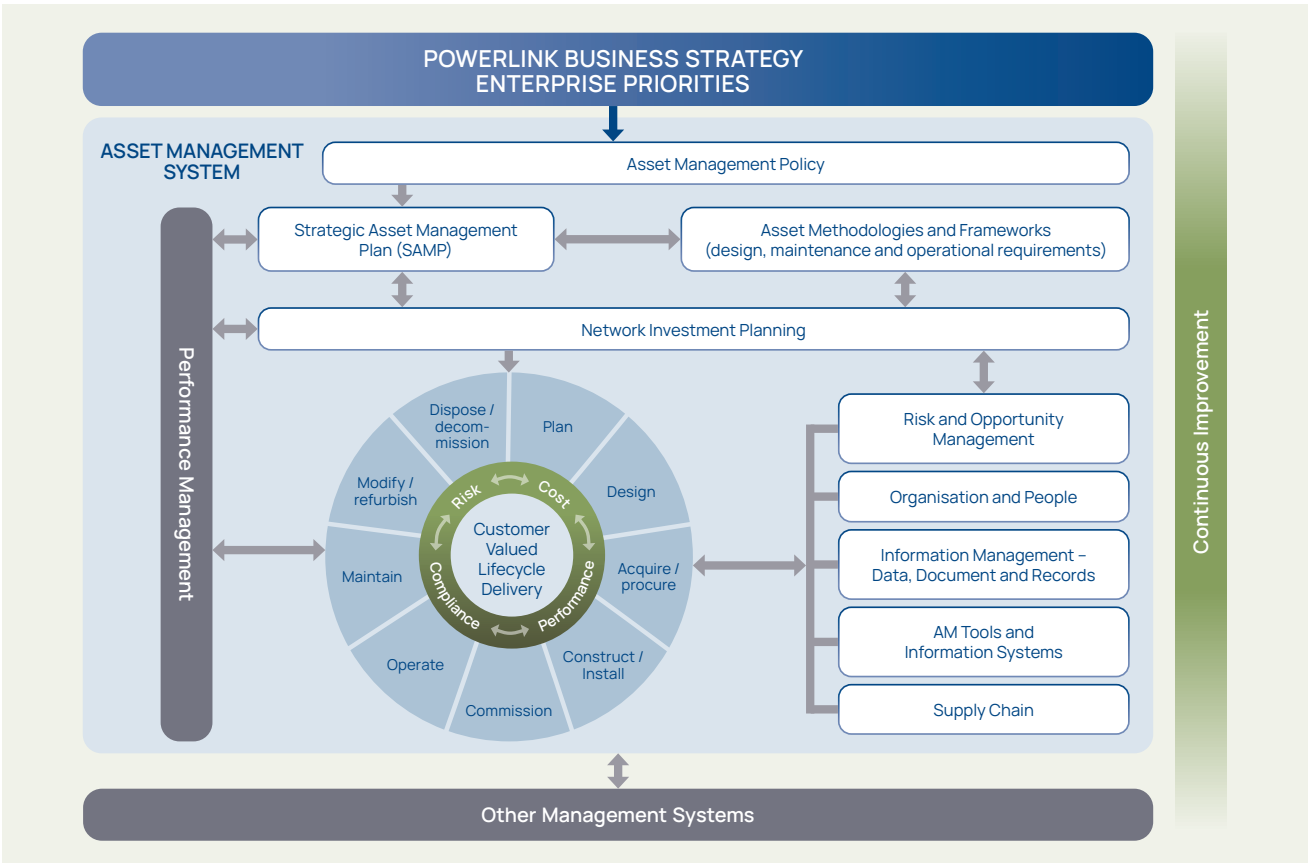
Powerlink's asset management approach ensures assets are managed in a manner consistent with overall corporate objectives to deliver safe, reliable and cost-effective services.

Asset management is a critical aspect of Powerlink's operations, ensuring efficient management of assets and optimal utilisation of resources. Figure C.1 illustrates the relationships and linkages between the Asset Management Policy, Strategic Asset Management Plan (SAMP), and other components of the Asset Management System.

Powerlink's asset management and joint planning approach ensures asset reinvestment needs consider the enduring need and most cost-effective options as opposed to considering only like-for-like replacements. A detailed analysis of both asset condition and network capability is performed prior to proposed reinvestment and where applicable, a Regulatory Investment Test for Transmission (RIT-T) is undertaken in order to bring about optimised solutions that may involve network reconfiguration, retirement and/or non-network solutions (refer to Appendix A and Section 5.3).

Powerlink's asset management approach is committed to achieving sustainable practices that ensure Powerlink provides a valued transmission service to meet customers' needs by optimising whole of life cycle costs, benefits and risks and ensuring compliance with applicable legislation, regulations and standards.

Figure C.1 Asset management overview



C.3 Powerlink's Asset Management System

The Asset Management System at Powerlink enables assets to be managed strategically, in line with corporate objectives and in coordination with other management systems.

Underpinning this system is the Asset Management Policy which sets out the principles to be applied for making asset management decisions as well as ensuring delivery of these decisions. The Asset Management Policy aligns Powerlink's strategic objectives with customer and stakeholder requirements.

The SAMP is developed based on Asset Management Policy principles which are used to inform asset management methodologies and activities. The SAMP and other asset management methodologies consider the need to continually improve asset management practices.

Powerlink undertakes periodic reviews of network assets, considering a broad range of factors, including physical condition, capacity constraints, performance and functionality, statutory compliance and ongoing supportability.

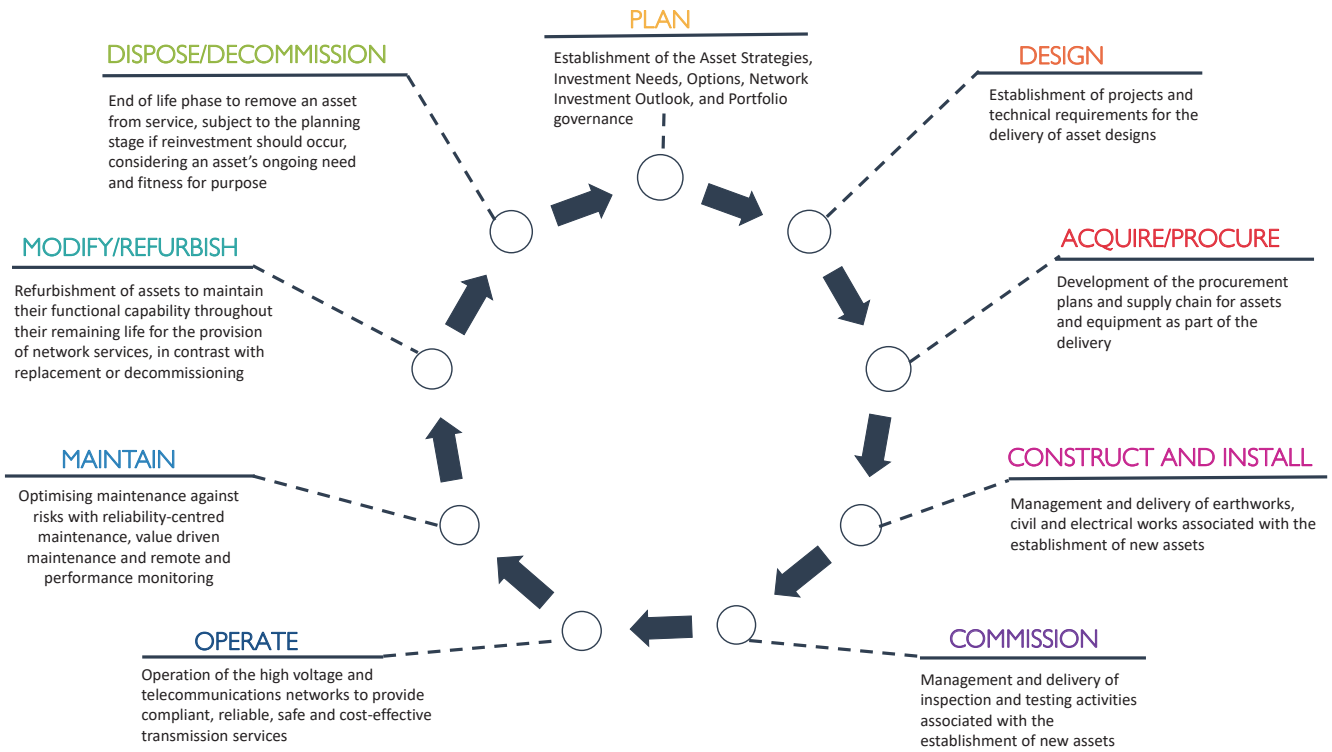
Asset methodologies provide whole of life cycle management for each asset category (transmission lines, substations, digital assets, land assets and underground cables) to inform the delivery of asset life cycle stages.

All asset management related activities are undertaken by applying relevant procedures, specifications and guidelines for delivering each stage of an asset life cycle activity. Performance, risk and assurance activities support governance of the Asset Management System and its ongoing effectiveness.

Asset information, data and analytics are fundamental enablers of asset management and support both operational and strategic decision-making. Asset information comes from the analysis of asset data which is used to inform decisions on how Powerlink's assets are managed for both short-term operational purposes and longer-term strategic plans.

Life cycle delivery establishes how and what is needed for asset decisions and activities in consideration of the Asset Management System. Powerlink defines asset life cycle and main activities throughout the nine stages shown in Figure C.2.

Figure C.2 Powerlink's Asset Life cycle stages



C.4 Flexible and integrated network investment planning

A fundamental element of the Asset Management System involves processes to manage the life cycle of assets, from planning and investment to operation, maintenance and refurbishment, and end of technical service life.

A range of options are considered as part of a flexible and integrated approach to network investment planning. These options may include retiring or decommissioning assets where there is unlikely to be an ongoing future need, refurbishing to maintain the service life of assets, replacing assets with different capacity or type to match needs, alternate network configuration opportunities, and non-network solutions.

The purpose of Powerlink's network investment planning is to:

- apply the principles set out in Powerlink's Asset Management Policy, SAMP and related processes to guide network asset planning and reinvestment decisions
- provide an overview of asset condition and health, life cycle plans and emerging risks related to factors such as safety, network reliability, resilience and obsolescence
- provide an overview and analysis of factors that impact network development, including energy and demand forecasts, generation developments, forecast network performance and capability, and the condition and performance of Powerlink's existing asset base
- identify potential opportunities for optimisation of the transmission network
- provide the platform to support a sustainable, cost-effective and climate-resilient power system.

C.5 Asset management implementation

Powerlink has adopted implementation strategies across its portfolio of projects and maintenance activities aimed at efficiently delivering the overall work program, including prudent design standardisation by considering emerging trends in technology, portfolio management and supply chain management.

One of Powerlink's objectives includes the efficient implementation of work associated with network operation, field maintenance and project delivery. Powerlink continues to pursue innovative work techniques that:

- reduce risk to personal safety
- optimise maintenance and/or operating costs
- reduce the requirement for and minimise the impacts of planned outages on the transmission network.

In line with good practice, Powerlink continually reviews and improves our Asset Management System through assurance, monitoring and improvement activities.

C.6 Further information

Further information on Powerlink's Asset Management System may be obtained by emailing NetworkAssessments@powerlink.com.au.

Appendix D Joint planning

This appendix outlines the results of Powerlink's joint planning with the Australian Energy Market Operator (AEMO) and other Network Service Providers (NSPs).

D.1 Introduction

Powerlink undertakes joint planning activities with other Transmission Network Service Providers (TNSPs), Distribution Network Service Providers (DNSPs) and AEMO. The objective of joint planning is to collaboratively identify network and non-network solutions to limitations which best serve the long-term interests of customers, irrespective of the asset boundaries (including those between jurisdictions). The joint planning process results in integrated area and inter-regional strategies which optimise asset investment needs and decisions consistent with whole of life asset planning.

In particular, joint planning seeks to:

- understand the issues faced by the different network owners
- understand existing and forecast congestion on power transfers between neighbouring networks
- understand asset condition-based drivers in neighbouring networks
- identify the most efficient options to address these issues, irrespective of the asset boundaries
- influence how networks are operated and managed, and what network changes are required
- clarify the investment decisions that are likely to progress.

Joint planning begins several years in advance of an investment decision. Depending on the nature of the limitation or asset condition driver to be addressed and the complexity of the proposed corrective action, the nature and timing of future investment needs are reviewed at least on an annual basis utilising an interactive joint planning approach. The joint planning process results in integrated area and inter-regional strategies which optimise asset investment needs and decisions and often leads to a combination of investments by Powerlink and the relevant DNSP (Energex, Ergon Energy or Essential Energy).

Projects where the estimated capital cost of the most expensive feasible network option is greater than $8 million are subject to a formal consultation process under the applicable regulatory investment test mechanism. The owner of the asset where the limitation emerges will determine whether a Regulatory Investment Test for Transmission (RIT-T) or Regulatory Investment Test for Distribution (RIT-D) is used to progress the investment recommendation under the joint planning framework. This provides customers, stakeholders and interested parties the opportunity to provide feedback and discuss alternative solutions to address network needs. Ultimately, this process results in investment decisions which are prudent, transparent and aligned with stakeholder expectations.

D.2 Working and regular engagement groups

Powerlink contributes to a number of working groups and reference groups for joint planning:

- Executive Joint Planning Committee (EJPC)
- Joint Planning Committee (JPC)
- Regulatory Working Group (RWG)
- Forecasting Reference Group (FRG)
- Power System Modelling Reference Group (PSMRG)
- Energy Networks Australia (ENA) working groups
- General Power System Risk Review (GPSRR)
- Operational Transition Points Working Group (OTPWG) and Future Transition Points Working Group (FTPWG)
- AEMO System Security Working Group
- AEMO Integrated System Plan (ISP) including joint planning and submissions to the ISP Inputs, Assumptions and Scenarios Report, ISP Methodology and development of ISP Preparatory Activity reports
- Inter-network Test Reference Committee
- Transgrid for assessment of the economic benefits of expanding the power transfer capability between Queensland and New South Wales (NSW)
- Energex, Ergon Energy and Essential Energy for planning developments and project delivery in the transmission and sub-transmission network.

D.2.1 Executive Joint Planning Committee

The EJPC coordinates collaboration and consultation between AEMO and other jurisdictional planning bodies (JPB) on electricity transmission network planning issues. The EJPC directs and coordinates the activities of the Forecasting Reference Group and the Regulatory Working Group. These activities ensure effective consultation and coordination between JPBs, TNSPs and AEMO on a broad spectrum of perspectives on network planning, forecasting, market modelling, and market regulatory matters in order to deal with the challenges of a rapidly changing energy industry.

D.2.2 Joint Planning Committee

The JPC is a working committee supporting the EJPC to achieve effective collaboration, consultation and coordination between JPBs, TNSPs and AEMO on electricity transmission network planning issues.

D.2.3 Forecasting Reference Group

The FRG is a monthly forum of AEMO and industry forecasting specialists. The forum seeks to facilitate constructive discussion on matters relating to gas and electricity forecasting and market modelling. It is an opportunity to share expertise and explore new approaches to addressing the challenges of forecasting in a rapidly changing energy industry.

D.2.4 Regulatory Reference Group

The RRG is a working group to support the EJPC to achieve effective collaboration, consultation and coordination between JPBs, TNSPs and AEMO on key areas related to the application of the transmission regulatory framework and suggestions for improvement.

D.2.5 Power System Modelling Reference Group

The PSMRG is a technical expert reference group which focuses on power system modelling and analysis techniques to ensure an accurate power system model is maintained for power system planning and operational analysis, establishing procedures and methodologies for power system analysis, plant commissioning and model validation.

D.2.6 Operational Transition Points Working Group

Operational Transition Points are essentially the expansion of the technical operating envelope of the National Electricity Market (NEM) via staged implementation of new limits (Operational Transitions) to successively allow or commission the system into new operating points as the NEM transitions toward 100% instantaneous penetrations of renewables.

The OTPWG is a technical expert working group focused on the Operational Transition Points and the Transition Plan for System Security (see Chapter 3) associated with the power system under the control or influence of AEMO and NSPs. It promotes efficient sharing of information and learnings between NSPs and AEMO.

The OTPWG is to develop processes to identify and evaluate Operational Transition Points across multiple time horizons, with a specific focus on Horizon 1 (2 years ahead). The OTPWG also coordinates with the FTPWG, which focuses on Horizon 2 (2 to 5 years ahead), ensuring continuity and strategic alignment across both near-term and mid-term planning.

D.2.7 Inter-network Test Reference Committee

The Inter-network Test Reference Committee supports consistent application of the NER Clause 5.7.7 inter-network testing framework. It assists project System Integration Steering Committees, the EJPC and JPBs by reviewing test processes, providing guidance to AEMO's test coordinator, supporting guideline development, and agreeing and documenting decisions on whether inter-network testing is required.

Powerlink continues to work closely with AEMO and Transgrid to test and release QNI interconnector capability following the commissioning of the QNI Minor project by Transgrid in mid-2022. The group manages the inter-network test program for this upgrade in QNI capacity, in accordance with Clause 5.7 of the NER.

D.3 AEMO Integrated System Plan

Powerlink works closely with AEMO to support the development of the ISP. The ISP outlines an optimal path for generation, storage and network investments in the NEM to meet customer needs and government policies, at least cost, to 2050.

The ISP reflects the dynamic nature of the power system and the need to continually innovate and evolve inputs, analysis methodologies and development strategies for the future transmission network. Powerlink provides a range of network planning inputs to the ISP consultation and modelling processes, through regular engagement and workshops. Powerlink also reviews the outcomes of the ISP modelling and provides jurisdictional advice on:

- capacity and limitations of inter and intra-regional grid sections
- network options to augment power transfer capability (including project scope and estimated cost)
- Regional Energy Hub capacity and system strength limitations.

Process

Powerlink continues to provide a range of network planning inputs to AEMO's ISP consultation and modelling processes, via joint planning processes, regular engagement, workshops and through formal consultations.

Methodology

More information on the 2026 ISP, including methodology and assumptions, is available on AEMO's website.

Outcomes

The 2026 ISP identified the following actionable projects for Queensland:

- Central to North Queensland Reinforcement (Stage 1)
- Brisbane Area 275kV Reinforcement

The 2026 ISP reclassified QNI Connect from an actionable ISP project (identified in the 2024 ISP) to a future ISP project. AEMO noted that this change was driven by updates to reduce the assumed flexibility of Queensland coal-fired generators and to incorporate newly committed and anticipated battery developments within its modelling framework.

D.4 AEMO System Security Reports

AEMO's 2025 Transition Plan for System Security covers a 10-year outlook period from December 2025 to December 2035. It provides updated forecasts of system strength and inertia requirements, inverter-based resource (IBR) forecasts, and identifies potential shortfalls across the NEM during this timeframe.

As discussed in chapters 2 and 3, declining minimum operational demand, changing synchronous generator behaviour and rapid uptake of IBR continue to present opportunities for delivery of power system security services.

Process

Powerlink has worked closely with AEMO to determine the system strength, inertia and Network Support and Control Ancillary Services requirements for the Queensland region. Powerlink and AEMO reviewed the Queensland fault level nodes and their minimum three phase fault levels and assessed the reactive power absorption requirements.

Methodology

AEMO applied the System Strength Requirements Methodology to determine the Queensland fault level nodes and their minimum three phase fault levels. More information on the System Strength Requirements Methodology, System Strength Requirements and Fault Level Shortfalls is available on AEMO's website.

Outcomes

The 2025 Transition Plan for System Security confirmed the existing minimum fault level requirements at the Queensland system strength nodes. AEMO forecasted system strength deficits of between 24MVA and 287MVA across the Lilyvale, Greenbank and Western Downs nodes between 2027/28 and 2029/30.

Powerlink has applied the best available information to review AEMO's results and is satisfied that no additional investment is required in the 2027/28 to 2029/30 period. Powerlink will continue to monitor developments to maintain demand reliability and system security.

D.5 General Power System Risk Review

AEMO published the 2026 GPSRR in July 2026.

Process

The purpose of the GPSRR is to review:

- a prioritised set of risks comprising contingency events and other events and conditions that could lead to cascading outages or major supply disruptions
- arrangements for managing the identified priority risks and options for their future management
- arrangements for management of existing protected events and consideration of any changes or revocation
- the performance of existing Emergency Frequency Control Schemes (EFCS) and the need for any modifications.

Methodology

With support from Powerlink, AEMO assessed the performance of existing EFCS. AEMO also assessed high-priority non-credible contingency events identified in consultation with Powerlink.

Outcomes

The Final 2026 GPSRR report recommended:

- AEMO support the implementation of load access standards for inverter-based loads to reduce risks related to increasing large load connections
- AEMO and TNSPs extend operational documentation to further support the ability to resecure the system for low probability non-credible contingency events
- AEMO consider the appropriate approach to reducing the likelihood or impacts of multiple prior generation and network outages while minimising impacts to market participants
- AEMO to continue to monitor conditions that may present an increased likelihood or consequence of cascading failure or major supply disruptions
- TNSPs to continue to support the assessment of power system resilience for large non-credible contingency events, particularly supporting the consideration of Remedial Action Schemes (RAS), EFCS or identifying the need for reclassification
- existing studies on voltage control risks be extended to consider the impacts of non-credible contingencies in operating conditions that may present an elevated risk of voltage control related cascading failures
- power system oscillation risks be considered a priority risk for a future GPSRR or through the Transition Plan for System Security.

Table D.1 outlines carry-over recommendations relating to Powerlink from earlier years that remain open in the 2026 GPSRR.

Table D.1 2026 GPSRR ongoing recommendations for Powerlink

Year	Recommendation	Update
2022	New Over Frequency Generator Shedding (OFGS) scheme to manage Queensland over-frequency during Queensland separation.	14 of the 19 generators have implemented the scheme. Three of the remaining five outstanding generators are targeting implementation by December 2026. For the remaining two generators, Powerlink is in the design stage for implementation of the scheme within Powerlink equipment at the connection point. Target implementation date for those sites is March 2027.
2022	Powerlink to implement a Special Protection Scheme (SPS) for the loss of both Columboola to Western Downs 275kV lines.	Site work is complete. The scheme is commissioned from Powerlink's perspective. Powerlink will provide AEMO with test results and an operational guide before AEMO will give clearance to enable the scheme.
2022	Review of wide area monitoring protection and control (WAMPAC) scheme to mitigate risks associated with non-credible loss of Calvale to Halys 275kV lines.	The project scope has been finalised. Estimated commissioning is early 2027.
2023	Powerlink and Transgrid investigate, design and implement an SPS to mitigate the risk of QNI instability and synchronous separation of Queensland following a range of non-credible contingencies.	A working group comprising AEMO, Powerlink, Transgrid, AEMO Victorian Planning and ElectraNet is analysing potential mitigation options. Recent works have involved Powerlink and Transgrid providing feedback on AEMO study results.

D.6 Joint planning with Transgrid – Expanding the transmission transfer capacity between New South Wales and Queensland

QNI Connect is a proposed high-capacity transmission project between Queensland and NSW. It aims to strengthen the NEM by enabling up to 1,000 megawatts of additional transfer capacity between southern Queensland and the New England region. The project was identified as an actionable project in the 2024 ISP. The 2026 ISP changed the status of the project from actionable to a future ISP project.

Should the project become actionable in a future ISP, it will be subject to the RIT-T process for actionable ISP projects.

D.7 Joint planning with Energex and Ergon Energy

Powerlink, Energex and Ergon Energy, participate in regular joint planning and coordination meetings to assess emerging limitations, including asset condition drivers, to ensure the recommended solution is optimised for efficient expenditure outcomes. These meetings are held regularly to assess, in advance of any requirement for an investment decision by either NSP, matters that are likely to impact on the other NSP. Powerlink and the DNSPs then initiate detailed discussions around addressing emerging limitations as required. Joint planning also ensures that interface works are planned to ensure efficient delivery.

Table D.2 provides a summary of activities that are utilised in joint planning. During preparation of respective regulatory submissions, the requirement for joint planning increases significantly and the frequency of some activities reflects this.

Table D.2 Joint planning activities with Energex and Ergon Energy

Activity	As required	Annual
Sharing and validating information covering specific issues	Y	
Sharing updates to network data and models	Y	
Identifying emerging limitations	Y	
Developing potential credible solutions	Y	
Estimating respective network cost estimates	Y	
Developing business cases	Y	
Preparing relevant regulatory documents	Y	
Sharing information for joint planning analysis	Y	
Sharing information for respective works plans	Y	Y
Sharing planning and fault level reports		Y
Sharing information for Regulatory Information Notices		Y
Sharing updates to demand forecasts		Y
Joint planning workshops	Y	Y

There are a number of projects where Powerlink, Energex and Ergon Energy engage on delivery, changes to secondary systems or metering, and other relevant matters which are not covered in this chapter. Since publication of the 2025 TAPR, joint planning has occurred between Powerlink and Energex or Ergon Energy on the following projects:

- Maintaining reliability of supply to Goodna and surrounding area
- Maintaining reliability of supply to Mudgeeraba and southern Gold Coast/Tweed
- Maintaining reliability of supply to Loganlea and surrounding area
- Establish new supply point to southern Cairns area.

Appendix E Forecast of Connection Point Maximum Demands

This appendix provides details of Powerlink's forecast of connection point maximum demands.

E.1 Introduction

The National Electricity Rules (NER) require a Transmission Annual Planning Report (TAPR) to provide the forecast loads submitted by a Distribution Network Service Provider (DNSP) in respect of each connection point the DNSP has to a connection point in the Network Service Provider's network[1] or modified as per NER clause 5.11.1.

This requirement is discussed below and includes a description of:

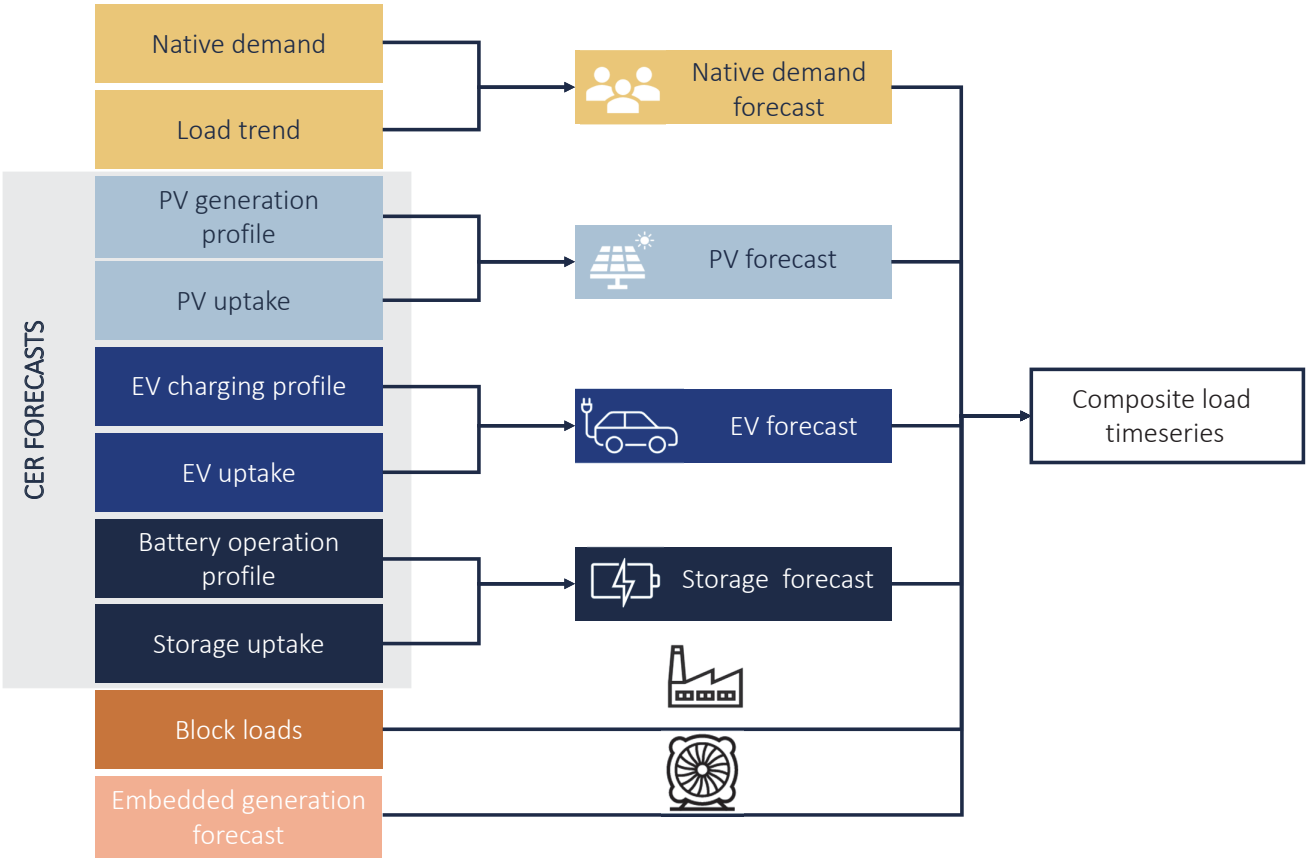
- the forecasting methodology, sources of input information and assumptions applied (refer to section E.2)
- a description of high, most likely and low growth scenarios (refer to section E.3)
- an analysis and explanation of any aspects of forecast loads provided in the TAPR that have changed significantly from forecasts provided in the TAPR from the previous year (refer to section E.4)
- an analysis and explanation of any aspects of forecast loads provided in the TAPR from the previous year which are significantly different from the actual outcome (refer to section E.5).

E.2 Powerlink's forecasting methodology for maximum demand

The Powerlink forecast process individually models the different component of electricity demand: Native demand, PV, EV, BESS, Block loads and Embedded Generation. It incorporates the latest assumptions for macro-economic factors and evolving trends in energy consumption and technology adoption, from sources including the Australian Bureau of Statistics (ABS), Queensland Government, the Australian Energy Market Operator (AEMO), Deloitte Access Economics economic forecasts, CSIRO GenCost reports, and internal data from Energy Queensland and Powerlink.

The following sections provide a high-level overview of each sub model and the forecast process.

Figure E.1 Schematic of the building blocks of the forecast



[1] National Electricity Rules (NER), clauses 5.12.2(c)(1) and 5.11.1, and schedule 5.7.

Independent sub models are derived for the different CER technologies, native demand, trends, block loads and embedded generation. Composite load traces are constructed from the output of each sub model and used in a Monte-Carlo process to estimate Maximum Demand with PoE 10% and 50%.

E.2.1 Native Demand Model – weather and calendar sensitivity

A demand model is used to estimate a probability distribution of demand conditional on weather and calendar conditions. The demand model is trained on the past 4 years of actual metered data (at half-hourly granularity) and leverages weather data sourced from the European Centre for Medium-Range Weather Forecasts (ECMWF) Copernicus Climate Change Service's ERA5 dataset. The model allows to sample a full year of demand data, at half hourly granularity, for a given 'weather year', which is a realisation of past weather conditions.

E.2.2 Load trends

The forecasting tool uses a regression model for average demand, incorporating historical population, Gross State Product (GSP), electricity prices, energy efficiency numbers from the ABS, Queensland Government and AEMO, as well as cooling degree days and heating degree days. The trend is forecast for each scenario, with different assumptions made for these macro drivers. The tool then applies a weighted trend for each asset in Powerlink's network, based on a spatial forecast of population (at SA2 level from Queensland Government data) and the consumption split between residential, commercial and industrial customers (informed by Energy Queensland and Powerlink).

E.2.3 Consumer Energy Resource uptakes (developed with Energy Queensland)

Consumer Energy Resource (CER) forecasts are developed from bottom-up (from feeders) and top-down (at the Energex and Ergon Energy network level) process. The bottom-up forecast uses spatially granular information, and a top-down forecast captures macroeconomic and technology factors. It is then mapped and aggregated to Energy Queensland's zone substations and then to Powerlink's substations.

The bottom-up forecast is a technology adoption model, using historical technology stock (CER register for solar photovoltaic (PV) and electric vehicle (EV), vehicle registration data for EV), as well as SA2 level ABS data. It defines per feeder s-curves of technology adoption.

The top-down forecast defines an adoption curve using historical and future GSP, population and technology prices.

A reconciliation process ensures that the top-down forecast is spatially consistent with the bottom-up forecast.

E.2.4 CER profiles (developed with Energy Queensland)

The load profiles derived for EV charging are modelled through simulation of driving and charging for different vehicle types. The simulation leverages vehicle driving data sourced by Energy Queensland. The simulations provide different profiles for collaborative and convenience charging. The scenarios further define a glide path between the two types of charging to model changing patterns over the forecast horizon.

Load profiles are derived for Battery Energy Storage Systems (BESS) through:

- A simulation process for 'solar soaking' patterns
- An optimisation of the battery dispatch for customers with fixed tariffs
- An optimisation of the battery dispatch in the National Electricity Market (NEM) for systems operating in the wholesale electricity market, using historical prices in the NEM
- Similar to EVs, for each forecast scenario, a glide path between the different consumption patterns combines a nominal composite profile for BESS operation, evolving over the forecast horizon.

Estimates for PV generation profiles use local historical weather conditions on each network asset.

E.2.5 Block loads

Energy Queensland provide a list of block loads that are added to the relevant High, Central and Low scenarios based on consultations with their customers. Powerlink also includes its own set of prospective large-scale customers in this list, split into the various scenarios. Block loads are defined by their capacity and a profile archetype, from which the forecast tool derives a modelled timeseries.

There are three categories of block loads: proposed, anticipated and committed. Proposed loads are all new load connections that are in the connection process and are all included in the high scenario. Anticipated loads are projects that have a high likelihood of becoming committed but do not have a signed connection and access agreement. Anticipated and committed projects are included in the Central scenario. The low scenario only includes committed loads. With recent emergence in data centre load interest in Queensland, potential data centre load has been added to the forecast as a block load.

Figure E.2 Block loads

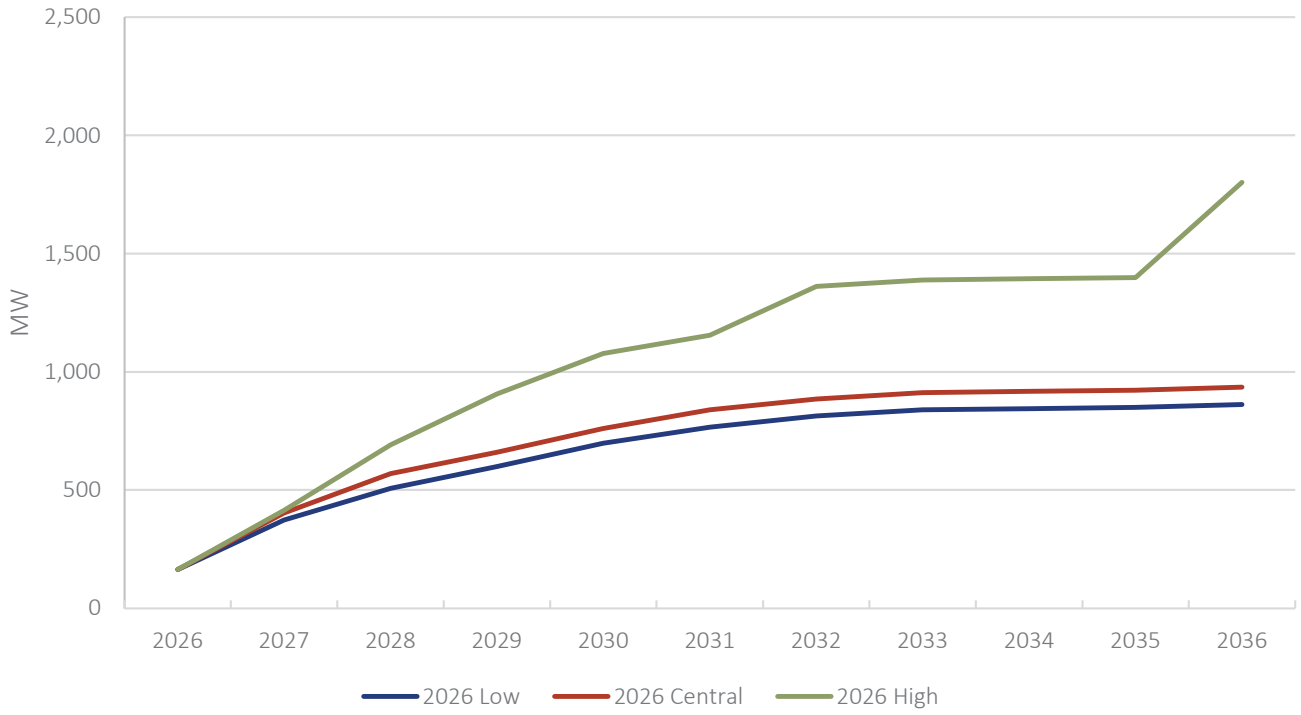
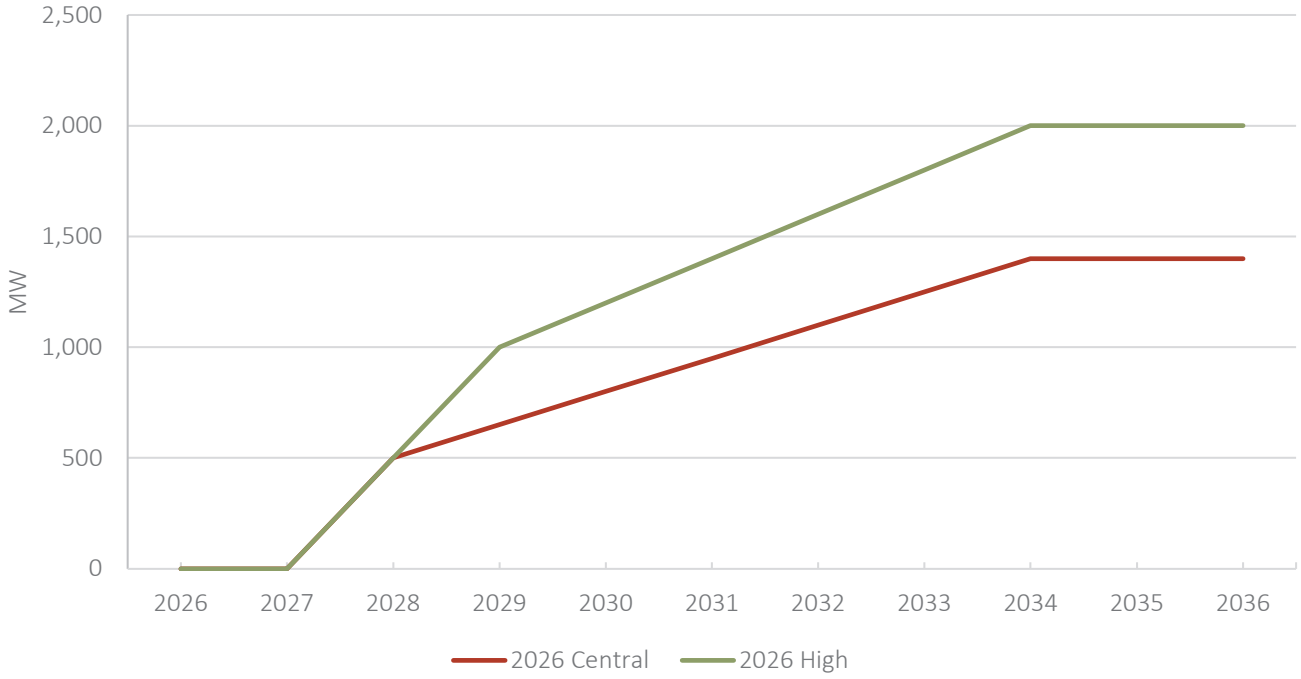


Figure E.3 Data centre load



E.2.6 Generator Model

Embedded generators are modelled according to their types:

- Non-dispatchable renewable generation (PV and wind) are modelled according to their capacity and historical weather conditions on site
- Dispatchable generation is modelled through profile archetypes derived from historical meter data.

E.2.7 Forecast process

The above sub-models are combined to estimate POE forecast by a Monte-Carlo approach:

- For 10 Weather Years, n estimates of demand are sampled from the modelled probability distribution (native demand model): each sample is a full year worth of load (30-minute interval)
- The samples are scaled by the trend modelled (energy consumption trend model)
- The CER profiles are multiplied by their forecast uptakes and are added to the timeseries (CER model)
- Block loads, with capacity and profiles defined by Powerlink, are added to the timeseries
- The generation is added to the timeseries (for a forecast of delivered demand)
- The Maximum demand of each composite sample is recorded
- The forecast tool derives the 50% and 10% POE maximum demand from these 10 x n samples of maximum demand.

E.3 Description of Powerlink's High, Central and Low growth scenarios for maximum demand

The scenarios developed for the high, central and low growth scenarios were prepared in June 2026 based on the latest information. The assumptions for the Powerlink forecast of demand are consistent with the assumptions for the DER forecast developed with Energy Queensland.

E.3.1 High growth scenario assumptions for maximum demand

- GSP - High growth (Deloitte Access Economics), averaging 3.21% per annum in the TAPR forecast horizon
- Queensland regional population growth – High growth, averaging 1.97% per annum in the TAPR forecast horizon (growing from 5.64M to 6.86M)
- Electricity Prices – Decreasing prices until 2031, before increasing and settling at 235.32 $/MWh by 2036
- Energy efficiency – Slower growth – (AEMO IASR 2025)
- EV charging profiles – Fast growth, residential unscheduled charging decreasing to 33% by 2060, with V2H/V2G growing to 17% each
- Battery charging profiles – Fast increasing participation in VPP programs, starting at 14% in 2025, increasing to 26% in 2029 and reaching 39% in 2049
- PV Uptake – Fast PV rooftop capacity uptake forecast model (EQL 2026)

E.3.2 Central scenario assumptions for maximum demand

- GSP – Medium growth (Deloitte Access Economics), averaging 2.31% per annum in the TAPR forecast horizon
- Queensland regional population growth – Central growth, averaging 1.29% per annum in the TAPR forecast horizon (growing from 5.64M to 6.45M)
- Electricity prices – Relatively flat prices until post 2031, followed by an increase to 261.36 $/MWh by 2036
- Energy efficiency – Step Change scenario (AEMO IASR 2025)
- EV charging profiles – Medium growth, residential unscheduled charging decreasing to 43% by 2060, with V2H/V2G growing to 12% each
- Battery charging profiles – Increasing participation in VPP programs, starting at 13% in 2025, increasing to 22% in 2029 and reaching 35% in 2049
- PV Uptake – Medium PV rooftop capacity uptake forecast model (EQL 2026)

E.3.3 Low scenario assumptions for maximum demand

- GSP – Slow growth (Deloitte Access Economics), averaging 1.41% per annum in the TAPR forecast horizon
- Queensland regional population growth – Slow growth, averaging 0.80% per annum in the TAPR forecast horizon (growing from 5.64M to 6.11M)
- Electricity prices – Increasing prices across the TAPR forecast horizon, reaching 287.39 $/MWh by 2036
- Energy efficiency – Accelerated transition scenario (AEMO IASR 2025)
- EV charging profiles – Slow growth, residential unscheduled charging decreasing to 56% by 2060, with V2H/V2G growing to 7% each
- Battery charging profiles – Low participation in VPP programs, starting at 11% in 2025, increasing to 13% in 2029 and reaching 21% in 2049
- PV Uptake – Slow PV rooftop capacity uptake forecast model (EQL 2026)

Figure E.4 Embedded Battery Energy Storage System – Capacity

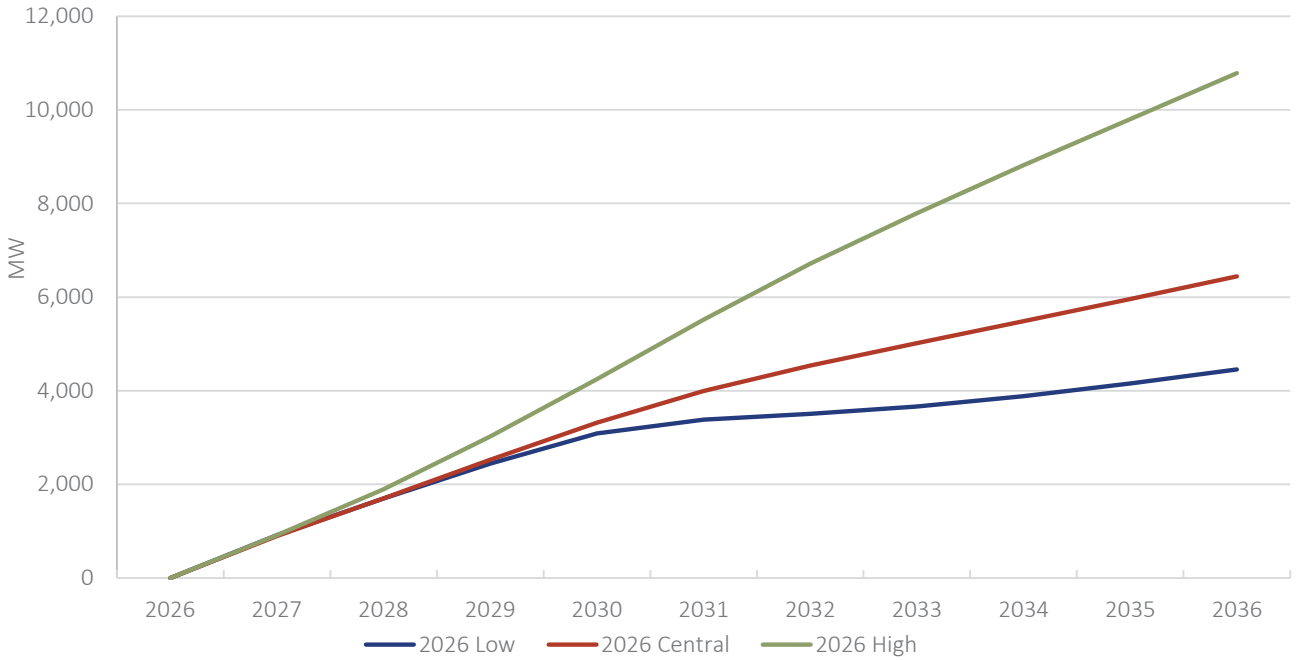


Figure E.5 Embedded Battery Energy Storage System – Energy

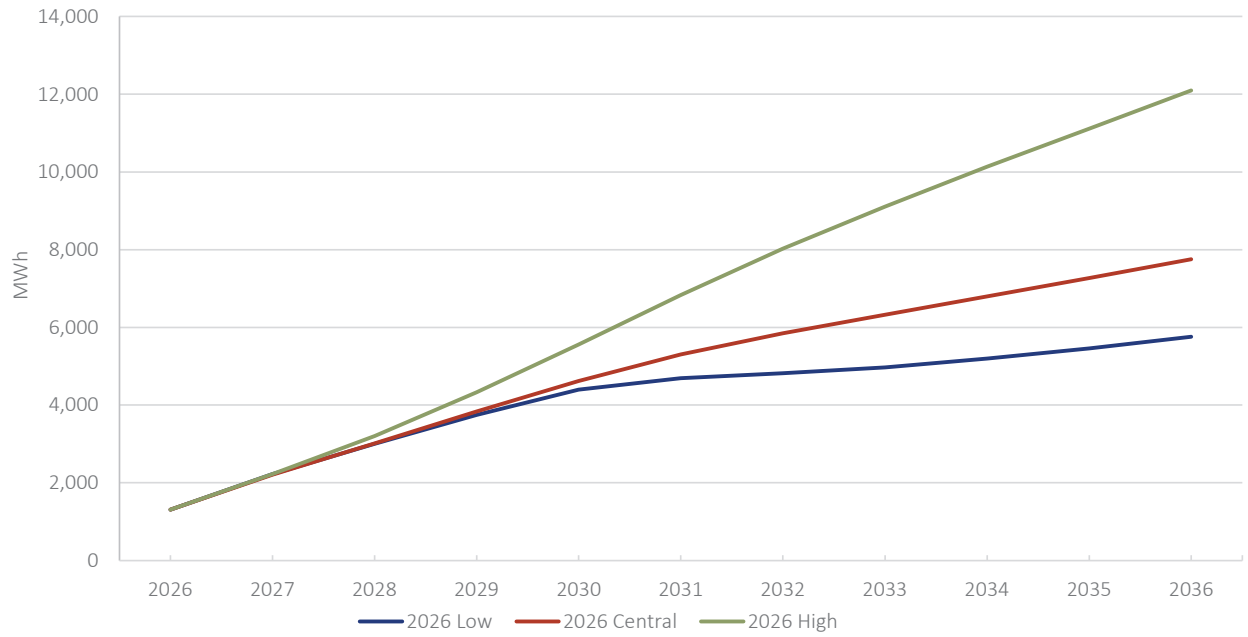


Figure E.6 Rooftop PV uptake – Capacity

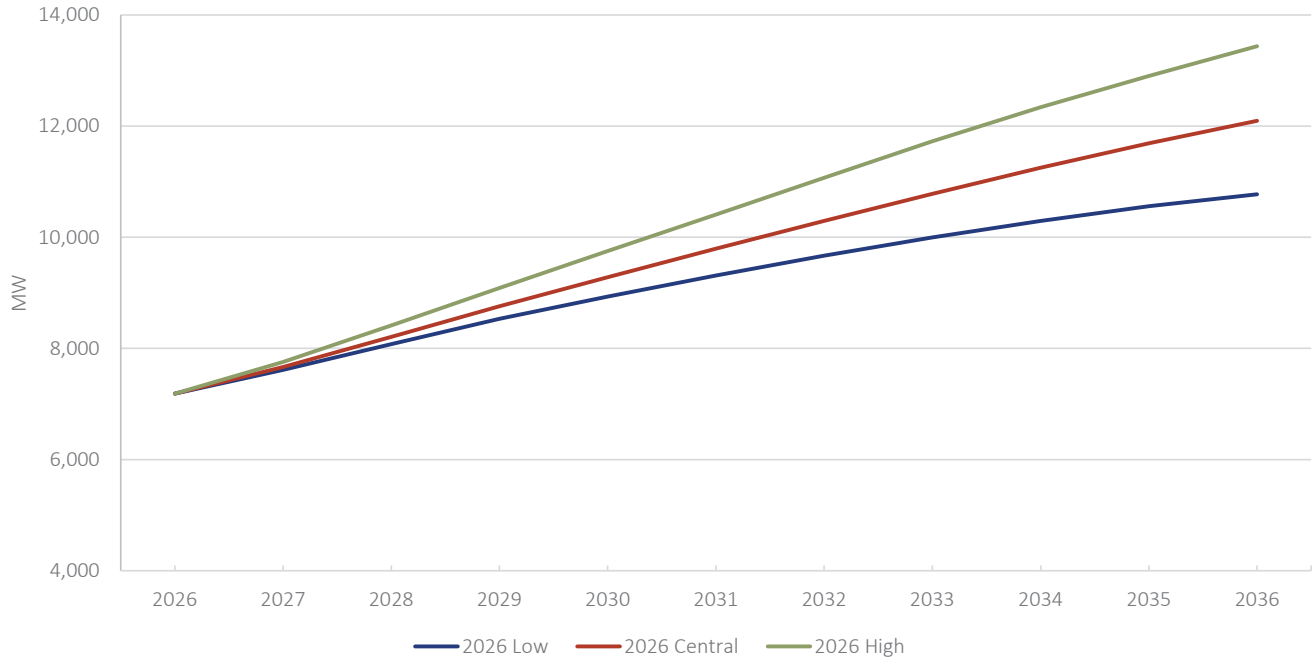


Figure E.7 Electric Vehicle uptake

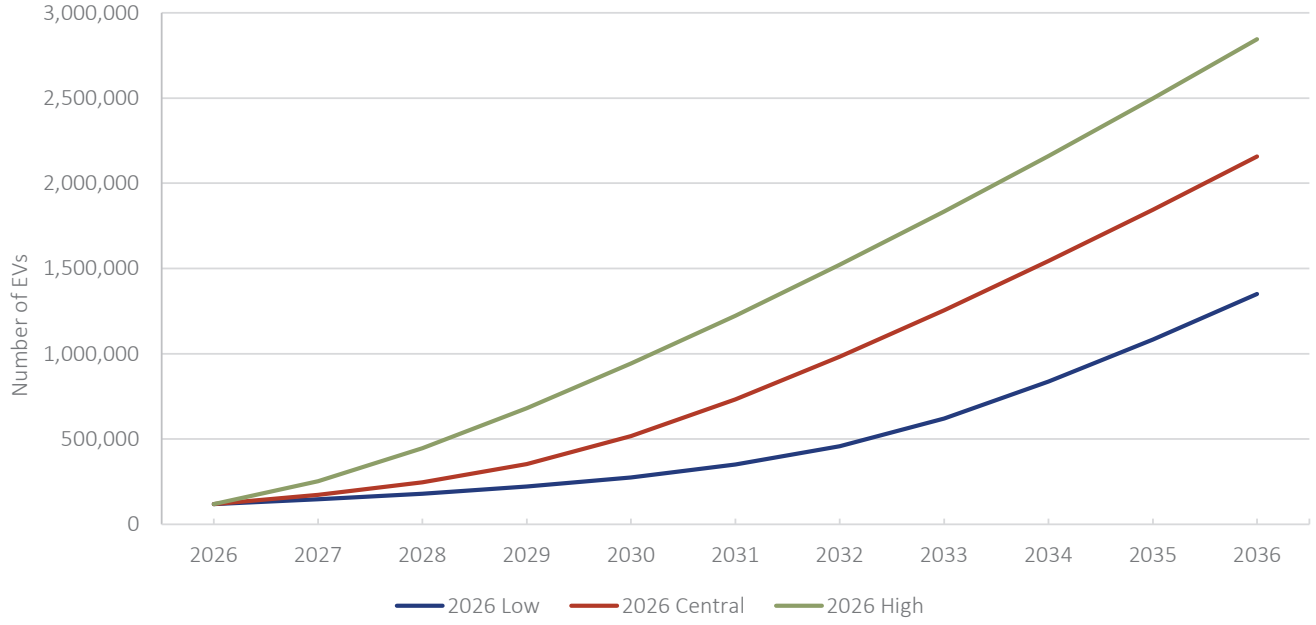
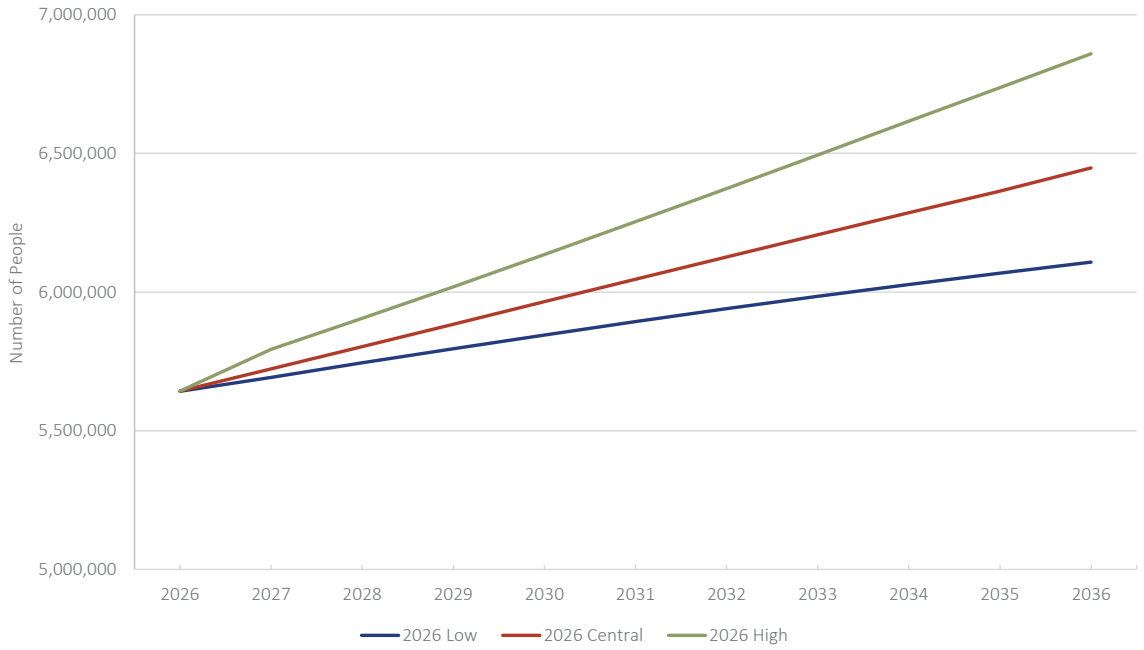


Figure E.8 Population



E.4 Significant changes to the connection point maximum demand forecasts

Major differences between the 2026 forecast and the 2025 forecast can generally be attributed to natural variation in peaks below the connection point level, which can result in displaying an associated variation in year-on-year changes at the connection point level, and with changes in the DER forecast rather than from any network configuration changes or significant block loads. Changes in proposed block loads also account for differences. These, combined with yearly load variations affecting the start values, are the major cause of the differences observed between the two forecasts.

Table E.1 Ergon connection points with the greatest difference in forecast demand between the 2025 and 2026 forecasts at the end of the TAPR forecast window (>=10% change and >= 10MW)

Connection Point	kV	Difference (MW)
Woree	132	54
Edmonton	132	11
Dan Gleeson	132	-16
Proserpine	132	-12

Table E.2 Energex connection points with the greatest difference in forecast demand between the 2025 and 2026 forecasts at the end of the TAPR forecast window (>=10% change and >= 10MW)

Connection Point	kV	Difference (MW)
Runcorn	110	29
Rocklea	110	-26

E.5 Significant differences to actual observations

The 2025/26 summer was relatively milder across large parts of Queensland when compared to recent seasons.

This, combined with natural variations in the peaks, load transfers and changes to proposed block loads resulted in substantial differences between the 2025 forecast values for 2025/26 and what was observed at the connection point.

Table E.3 Ergon connection points with the greatest difference between the observed 2025/26 peak and corresponding base 2025/26 forecast (>=10% change and >= 10MW)

Connection Point	2025/26 forecast peak (MW)	2025/26 actual (MW)	Difference (MW)
Clare South	64	74	10
Columboola (Ergon)	62	75	13
Dan Gleeson	92	107	15
Gin Gin	186	168	-18
Kamerunga	67	56	-11
Mackay	99	88	-11
Middle Ridge (Ergon)	289	247	-42
Moranbah (66)	103	89	-14
Newlands	26	10	-16
Pioneer Valley	52	68	16
Proserpine	63	52	-11
Rockhampton	110	97	-13
Tarong (66)	57	45	-12
Woree	99	145	46

Table E.4 Energex connection points with the greatest difference between the observed 2025/26 peak and corresponding base 2025/26 forecast (>=10% change and >= 10MW)

Connection Point	2025/26 forecast peak (MW)	2025/26 actual (MW)	Difference (MW)
Belmont (110)	384	292	-92
Blackstone	118	104	-14
Mudgeeraba (110)	367	330	-37
Rocklea	163	133	-30

E.6 Customer forecasts of connection point maximum demands

Tables E.1 to E.18 (in the Appendix E Compendium on Powerlink's website) show 10-year forecasts of native summer and winter demand at connection point peak, for High, Central and Low growth scenarios (refer to Appendix E). These forecasts have been supplied by Powerlink direct connect customers and have been produced by Powerlink.

The connection point reactive power (MVAr) forecast includes the effect of customer's downstream capacitive compensation.

Groupings (sums of non-coincident forecasts) of some connection points are used to protect the confidentiality of specific customer loads.

In Tables E.1 to E.18 the zones in which connection points are located are abbreviated as follows:

FN Far North zone
R Ross zone
N North zone
CW Central West zone
G Gladstone zone
WB Wide Bay zone
S Surat zone
B Bulli zone
SW South West zone
M Moreton zone
GC Gold Coast zone

Appendix F Summary of possible transmission investments by region and zone

This appendix summarises possible network investments for the 10-year outlook period and also sets out the forecast transmission line intervention outlook for the 10-20 year outlook period.

F.1 Possible network investments for the 10-year outlook period

Through the annual planning review, Powerlink has identified that the investments listed in Table F.1 are likely to be required to address the risks arising from network assets reaching end of technical service life and to maintain reliability of supply in the 10-year outlook period. Contingent Project and Actionable Integrated System Plan projects are included for completeness. Potential projects have been grouped by region and zone as described in chapters 6, 7 and 8. Possible network investments do not constitute committed projects, and their scope, timing and implementation remain subject to further assessment and investment decision-making processes.

As required by the Australian Energy Regulator's Transmission Annual Planning Report Guidelines, additional information on potential projects is available in the TAPR Templates which can be accessed through Powerlink's TAPR Portal.

Table F.1 Possible future network investments in the 10-year outlook period

Potential project	ID	Zone	Category	Outlook	Region
Line refit works on the 275kV transmission lines between Ross and Chalumbin substations	CQNQ-01	Far North	Future investment	5 years	NQ
Reid River 275kV Network Integration	CQNQ-02	Ross	Future investment	5 years	NQ
Stanwell to Broadsound 275kV Second Circuit Stringing	CQNQ-03	Central West	AEMO 2026 ISP Actionable Project	To be determined	NQ
Central Queensland to North Queensland Augmentation	CQNQ-04	Central West	Powerlink Revenue Proposal contingent project	To be determined	NQ
Line refit works on the 275kV transmission line between Bouldercombe and Nebo substations	CQNQ-05	Central West	Future investment	10 years	NQ
Line refit works on the 275kV transmission line between Bouldercombe and Broadsound substations	CQNQ-06	Central West	Future investment	10 years	NQ
Line refit works on the 132kV transmission lines between Chalumbin and Turkinje substations and 275kV and 132kV reinvestment at the Chalumbin Substation	FNQ-01	Far North	Future investment	5 years	NQ
Woree PASS M1 replacement	FNQ-02	Far North	Future investment	5 years	NQ
Tully 132/22kV transformer replacement	FNQ-03	Far North	Future investment	5 years	NQ
Woree 275kV and 132kV secondary systems replacement	FNQ-04	Far North	Future investment	10 years	NQ
Barron Gorge 132kV secondary systems replacement	FNQ-05	Far North	Future investment	10 years	NQ
Edmonton 132kV secondary systems replacement	FNQ-06	Far North	Future investment	5 years	NQ
El Arish 132kV secondary systems replacement	FNQ-07	Far North	Future investment	10 years	NQ
Line refit works on the 132kV transmission line between Ross and Dan Gleeson substations	RZ-01	Ross	Future investment	5 years	NQ
Ross 275kV reactor bushing replacement	RZ-02	Ross	Future investment	10 years	NQ
Alan Sherriff 132kV secondary systems replacement	RZ-03	Ross	Future investment	5 years	NQ
Garbutt 132kV secondary systems replacement	RZ-04	Ross	Future investment	5 years	NQ
Townsville East 132kV secondary systems replacement	RZ-05	Ross	Future investment	5 years	NQ

Table F.1 Possible future network investments in the 10-year outlook period *(continued)*

Potential project	ID	Zone	Category	Outlook	Region
Townsville South 132kV secondary systems replacement	RZ-06	Ross	Future investment	5 years	NQ
Yabulu South 132kV secondary systems replacement	RZ-07	Ross	Future investment	10 years	NQ
Clare South 132kV secondary systems replacement	RZ-08	Ross	Future investment	10 years	NQ
Line refit works on the 132kV transmission line between Collinsville North, Strathmore and Clare South substations	NQ-01	North	Future investment	10 years	NQ
Line refit works on the 132kV transmission line between Collinsville North, Goonyella Riverside and Moranbah substations	NQ-02	Central West	Future investment	10 years	NQ
Line refit works on the 132kV transmission line between Moranbah, Kemmis and Nebo substations	NQ-03	Central West	Future investment	10 years	NQ
Northern Bowen Basin reinforcement	NQ-04	North	Powerlink Revenue Proposal contingent project	5 years	NQ
Broadsound 275kV selected primary plant replacement	NQ-05	Central West	Future investment	5 years	NQ
Stanwell selected 275kV primary plant replacement	NQ-06	Central West	Future investment	10 years	NQ
Pioneer Valley 132kV primary plant replacement	NQ-07	North	Future investment	10 years	NQ
Alligator Creek 132kV Substation reinvestment	NQ-08	North	Future investment	5 years	NQ
North Goonyella 132kV secondary systems replacement	NQ-09	North	Future investment	5 years	NQ
Strathmore 275kV and 132kV secondary systems replacement	NQ-10	North	Future investment	10 years	NQ
Strathmore SVC secondary systems replacement	NQ-11	North	Future investment	5 years	NQ
Lilyvale 132kV secondary systems replacement	NQ-12	Central West	Future investment	10 years	NQ
Line refit works on the 275kV transmission line between Calliope River Substation and Wurdong Substation	GW-01	Gladstone	Future investment (scenario dependent and market benefits)	10 years	CQ
Rebuild the 275kV transmission line between Calliope River Substation and the Wurdong Tee	GW-02	Gladstone	Future investment	10 years	CQ
Reinvestment into the 132kV transmission line between Gladstone Power Station and Calliope River	GW-03	Gladstone	Future investment	10 years	CQ
Reinvestment into the 132kV transmission line between Gladstone Power Station and Callemondah Substation and QAL 132kV reinvestment	GW-04	Gladstone	Scenario dependent	10 years	CQ
Wurdong 275kV selected primary plant replacement	GW-05	Gladstone	Future investment	10 years	CQ
Pandoin 132kV secondary systems replacement	BR-01	Central West	Future investment	10 years	CQ
Calvale 275kV selected primary plant replacement	CW-01	Central West	Future investment	10 years	CQ
Moura 132/66kV transformer replacements	CW-02	Central West	Future investment	5 years	CQ
Blackwater 132kV secondary systems replacement	CW-03	Central West	Future investment	10 years	CQ
Biloela 132kV secondary systems replacement	CW-04	Central West	Future investment	10 years	CQ

Table F.1 Possible future network investments in the 10-year outlook period *(continued)*

Potential project	ID	Zone	Category	Outlook	Region
CQ-SQ Wide Area Monitoring Protection and Control Stage 2	CQSQ-01	Wide Bay	Future investment	5 years	SQ
Line refit works on the 275kV transmission line between Woolooga and Teebar Creek substations	CQSQ-02	Wide Bay	Future investment	10 years	SQ
Line refit works on the 275kV transmission line between Woolooga and South Pine substations	CQSQ-03	Wide Bay	Future investment	5 years	SQ
South West Queensland Augmentation	SWSEQ-01	South West	Powerlink Revenue Proposal contingent project	To be determined	SQ
Surat Basin Area Network Development	SWSEQ-02	Surat	Powerlink Revenue Proposal contingent project	To be determined	SQ
Woolooga 275kV and 132kV selected primary plant replacement	WB-01	Wide Bay	Future investment	5 years	SQ
Teebar Creek 275kV and 132kV secondary systems replacement	WB-02	Wide Bay	Future investment	10 years	SQ
Woolooga 275kV and 132kV secondary systems replacement	WB-03	Wide Bay	Future investment	10 years	SQ
Middle Ridge 110kV primary plant replacement	SWQ-01	South West	Future investment	5 years	SQ
Middle Ridge 275/110kV transformers life extension	SWQ-02	South West	Future investment	5 years	SQ
Braemar 330kV secondary systems replacement non-iPASS	SWQ-03	Bulli	Future investment	10 years	SQ
Millmerran 330kV AIS secondary systems replacement	SWQ-04	Bulli	Future investment	10 years	SQ
Middle Ridge 275kV and 110kV secondary systems replacement	SWQ-05	South West	Future investment	5 years	SQ
Columboola 132kV secondary systems replacement	SWQ-06	Surat	Future investment	10 years	SQ
Brisbane Area 275kV reinforcement	MZ-01	Moreton	AEMO 2026 ISP Actionable Project	To be determined	SQ
North Brisbane Area Network Development	MZ-02	Moreton	Powerlink Revenue Proposal contingent project	To be determined	SQ
Goodna 110/33kV transformer augmentation	MZ-03	Moreton	Future investment	5 years	SQ
Replacement of the 110kV underground cable between Upper Kedron and Ashgrove West substations	MZ-04	Moreton	Future investment	10 years	SQ
Palmwoods 275kV and 132kV selected primary plant replacement	MZ-05	Wide Bay	Future investment	10 years	SQ
South Pine 275/110kV transformer replacement	MZ-06	Moreton	Future investment	5 years	SQ
South Pine 275kV secondary systems replacement	MZ-07	Moreton	Future investment	5 years	SQ
Abermain 275kV and 110kV secondary systems replacement	MZ-08	Moreton	Future investment	10 years	SQ
Goodna 275kV and 110kV secondary systems replacement	MZ-09	Moreton	Future investment	5 years	SQ
Belmont 110kV and 275kV secondary systems replacement	MZ-10	Moreton	Future investment	10 years	SQ

Table F.1 Possible future network investments in the 10-year outlook period *(continued)*

Potential project	ID	Zone	Category	Outlook	Region
Loganlea 275kV secondary systems replacement	MZ-11	Moreton	Future investment	10 years	SQ
Greenbank 275kV secondary systems replacement	MZ-12	Moreton	Future investment	10 years	SQ
South Pine 110kV secondary systems replacement	MZ-13	Moreton	Future investment	5 years	SQ
Ashgrove West 110kV secondary systems replacement	MZ-14	Moreton	Future investment	5 years	SQ
Bundamba 110kV secondary systems replacement	MZ-15	Moreton	Future investment	10 years	SQ
West Darra 110kV secondary systems replacement	MZ-16	Moreton	Future investment	5 years	SQ
Algester 110kV secondary systems replacement	MZ-17	Moreton	Future investment	10 years	SQ
Murarrie 110kV secondary systems replacement	MZ-18	Moreton	Future investment	5 years	SQ
Line refit works on the 110kV transmission line between Mudgeeraba Substation and Terranora	GCZ-01	Gold Coast	Future investment	5 years	SQ
Mudgeeraba 275/110kV transformer augmentation	GCZ-02	Gold Coast	Future investment	10 years	SQ
Mudgeeraba 275/110kV primary plant and 110kV secondary systems replacement.	GCZ-03	Gold Coast	Future investment	10 years	SQ
Molendinar 275kV secondary systems replacement	GCZ-04	Gold Coast	Future investment	5 years	SQ

F.2 Forecast line intervention outlook for the 10-20 year outlook period

The asset intervention outlook for the 10 to 20-year period (June 2036 to June 2046) identifies transmission lines that may require future intervention or investment responses beyond the TAPR 10-year outlook period. The assets listed in tables F.2 to F.4 are included to provide visibility of potential longer-term network investment and asset management requirements.

Future intervention or investment responses remain subject to ongoing assessment and will be informed by evolving asset condition, network requirements and broader investment drivers.

The information presented is provided in good faith as a planning snapshot based on the best information available at the time of TAPR publication. Inclusion in either outlook should not be interpreted as a committed investment decision or final investment outcome.

Proponents wishing to connect to Powerlink's transmission network are encouraged to contact connections@powerlink.com.au in the first instance.

Potential condition-based programs of work are listed in Table 5.2.

Table F.2 Northern region transmission lines approaching end of technical service: 10–20 year outlook

Zone	Feeder	Voltage	General location
Far North	876	275kV	Between Chalumbin and Walkamin substations
Far North	8905/2	275kV	Between Ross and Woree Tee Tully South substations
Far North	8932	275kV	Between Chalumbin and Tumoulin substations
Far North	7139	132kV	Between Edmonton and Innisfail substations
Far North	7206	132kV	Between Woree and Cairns City substations
Far North	7225, 7226	132kV	Between Woree and Cairns substations
Far North	7227/1, 7227/2	132kV	Between Woree and Cairns City Tee Cairns substations
Far North	7301	132kV	Between Woree and Tully substations
Ross	879, 879R	275kV	Between Strathmore and Haughton River substations
Ross	8857, 8858	275kV	Between Strathmore and Ross substations
Ross	8911, 8911R	275kV	Between Haughton River and Ross substations
Ross	7130/1, 7130/2	132kV	Between Clare South and Townsville South Tee Invicta Mill substations
Ross	7131	132kV	Between Clare South and Townsville South substations
Ross	7182	132kV	Between Ross and Millchester By-Pass substations
Ross	7239, 7240	132kV	Between Garbutt and Alan Sherriff substations
North	822, 822L	275kV	Between Nebo and Strathmore substations
North	833	275kV	Between Broadsound and Lilyvale substations
North	834	275kV	Between Broadsound and Nebo substations
North	856	275kV	Between Stanwell and Broadsound substations
North	7117/1, 7117/2	132kV	Between Kemmis and Moranbah Tee Burton Downs/Greenland substations
North	7118/1, 7118/2	132kV	Between Nebo and Wotonga Tee Coppabella substations
North	7121	132kV	Between Collinsville North and Newlands substations
North	7122	132kV	Between Stony Creek and Goonyella Riverside substations
North	7124/1, 7124/2	132kV	Between Moranbah and Dysart Tee Peak Downs substations
North	7125, 7126	132kV	Between Collinsville North and Proserpine substations
North	7150/1	132kV	Between Lilyvale and Dysart Tee Norwich Park/Bundoora substations
North	7155	132kV	Between Newlands and Goonyella Riverside substations
North	7175	132kV	Between Alligator Creek and Oonooie substations
North	7176	132kV	Between Nebo and Wandoo substations
North	7252	132kV	Between Nebo and Kemmis substations
North	7306	132kV	Between Collinsville North and Stony Creek substations
North	7382	132kV	Between Moranbah and Eagle Downs substations
North	7383	132kV	Between Eagle Downs and Dysart substations
North	7413	132kV	Between Moranbah and Wotonga substations
North	7470	132kV	Between Strathmore and Collinsville North substations

Table F.3 Central region transmission lines approaching end of technical service: 10–20 year outlook

Zone	Feeder	Voltage	General location
Central West	848, 849	275kV	Between Stanwell and Bouldercombe substations
Central West	855	275kV	Between Calvale and Stanwell substations
Central West	789	132kV	Between Lilyvale and Blackwater substations
Central West	7107	132kV	Between Bouldercombe and Rockhampton substations
Central West	7108	132kV	Between Bouldercombe and Rockhampton substations
Central West	7111	132kV	Between Callide A and Baralaba substations
Central West	7113	132kV	Between Baralaba and Blackwater substations
Central West	7114/1, 7114/2	132kV	Between Baralaba and Blackwater Tee Duaringa substations
Central West	7167	132kV	Between Bouldercombe and Stanwell substations
Central West	7185	132kV	Between Stanwell and Grantleigh substations
Central West	7310	132kV	Between Lilyvale and Blackwater substations
Gladstone	865	275kV	Between Wurdong and Boyne Island substation
Gladstone	871	275kV	Between Calvale and Wurdong substations
Gladstone	7194, 7195	132kV	Between Calliope River and Gladstone North substations

Table F.4 Southern region transmission lines approaching end of technical service: 10–20 year outlook

Zone	Feeder	Voltage	General location
Wide Bay	8850	275kV	Between Woolooga and Teebar Creek substations
South West	827	275kV	Between Tarong and Blackwall substations
South West	831	275kV	Between Tarong and Middle Ridge substations
South West	832	275kV	Between Tarong and South Pine substations
South West	875	275kV	Between Tarong and Blackwall substations
South West	8812	275kV	Between Tarong and Mt England substations
Surat	7349	110kV	Between Chinchilla and Columboola substations
Surat	7350	110kV	Between Chinchilla and Columboola Tee Cameby substations
Moreton	802	275kV	Between Mt. England and Blackwall substations
Moreton	805	275kV	Between Swanbank E and Greenbank substations
Moreton	817	275kV	Between Blackwall and Belmont substations
Moreton	825	275kV	Between Mt. England and South Pine substations
Moreton	829	275kV	Between Loganlea and Belmont substations
Moreton	8818	275kV	Between Blackwall and Rocklea substations
Moreton	8822	275kV	Between Greenbank and Belmont substations
Moreton	8823	275kV	Between Mt England and Abermain substations
Moreton	8826	275kV	Between Swanbank E PS and Blackstone substation
Moreton	707	110kV	Between West Darra and Richlands substations
Moreton	749	110kV	Between Belmont and Algester substations
Moreton	762	110kV	Between Belmont and Runcorn substations
Moreton	791	110kV	Between West Darra and Goodna substations
Moreton	7196, 7197	110kV	Between Rocklea and Tennyson substations
Moreton	7287/2, 7288/2	110kV	Between Belmont and Murarrie Tee Sswrd substations
Moreton	7292	110kV	Between Sumner and Rocklea substations
Moreton	7293	110kV	Between Algester and Runcorn substations
Moreton	7295	110kV	Between Goodna and West Darra substations
Moreton	7296	110kV	Between Goodna and Redbank Plains substations

Appendix G TAPR templates methodology

This appendix provides information about Powerlink's Transmission Annual Planning Report (TAPR) Templates.

The National Electricity Rules (NER) require a TAPR to be consistent with the Australian Energy Regulator's (AER) Transmission Annual Planning Report Guidelines (TAPR Guidelines). The TAPR Guidelines set out the required format of TAPRs, including the provision of TAPR Templates to complement the TAPR document. The purpose of the TAPR Templates is to provide a set of consistent data across the National Electricity Market (NEM) to assist stakeholders to make informed decisions.

Readers should note the data provided is not intended to be relied upon explicitly for the evaluation of investment decisions. Interested parties are strongly encouraged to contact Powerlink in the first instance.

The TAPR template data may be directly accessed on Powerlink's TAPR Portal. Alternatively, contact NetworkAssessments@powerlink.com.au for assistance.

G.1 Context

While care is taken in the preparation of TAPR Templates, data is provided in good faith. Powerlink accepts no responsibility or liability for any loss or damage that may be incurred by persons acting in reliance on this information or assumptions drawn from it.

The proposed preferred investment and associated data is indicative, has the potential to change and will be assessed for technical and economic feasibility under the Regulatory Investment Test for Transmission (RIT-T) consultation process as/if required at the appropriate time. TAPR Templates may be updated at the time of RIT-T commencement (separate to annual publication of the TAPR) to reflect the most recent data and to better inform non-network providers. Changes may also be driven by the external environment, advances in technology, non-network solutions and outcomes of other RIT-T consultations which have the potential to shape transmission network development.

There is likely to be more certainty over the need to reinvest in key areas of the transmission network which have been identified in the TAPR in the near-term, as assets approach their anticipated end of technical service life. However, the potential preferred investments (and alternative options) identified in the TAPR Templates undergo detailed planning to confirm alignment with future reinvestment, optimisation and delivery strategies. This near-term analysis provides Powerlink with an additional opportunity to deliver greater benefits to customers through improving and further refining options. In the medium to long-term, there is less certainty regarding the needs or drivers for reinvestments. As a result, considerations in the latter period of the annual planning review require more flexibility and have a greater potential to change or adapt to the external environment as the NEM evolves and customer behaviour changes.

Where an investment is primarily focused on addressing asset condition issues, Powerlink has not attempted to quantify the impact on the market; for example, where there are market constraints arising from reconfiguration of the network around the investment and Powerlink considers that generation operating within the market can address this constraint.

Groupings of some connection points are used to protect the confidentiality of specific customer loads.

G.2 Methodology/principles applied

The TAPR Guidelines incorporate text to define or explain the different data fields in the template. Powerlink has used these definitions in the preparation of the data within the templates.

For connection point templates, the expected unserved energy (EUSE) has been calculated using aggregated failure statistics for network assets, considering both momentary and sustained failures by the following expression:

EUSE = Probability of Asset Failure × Median Restoration time × MW @ Risk

For line segment templates, the expected unserved energy should be interpreted as the annual energy that cannot be supplied by that asset under system normal conditions.

Further to the AER's data field definitions, Powerlink provides details on the methodology used to forecast the daily demand profiles. Table G.1 provides further context for some specific data fields.

The data fields are denoted by their respective TAPR Guideline Rule designation, TGCPXXX (TAPR Guideline Connection Point) and TGTLXXX (TAPR Guideline Transmission Line).

G.3 Development of daily demand profiles

Forecasts of the daily demand profiles for the days of annual maximum and minimum demands over the next 10 years were developed using VISION forecasting and planning software (by Blunomy). These daily demand profiles are an estimate and should only be used as a guide. For further context and explanation of the methodology used to develop minimum and maximum demand profiles refer to Appendix E.2.

The 10-year forecasts of daily demand profiles that have been developed for the TAPR Templates include:

- 50% probability of exceedance (PoE) Maximum demand, MVA (TGCP008)
- Where the megawatt (MW) transfer through the asset with emerging limitations reverses in direction, the megavolt amperes (MVA) is denoted a negative value
- Minimum demand, MVA (TGCP008)
- Where the MW transfer through the asset with emerging limitations reverses in direction, the MVA is denoted a negative value
- 50% PoE Maximum demand, MW (TGCP010)
- Minimum demand, MW (TGCP011).

The maximum demand forecast on the minimum demand day (TGCP009) and the forecast daily demand profile on the minimum demand day (TGCP011) were determined from the minimum (annual) daily demand profiles.

Table G.1 Further Definitions for Specific Data Fields

Data field	Definition
TGCP013 and TGTL008 Maximum load at risk per year	The load at risk takes into account both the network topology and aggregated outage and asset failure statistics for lines, transformers, and switching assets across the network. Where detailed project scopes and project requirements have not been determined, the aggregation of impacted loads was deemed at risk.
TGCP016 and TGTL011 Preferred investment - capital cost	The timing reflected for the estimated capital cost is the year of proposed project commissioning. RIT-Ts to identify the preferred option for implementation would typically commence three to five years prior to this date, relative to the complexity of the identified need, option analysis required and consideration of the necessary delivery timeframes to enable the identified need to be met.
TGCP017 and TGTL012 Preferred investment - Annual operating cost	Powerlink has applied a standard 2% of the preferred investment capital cost to calculate indicative annual operating costs.
TGCP024 Historical connection point rating	Includes the summer and winter ratings for the past three years at the connection point. The historical connection point rating is based on the most limiting network component on Powerlink's network, in transferring power to a connection point. However lower downstream distribution connection point ratings could be more limiting than the connection point ratings on Powerlink's network.
TGCP026 Unplanned outages	Unplanned outage data relates to Powerlink's transmission network assets only. Forced and faulted outages are included in the data provided. Information to date is based on historical outage data.
TGCP028 and TGTL019 Annual economic cost of constraint	The annual economic cost of the constraint is the direct product of the annual expected unserved energy and the Value of Customer Reliability (VCR) related to the investment. It does not consider cost of safety risk or market impacts such as changes in the wholesale electricity cost or network losses.
TGTL005 Forecast 10-year asset rating	Asset rating is based on an enduring need for the asset's functionality and is assumed to be constant for the 10year outlook period.
TGTL017 Historical line load trace	Due to the meshed nature of the transmission network and associated power transfers, the identification of load switching would be labour intensive and the results inconclusive. Therefore, the data provided does not highlight load switching events.

Appendix H Zone and grid section definitions

This appendix provides definitions of the 11 geographical zones and eight grid sections referenced in this Transmission Annual Planning Report (TAPR).

The geographical zones are defined areas of the transmission network used for TAPR reporting purposes. These zones are distinct from the broader Northern Queensland (NQ), Central Queensland (CQ) and Southern Queensland (SQ) regional delineations used in chapters 6, 7 and 8. The regional boundaries do not necessarily align with individual geographical zone boundaries.

For the purpose of chapters 6, 7 and 8, the NQ-CQ interface is defined at Lilyvale and Bouldercombe, and the CQ-SQ interface at Calvale and Wurdong Tee. These are the interface points identified in the regional chapters.

Tables H.1 and H.2 provide detailed definitions of zone and grid sections.

Figure H.1 provides illustrations of the grid section definitions.

Table H.1 Zone definitions

Zone	Area covered
Far North	North of Guybal Munjan and Tully
Ross	North of King Creek and Bowen North, excluding the Far North zone
North	North of Glencoe and Dysart, excluding the Far North and Ross zones
Central West	South of Nebo and Peak Downs, and north of Gin Gin, but excluding the Gladstone zone
Gladstone	South of Raglan, north of Gin Gin and east of Calvale
Wide Bay	Gin Gin, Teebar Creek and Woolooga 275kV substation loads, excluding Gympie
Surat	West of Western Downs and south of Moura, excluding the Bulli zone
Bulli	Goondiwindi (Waggamba) load and the 275/330kV network south of Kogan Creek and west of Middle Ridge
South West	Tarong and Middle Ridge load areas west of Postmans Ridge, excluding the Bulli zone
Moreton	South of Woolooga and east of Middle Ridge, but excluding the Gold Coast zone
Gold Coast	East of Greenbank, south of Coomera to the Queensland/New South Wales border

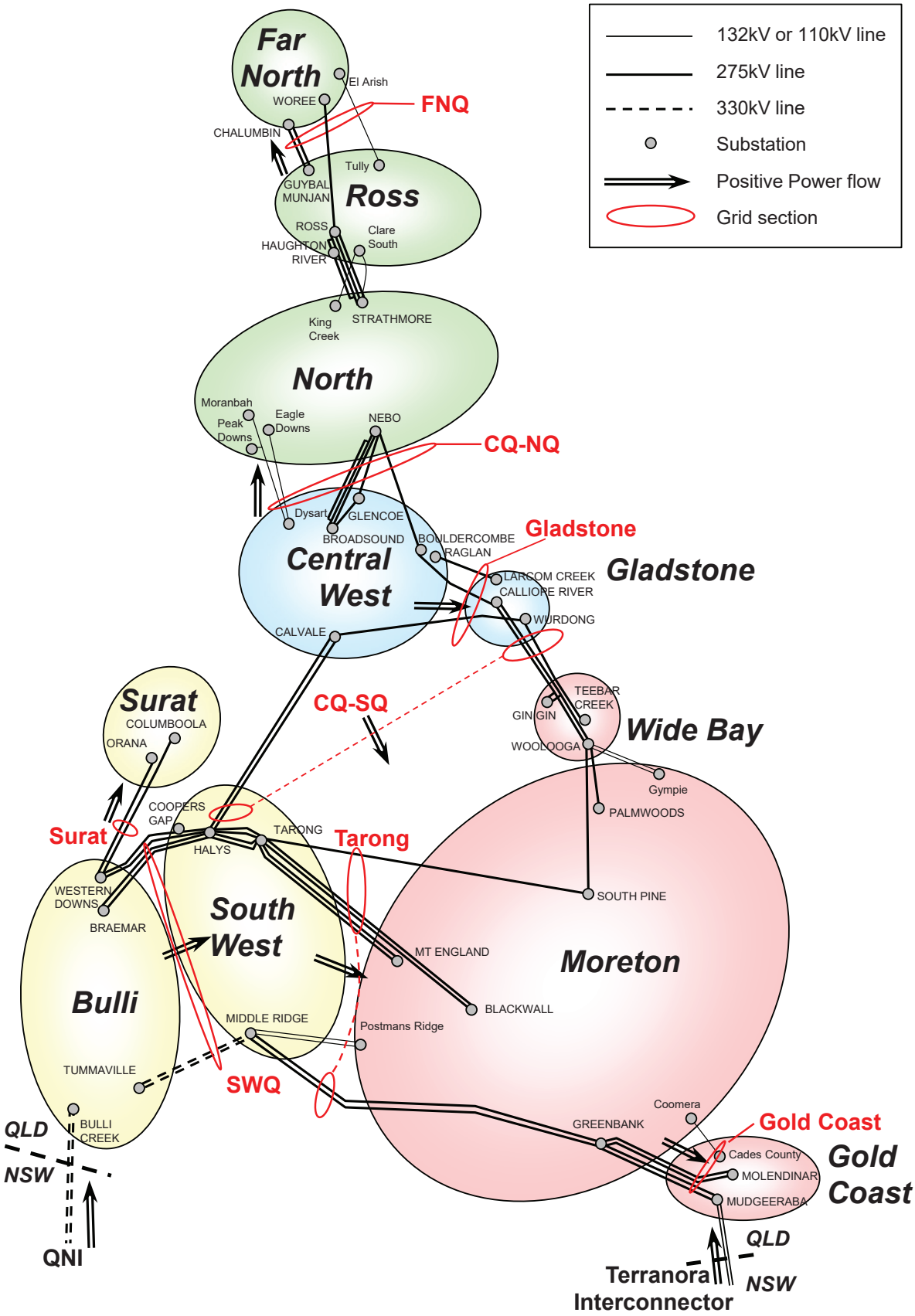
Table H.2 Grid section definitions (1)

Grid Section	Area covered
Far North Queensland (FNQ)	Guybal Munjan into Chalumbin 275kV (2 circuits) Ross/Tully into Woree 275kV (1 circuit) Tully into El Arish 132kV (1 circuit)
Central Queensland-North Queensland (CQ-NQ)	Bouldercombe into Nebo 275kV (1 circuit) Broadsound into Nebo 275kV (2 circuits) Glencoe into Nebo 275kV (1 circuit) Dysart to Peak Downs/Moranbah 132kV (1 circuit) Dysart to Eagle Downs 132kV (1 circuit)
Gladstone	Bouldercombe into Calliope River 275kV (1 circuit) Raglan into Larcom Creek 275kV (1 circuit) Calvale into Wurdong 275kV (1 circuit)
Central Queensland-South Queensland (CQ-SQ)	Wurdong to Teebar Creek 275kV (1 circuit) Calliope River to Gin Gin/Woolooga 275kV (2 circuits) Calvale into Halys 275kV (2 circuits)
Surat	Western Downs to Columboola 275kV (1 circuit) Western Downs to Orana 275kV (1 circuit)
South West Queensland (SWQ)	Western Downs to Halys 275kV (1 circuit) Western Downs to Coopers Gap 275kV (1 circuit) Braemar (East) to Halys 275kV (2 circuits) Tummaville to Middle Ridge 330kV (2 circuits)
Tarong	Tarong to South Pine 275kV (1 circuit) Tarong to Mt England 275kV (2 circuits) Tarong to Blackwall 275kV (2 circuits) Middle Ridge to Greenbank 275kV (2 circuits)
Gold Coast	Greenbank into Mudgeeraba 275kV (2 circuits) Greenbank into Molendinar 275kV (2 circuits) Coomera into Cades County 110kV (1 circuit)

Note:

(1) The grid sections defined are as illustrated in Figure H.1. X into Y – the megawatt (MW) flow between X and Y measured at the Y end; X to Y – the MW flow between X and Y measured at the X end.

Figure H.1 Grid section legend



Appendix I Limit equations

This appendix lists the Queensland intra-regional limit equations, derived by Powerlink, valid at the time of publication. The Australian Energy Market Operator (AEMO) defines other limit equations for the Queensland region of the National Electricity Market in its market dispatch systems.

Limit equations are continually under review to consider changing market and network conditions.

Interested parties should contact Powerlink via NetworkAssessments@powerlink.com.au to confirm the latest form of the relevant limit equation if required.

Table I.1 Far North Queensland grid section voltage stability equation

Measured variable	Coefficient
Constant term (intercept)	597
Total MW generation at Mt Emerald Wind Farm	-0.55
Total MW generation at Kaban Wind Farm	-0.64
Total MW generation at Kareeya Power Station	-0.57
Total MW generation in Ross zone (1)	0.06
Total nominal MVAr of 132kV shunt capacitors online within nominated Cairns area (2)	0.38
Total nominal MVAr of 275kV shunt reactors online within nominated Cairns area (3)	-0.38
Total nominal MVAr of 132kV shunt reactors online within nominated Chalumbin area (4)	-0.36
Total nominal MVAr of 275kV shunt reactors online within nominated Chalumbin area (5)	-0.46
AEMO Constraint ID	Q^NIL_FNQ_8905

Notes:

(1) Ross generation term refers to summated active power generation at Mt Stuart, Townsville, Ross River Solar Farm, Sun Metals Solar Farm, Kidston Solar Farm, Hughenden Solar Farm, Clare Solar Farm, Haughton Solar Farm and Invicta Mill.

(2) The shunt capacitor bank locations, nominal sizes and quantities for the Cairns 132kV area comprise the following:

Innisfail 132kV	1 x 10MVAr
Edmonton 132kV	1 x 13MVAr
Woree 132kV	2 x 54MVAr

(3) The shunt reactor location, nominal sizes and quantities for the Cairns 275kV area comprise the following:

Woree 275kV	2 x 20.2MVAr, 1 x 42MVAr

(4) The shunt reactor location, nominal size and quantities for the Chalumbin 132kV and below area comprise the following:

Chalumbin tertiary	1 x 20.2MVAr

(5) The shunt reactor location, nominal sizes and quantities for the Chalumbin 275kV area comprise the following:

Chalumbin 275kV	2 x 29.4MVAr, 1 x 30MVAr

Table I.2 Central to North Queensland grid section voltage stability equations

Measured variable	Coefficient	
	Equation 1	Equation 2
	Feeder contingency	Townsville contingency
Constant term (intercept)	1,500	1,650
Total MW generation at Barron Gorge, Kareeya and Koombooloomba	0.321	–
Total MW generation at Townsville	0.172	-1.000
Total MW generation at Mt Stuart	-0.092	-0.136
Number of Mt Stuart units online [0 to 3]	22.447	14.513
Total MW northern VRE (1)	-1.00	-1.00
Total nominal MVAr shunt capacitors online within nominated Ross area locations (2)	0.453	0.440
Total nominal MVAr shunt reactors online within nominated Ross area locations (3)	-0.453	-0.440
Total nominal MVAr shunt capacitors online within nominated Strathmore area locations (4)	0.388	0.431
Total nominal MVAr shunt reactors online within nominated Strathmore area locations (5)	-0.388	-0.431
Total nominal MVAr shunt capacitors on line within nominated Nebo area locations (6)	0.296	0.470
Total nominal MVAr shunt reactors on line within nominated Nebo area locations (7)	-0.296	-0.470
Total nominal MVAr shunt capacitors available to the Nebo Q optimiser (8)	0.296	0.470
Total nominal MVAr shunt capacitors on line but not available to the Nebo Q optimiser	0.296	0.470
AEMO Constraint ID	Q^NIL_CN_FDR	Q^NIL_CN_GT

Notes:

(1) Northern VRE includes all solar farms and wind farms in the Far North, Ross and North zones.

(2) The shunt capacitor bank locations, nominal sizes and quantities for the Ross area comprise the following:

Ross 132kV	1 x 50MVAr
Townsville South 132kV	2 x 50MVAr
Dan Gleeson 66kV	2 x 24MVAr
Garbutt 66kV	2 x 15MVAr

(3) The shunt reactor bank locations, nominal sizes and quantities for the Ross area comprise the following:

Ross 275kV	2 x 84MVAr, 2 x 29.4MVAr

(4) The shunt capacitor bank locations, nominal sizes and quantities for the Strathmore area comprise the following:

Newlands 132kV	1 x 25MVAr
Clare South 132kV	1 x 20MVAr
Collinsville North 132kV	1 x 20MVAr

(5) The shunt reactor bank locations, nominal sizes and quantities for the Strathmore area comprise the following:

Strathmore 275kV	1 x 84MVAr

(6) The shunt capacitor bank locations, nominal sizes and quantities for the Nebo area comprise the following:

Moranbah 132kV	1 x 52MVAr
Pioneer Valley 132kV	1 x 30MVAr
Kemmis 132kV	1 x 30MVAr
Dysart 132kV	2 x 25MVAr
Alligator Creek 132kV	1 x 20MVAr
Mackay 33kV	2 x 15MVAr

(7) The shunt reactor bank locations, nominal sizes and quantities for the Nebo area comprise the following:

Nebo 275kV	1 x 84MVAr, 1 x 30MVAr, 1 x 20.2MVAr

(8) The shunt capacitor bank which may be available to the Nebo Q optimiser comprise the following:

Nebo 275kV	2 x 120MVAr

The following table describes limit equations for the Inverter-based Resources (IBRs) in north Queensland. The Boolean AND operation is applied to the system conditions across a row, if the expression yields a True value then the maximum capacity quoted for the farm in question becomes an argument to a MAX function, if False then zero (0) becomes the argument to the MAX function. The maximum capacity is the result of the MAX function.

Table I.3 North Queensland system strength equations

System conditions								Maximum capacity (%)	
Number of Stanwell units online	Number of Stanwell + Callide (1) units online	Number of CQ units online (2)	Clarke Creek Synchronous Condenser	Number of Kareeya units online	Total of Haughton Synchronous Condenser + Townsville GT	NQ Load	Ross + FNQ Load	Haughton Solar Farm	Other NQ plants
≥ 2	≥ 3	≥ 7	≥ 0	≥ 0	≥ 1	> 250	> 100	100% (if Haughton SC ON) 50% (if Haughton SC OFF)	100%
≥ 2	≥ 3	≥ 7	≥ 0	≥ 2	≥ 0	> 350	> 150	100% (if Haughton SC ON) 50% (if Haughton SC OFF)	100%
≥ 1	≥ 4	≥ 6	≥ 0	≥ 2	≥ 1	> 350	> 150	100% (if Haughton SC ON) 50% (if Haughton SC OFF)	100%
≥ 1	≥ 4	≥ 6	≥ 0	≥ 0	≥ 2	> 250	> 100	100%	100%
≥ 1	≥ 4	≥ 6	1	≥ 2	≥ 0	> 350	> 150	100% (if Haughton SC ON) 50% (if Haughton SC OFF)	100%
≥ 2	≥ 3	≥ 7	≥ 0	≥ 0	≥ 1	> 50	> 0	100% (if Haughton SC ON) 10% (if Haughton SC OFF)	70%
≥ 2	≥ 3	≥ 7	≥ 0	≥ 2	≥ 0	> 50	> 0	100% (if Haughton SC ON) 10% (if Haughton SC OFF)	60%
≥ 1	≥ 4	≥ 6	≥ 0	≥ 2	≥ 1	> 50	> 0	100% (if Haughton SC ON) 10% (if Haughton SC OFF)	60%
≥ 1	≥ 4	≥ 6	≥ 0	≥ 0	≥ 2	> 50	> 0	100%	70%
≥ 1	≥ 4	≥ 6	1	≥ 2	≥ 0	> 50	> 0	100% (if Haughton SC ON) 10% (if Haughton SC OFF)	60%
AEMO Constraint ID								Q_NIL_STRGTH_HAUSF	Various (3)

Notes:

(1) Refers to the total number of Callide B and Callide C units online.

(2) Refers to the number of Gladstone, Stanwell and Callide units online.

(3) Q_NIL_STRGTH_CKWF, Q_NIL_STRGTH_CLRSF, Q_NIL_STRGTH_COLSF, Q_NIL_STRGTH_DAYSF, Q_NIL_STRGTH_HAMSF, Q_NIL_STRGTH_HAYSF, Q_NIL_STRGTH_KBWF, Q_NIL_STRGTH_KEP, Q_NIL_STRGTH_KIDSF, Q_NIL_STRGTH_MEWF, Q_NIL_STRGTH_RRSF, Q_NIL_STRGTH_RUGSF, Q_NIL_STRGTH_SMSF, Q_NIL_STRGTH_WHTSF.

Table I.4 Central to South Queensland grid section voltage stability equations

Measured variable	Coefficient
Constant term (intercept)	1,015
Total MW generation at Gladstone 275kV and 132kV	0.1407
Number of Gladstone 275kV units on line [2 to 4]	57.5992
Number of Gladstone 132kV units on line [1 to 2]	89.2898
Total MW generation at Callide B and Callide C	0.0901
Number of Callide B units on line [0 to 2]	29.8537
Number of Callide C units on line [0 to 2]	63.4098
Total MW generation in southern Queensland (1)	-0.0650
Number of 90MVAr capacitor banks available at Boyne Island [0 to 2]	51.1534
Number of 50MVAr capacitor banks available at Boyne Island [0 to 1]	25.5767
Number of 120MVAr capacitor banks available at Wurdong [0 to 3]	52.2609
Number of 50MVAr capacitor banks available at Gin Gin [0 to 1]	31.5525
Number of 120MVAr capacitor banks available at Woolooga [0 to 1]	47.7050
Number of 50MVAr capacitor banks available at Woolooga [0 to 2]	22.9875
Number of 120MVAr capacitor banks available at Palmwoods [0 to 1]	30.7759
Number of 50MVAr capacitor banks available at Palmwoods [0 to 4]	14.2253
Number of 120MVAr capacitor banks available at South Pine [0 to 4]	9.0315
Number of 50MVAr capacitor banks available at South Pine [0 to 4]	3.2522
Equation lower limit	1,550
Equation upper limit	2,100 (2)
AEMO Constraint ID	Q^^NIL_CS, Q:NIL_CS

Notes:

(1) Southern Queensland generation term refers to summated active power generation for generators in the Wide Bay, Moreton, South West, Bulli and Surat zones and Terranora Interconnector and Queensland - New South Wales Interconnector (QNI) transfers (positive transfer denotes northerly flow).

(2) The upper limit is due to a transient stability limitation between Central and Southern Queensland areas.

Table I.5 Tarong grid section voltage stability equations

Measured variable	Coefficient	
	Equation 1	Equation 2
	Calvale-Halys contingency	Tarong-Blackwall contingency
Constant term (intercept) (1)	740	1,124
Total MW generation at Callide B and Callide C	0.0346	0.0797
Total MW generation at Gladstone 275kV and 132kV	0.0134	–
Total MW in Surat, Bulli and South West and QNI transfer (2)	0.8625	0.7945
Surat/Braemar demand	-0.8625	-0.7945
Total MW generation in Moreton	-0.0517	-0.0687
Active power transfer (MW) across Terranora Interconnector	-0.0808	-0.1287
Number of 200MVAr capacitor banks available (3)	7.6683	16.7396
Number of 120MVAr capacitor banks available (4)	4.6010	10.0438
Number of 50MVAr capacitor banks available (5)	1.9171	4.1849
Reactive to active demand percentage (6) (7)	-2.9964	-5.7927
Equation lower limit	3,200	3,200
AEMO Constraint ID	Q^^NIL_TR_CLHA	Q^^NIL_TR_TRBK

Notes:

(1) Equations 1 and 2 are offset by 100MW and 150MW respectively when the Middle Ridge to Abermain 110kV loop is run closed.

(2) Surat, Bulli and South West generation term refers to summated active power generation for all generators listed in Table H.3 in Appendix H in the Surat, Bulli and South West zones and Queensland New South Wales Interconnnector (QNI) transfers (positive transfer denotes northerly flow).

(3) There are currently three capacitor banks of nominal size 200MVAr which may be available within this area.

(4) There are currently 18 capacitor banks of nominal size 120MVAr which may be available within this area.

(5) There are currently 37 capacitor banks of nominal size 50MVAr which may be available within this area.

(6) Reactive to active demand percentage = $\frac{\text{Zone reactive demand}}{\text{Zone Active demand}} \times 100$

Zone reactive demand (MVAr) = Reactive power transfers into the 110kV measured at the 132/110kV transformers at Palmwoods and 275/110kV transformers inclusive of south of South Pine and east of Abermain + reactive power generation from 50MVAr shunt capacitor banks within this zone + reactive power transfer across Terranora Interconnector.

Zone active demand (MW) = Active power transfers into the 110kV measured at the 132/110kV transformers at Palmwoods and the 275/110kV transformers inclusive of south of South Pine and east of Abermain + active power transfer on Terranora Interconnector.

(7) The reactive to active demand percentage is bounded between 10 and 35.

Table I.6 Gold Coast Grid Section Voltage Stability Equation

Measured Variable	Coefficient
Constant term (intercept)	1,351
Moreton to Gold Coast demand ratio (1) (2)	-137.50
Number of Wivenhoe units on line [0 to 2]	17.7695
Number of Swanbank E units on line [0 to 1]	-20.00
Active power transfer (MW) across Terranora Interconnector (3)	-0.9029
Reactive power transfer (MVAr) across Terranora Interconnector (3)	0.1126
Number of 200MVAr capacitor banks available (4)	14.3339
Number of 120MVAr capacitor banks available (5)	10.3989
Number of 50MVAr capacitor banks available (6)	4.9412
AEMO Constraint ID	Q^NIL_GC

Notes:

(1) Moreton to Gold Coast demand ratio = x 100

(2) The Moreton to Gold Coast demand ratio is bounded between 4.7 and 6.0.

(3) Positive transfer denotes northerly flow.

(4) There are currently three capacitor banks of nominal size 200MVAr which may be available within this area.

(5) There are currently 16 capacitor banks of nominal size 120MVAr which may be available within this area.

(6) There are currently 33 capacitor banks of nominal size 50MVAr which may be available within this area.

Appendix J Indicative short circuit currents

Tables J.1 to J.3 show indicative maximum and minimum short circuit currents at Powerlink Queensland's substations. This appendix also shows the indicative System Strength Locational Factor (SSLF) calculated as per the Australian Energy Market Operator's (AEMO) System Strength Impact Assessment Guidelines (Version 2.2). An overview of system strength pricing can be found on Powerlink's website.

J.1 Indicative maximum short circuit currents

Tables J.1 to J.3 show indicative maximum symmetrical three phase and single phase to ground short circuit currents in Powerlink's transmission network for summer 2026/27, 2027/28 and 2028/29.

These results include the short circuit contribution of some of the more significant embedded non-scheduled generators, however smaller embedded non-scheduled generators may have been excluded. As a result, short circuit currents may be higher than shown at some locations. Therefore, this information should be considered as an indicative guide to short circuit currents at each location and interested parties should consult Powerlink and/or the relevant Distribution Network Service Provider (DNSP) for more detailed information.

Powerlink calculated the maximum short circuit currents using a system model:

- in which all generators were represented as a voltage source of 110% of nominal voltage behind sub-transient reactance
- with all model shunt elements removed.

The short circuit currents shown in tables J.1 to J.3 are based on generation shown in the 'Generation Commitments' sheet of the Chapter 9 Network Capability and Performance Data Workbook (together with the more significant embedded non-scheduled generators) on the committed network development as forecast at the end of each calendar year. The tables also show the design rating of the Powerlink substation at each location. Design ratings shown in this appendix are based on Powerlink's current planning and equipment rating policies. Actual equipment ratings may differ due to site-specific conditions, operational constraints, asset configuration, maintenance status, or subsequent rating updates.
No assessment has been provided of the short circuit currents within networks owned by DNSPs or directly connected customers, nor has an assessment been made of the ability of their plant to withstand and/or interrupt the short circuit current.

The maximum short circuit currents presented in this appendix are based on all generating units online and an 'intact' network; that is, all network elements are assumed to be in-service. This assumption can result in short circuit currents appearing to be above plant rating at some locations. Where this is found, detailed assessments are made to determine if the contribution to the total short circuit current that flows through the plant exceeds its rating. If so, the network may be split to create 'normally-open' points as an operational measure to ensure that short circuit currents remain within the plant rating, until longer-term solutions can be justified.

J.2 Indicative minimum short circuit currents

Minimum short circuit currents are used to inform the capacity of the system to accommodate fluctuating loads and power electronic connected systems (including non-synchronous generators and static VAr compensators (SVC)). Minimum short circuit currents are also important in ensuring power quality and system stability standards are met and for ensuring the proper operation of protection systems.

Tables J.1 to J.3 show indicative minimum system normal and post-contingent symmetrical three phase short circuit currents at Powerlink's substations. These were calculated by taking the existing intact network and setting the synchronous generator dispatch to align with AEMO's assumptions for minimum three phase fault level as described in AEMO's 2025 Transition Plan for System Security - Appendix A2. The short circuit current is calculated, using the sub-transient machine impedances, with the system intact and with individual outages of each significant network element.

The minimum short circuit current which results from these outages is reported.

The short circuit currents are calculated using the same methodology as AEMO's assumptions.

These minimum short circuit currents are indicative only. The system strength available to new non-synchronous generators can only be assessed by a Full Impact Assessment using electromagnetic transient (EMT) modelling techniques.

Additional short-circuit information, including detailed fault-level and impedance data, is available through Powerlink's TAPR Portal.

Table J.1 Indicative short circuit currents – Northern Queensland

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Alan Sherriff	132	31.5	4.2	3.8	4.9	14.0	14.2	14.9	15.0	15.4	15.3	1.0322	Ross 275kV
Alligator Creek	132	31.5	3.2	1.8	2.6	4.5	5.9	4.5	5.9	4.5	6.0	1.1300	Ross 275kV
Aurumfield	275	40	1.2	1.1	1.0	4.1	4.6	4.1	4.6	4.3	4.7	1.1060	Ross 275kV
Bolingbroke	132	31.5	2.0	1.9	1.6	2.5	1.9	2.5	1.9	2.5	1.9	1.2135	Ross 275kV
Bowen North	132	31.5	2.0	0.7	0.9	2.8	3.1	2.8	3.1	2.8	3.1	1.1771	Ross 275kV
Cairns (2T)	132	31.5	3.1	0.6	0.7	6.8	8.9	6.8	8.9	7.1	9.2	1.0760	Ross 275kV
Cairns (3T)	132	31.5	3.1	0.6	0.7	6.8	8.9	6.8	9.0	7.1	9.3	1.0760	Ross 275kV
Cardwell	132	31.5	2.0	0.9	1.2	3.3	3.6	3.4	3.6	3.4	3.6	1.1439	Ross 275kV
Chalumbin	132	40	3.4	2.7	3.5	7.4	8.5	7.5	8.5	7.8	8.9	1.0790	Ross 275kV
Chalumbin	275	40	2.0	1.6	2.1	5.4	5.5	5.4	5.6	5.9	6.1	1.0453	Ross 275kV
Clare South	132	31.5	3.4	2.8	3.5	8.2	8.2	8.3	8.2	8.4	8.3	1.0719	Ross 275kV
Collinsville North	132	31.5	4.5	2.3	2.9	9.4	9.9	9.5	9.9	9.6	10.0	1.0561	Ross 275kV
Coppabella	132	31.5	2.2	1.5	1.8	3.0	3.4	3.0	3.4	3.0	3.4	1.1884	Ross 275kV
Crush Creek	275	40	3.5	3.0	4.0	10.8	11.8	11.0	12.0	11.7	12.5	1.0201	Ross 275kV
Dan Gleeson (1T)	132	31.5	4.2	3.8	4.9	13.4	13.6	14.1	14.2	14.5	14.5	1.0326	Ross 275kV
Dan Gleeson (2T)	132	31.5	4.2	3.8	5.0	13.4	13.7	14.1	14.3	14.5	14.6	1.0326	Ross 275kV
Eagle Downs	132	31.5	2.9	1.5	1.7	4.6	4.4	4.6	4.4	4.6	4.4	1.1302	Lilyvale 132kV
Edmonton	132	31.5	2.9	0.9	1.1	6.1	7.3	6.1	7.3	6.3	7.5	1.0835	Ross 275kV
El Arish	132	31.5	2.3	1.0	1.4	3.8	4.6	3.8	4.6	3.9	4.7	1.1213	Ross 275kV
Garbutt	132	31.5	3.9	1.7	2.0	11.4	11.2	12.0	11.7	12.3	11.8	1.0403	Ross 275kV
Goonyella Riverside	132	31.5	3.4	3.0	3.2	6.0	5.5	6.1	5.5	6.1	5.5	1.1109	Ross 275kV
Greenland	132	31.5	3.4	2.1	2.1	5.5	5.1	5.5	5.1	5.5	5.1	1.1168	Ross 275kV

Table J.1 Indicative short circuit currents – Northern Queensland *(continued)*

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Guybal Munjan	275	40	2.2	1.9	2.2	6.7	5.3	6.8	5.3	8.3	9.1	1.0266	Ross 275kV
Haughton River	275	40	2.7	2.1	2.7	8.5	8.6	8.7	8.7	9.6	9.9	1.0132	Ross 275kV
Ingham South	132	31.5	1.9	1.1	1.3	3.5	3.5	3.5	3.5	3.5	3.5	1.1534	Ross 275kV
Innisfail	132	31.5	2.1	1.3	1.7	3.3	3.9	3.3	3.9	3.4	4.0	1.1434	Ross 275kV
Invicta	132	31.5	2.6	2.4	2.4	5.4	4.8	5.4	4.8	5.4	4.9	1.1069	Ross 275kV
Kamerunga (1T)	132	31.5	2.6	0.6	0.8	5.0	5.8	5.0	5.8	5.1	5.9	1.1061	Ross 275kV
Kamerunga (2T)	132	31.5	2.6	0.6	0.8	5.0	5.8	5.0	5.8	5.2	6.0	1.1061	Ross 275kV
Kareeya	132	31.5	3.2	2.4	3.0	6.2	6.8	6.2	6.8	6.5	7.0	1.0957	Ross 275kV
Kemmis	132	31.5	3.9	1.6	2.1	6.2	6.7	6.2	6.7	6.2	6.7	1.1015	Ross 275kV
King Creek	132	31.5	3.0	2.1	2.2	5.2	4.4	5.2	4.4	5.2	4.4	1.0977	Ross 275kV
Lake Ross	132	31.5	4.8	4.3	5.8	19.0	21.1	20.0	22.1	21.0	23.1	1.0190	Ross 275kV
Mackay	132	31.5	3.4	2.9	3.7	5.1	6.1	5.1	6.1	5.1	6.1	1.1190	Ross 275kV
Mackay Ports	132	31.5	2.6	1.6	2.1	3.5	4.1	3.5	4.1	3.5	4.1	1.1609	Ross 275kV
Mindi	132	31.5	3.5	3.3	2.8	4.9	3.7	5.0	3.7	5.0	3.7	1.1167	Ross 275kV
Moranbah	132	31.5	4.0	3.2	4.3	8.1	9.6	8.1	9.6	8.1	9.6	1.0986	Ross 275kV
Moranbah Plains	132	31.5	2.6	2.3	2.8	4.4	4.8	4.4	4.8	4.5	4.8	1.1548	Ross 275kV
Moranbah South	132	31.5	3.3	2.7	3.1	5.8	5.3	5.8	5.3	5.8	5.3	1.1224	Ross 275kV
Mt Mclaren	132	31.5	1.5	1.4	1.3	2.1	2.3	2.1	2.3	2.1	2.3	1.2720	Ross 275kV
Nebo	132	40	7.1	6.2	7.8	14.4	16.4	14.6	16.6	14.8	16.7	1.0525	Ross 275kV
Nebo	275	40	4.6	4.0	5.0	12.3	12.2	12.6	12.5	12.9	12.7	1.0371	Ross 275kV
Newlands	132	31.5	2.5	1.3	1.7	3.6	4.0	3.6	4.0	3.6	4.0	1.1535	Ross 275kV
North Goonyella	132	31.5	2.9	2.5	2.5	4.6	3.8	4.6	3.8	4.6	3.8	1.1353	Ross 275kV
Oonooie	132	31.5	2.4	1.5	2.0	3.1	3.7	3.1	3.7	3.1	3.7	1.1770	Ross 275kV

Table J.1 Indicative short circuit currents – Northern Queensland *(continued)*

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Peak Downs	132	31.5	2.8	2.1	2.2	4.2	3.7	4.2	3.7	4.3	3.7	1.1369	Lilyvale 132kV
Pioneer Valley	132	31.5	4.1	3.6	4.5	6.7	7.6	6.7	7.6	6.7	7.6	1.0966	Ross 275kV
Proserpine	132	31.5	2.3	1.5	2.0	3.3	3.8	3.3	3.8	3.3	3.9	1.1503	Ross 275kV
Ross	132	40	4.8	4.3	5.9	19.7	22.1	20.8	23.1	21.8	24.2	1.0181	Ross 275kV
Ross	275	40	2.8	2.4	3.3	10.5	11.4	10.8	11.6	12.2	13.2	1.0000	Ross 275kV
Springlands	132	31.5	4.7	2.3	2.8	10.1	11.1	10.2	11.2	10.3	11.3	1.0519	Ross 275kV
Stony Creek	132	31.5	2.5	1.2	1.4	3.7	3.6	3.7	3.6	3.7	3.6	1.1417	Ross 275kV
Strathmore	275	40	3.5	3.0	4.0	11.0	12.0	11.2	12.1	11.8	12.7	1.0198	Ross 275kV
Strathmore	132	40	4.8	2.3	2.8	10.4	11.7	10.5	11.7	10.6	11.9	1.0505	Ross 275kV
Townsville PS	132	31.5	3.5	2.4	3.2	10.2	10.7	11.0	11.8	11.2	12.0	1.0537	Ross 275kV
Townsville East	132	31.5	3.9	1.6	1.8	13.5	12.9	13.8	13.1	14.1	13.2	1.0407	Ross 275kV
Townsville South	132	31.5	4.3	3.9	5.5	18.4	21.8	19.0	22.4	19.5	22.9	1.0309	Ross 275kV
Tully	132	31.5	2.8	1.5	1.8	5.0	5.7	5.0	5.7	5.1	5.8	1.0892	Ross 275kV
Tully South	275	40	1.7	1.2	1.4	3.9	3.7	4.0	3.7	4.1	3.8	1.0506	Ross 275kV
Tumoulin	275	40	1.8	1.3	1.6	4.5	5.0	4.6	5.0	4.9	5.3	1.0540	Ross 275kV
Turkinje	132	31.5	1.8	1.2	1.6	2.8	3.2	2.8	3.2	2.9	3.3	1.1932	Ross 275kV
Walkamin	275	40	1.7	1.4	1.8	4.3	4.9	4.4	4.9	4.6	5.1	1.0575	Ross 275kV
Wandoo	132	31.5	3.3	3.1	2.6	4.6	3.3	4.6	3.3	4.6	3.3	1.1241	Ross 275kV
Woree	132	40	3.2	2.7	3.9	7.1	9.6	7.1	9.6	7.4	10.0	1.0730	Ross 275kV
Woree	275	40	1.8	1.5	2.0	4.6	5.4	4.6	5.4	4.9	5.7	1.0530	Ross 275kV
Wotonga	132	31.5	3.5	1.7	2.2	6.1	7.0	6.1	7.0	6.1	7.1	1.1138	Ross 275kV
Yabulu South	132	31.5	3.8	3.2	3.9	11.5	10.8	13.0	14.2	13.3	14.4	1.0425	Ross 275kV

Table J.2 Indicative short circuit currents – Central Queensland

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Baralaba	132	31.5	3.4	2.1	2.0	4.4	3.8	4.4	3.8	4.4	3.8	1.1421	Lilyvale 132kV
Biloela	132	31.5	6.1	3.5	4.0	8.2	8.4	8.2	8.4	8.3	8.5	1.0889	Gin Gin 275kV
Blackwater	132	31.5	4.0	3.3	4.1	6.0	6.9	6.0	6.9	6.0	6.9	1.0480	Lilyvale 132kV
Bluff	132	31.5	2.6	2.3	2.5	3.5	4.3	3.5	4.3	3.5	4.3	1.1057	Lilyvale 132kV
Bouldercombe	275	40	10.1	8.6	10.2	22.8	21.6	23.5	22.1	23.6	22.2	1.0375	Gin Gin 275kV
Bouldercombe	132	40	10.2	6.3	7.8	15.2	17.4	15.3	17.6	15.3	17.6	1.0595	Gin Gin 275kV
Broadsound	275	40	6.0	4.9	6.4	16.8	17.9	17.4	18.5	17.6	18.6	1.0434	Lilyvale 132kV
Bundoora	132	31.5	5.2	4.4	5.2	9.5	9.2	9.5	9.2	9.6	9.2	1.0120	Lilyvale 132kV
Callemondah	132	31.5	16.0	6.7	7.1	22.5	25.0	22.7	25.2	27.1	29.4	1.0397	Gin Gin 275kV
Calliope River	132	40	17.5	14.2	18.0	25.3	30.4	25.5	30.6	31.3	37.3	1.0372	Gin Gin 275kV
Calliope River	275	40	10.4	8.7	11.3	22.4	25.6	22.9	26.0	28.2	31.2	1.0231	Gin Gin 275kV
Calvale	275	40	10.2	8.4	10.7	24.7	26.9	25.4	27.5	29.9	31.4	1.0379	Gin Gin 275kV
Calvale (1T)	132	40	6.6	2.8	3.1	8.6	9.4	8.7	9.5	8.8	9.6	1.0839	Gin Gin 275kV
Calvale (2T)	132	40	6.8	3.1	3.3	9.0	9.8	9.0	9.8	9.2	10.0	1.0822	Gin Gin 275kV
Duaringa	132	31.5	1.9	1.6	1.4	2.3	2.9	2.3	2.9	2.3	2.9	1.2140	Lilyvale 132kV
Dysart	132	31.5	3.2	1.9	2.4	4.8	5.4	4.9	5.4	4.9	5.4	1.1044	Lilyvale 132kV
Egans Hill	132	31.5	6.4	1.6	1.8	8.5	8.3	8.6	8.3	8.6	8.3	1.0851	Gin Gin 275kV
Gladstone PS	132	40	16.0	12.6	14.8	22.2	25.4	22.3	25.5	26.4	29.4	1.0411	Gin Gin 275kV
Gladstone PS	275	40	9.9	8.4	10.7	20.7	23.1	21.1	23.4	25.5	27.4	1.0241	Gin Gin 275kV
Gladstone South	132	31.5	12.3	9.6	11.1	16.4	17.4	16.5	17.4	18.8	19.1	1.0479	Gin Gin 275kV
Glencoe	275	40	4.4	2.3	2.2	9.1	7.3	9.7	9.1	9.8	9.2	1.0568	Lilyvale 132kV
Grantleigh	132	31.5	2.3	2.0	1.7	2.7	2.8	2.7	2.8	2.7	2.8	1.2084	Gin Gin 275kV

Table J.2 Indicative short circuit currents – Central Queensland *(continued)*

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Gregory	132	31.5	5.7	4.7	6.0	10.6	11.8	10.6	11.8	10.7	11.9	1.0027	Lilyvale 132kV
Larcom Creek	275	40	9.2	3.3	4.4	16.9	18.7	17.1	18.9	18.8	20.3	1.0296	Gin Gin 275kV
Larcom Creek	132	40	7.9	4.2	5.0	12.6	14.3	12.6	14.3	12.9	14.6	1.0597	Gin Gin 275kV
Lilyvale	132	40	5.9	4.8	6.3	11.2	12.9	11.3	13.0	11.3	13.0	1.0000	Lilyvale 132kV
Lilyvale	275	40	3.5	2.6	3.2	6.8	6.6	6.9	6.7	6.9	6.7	1.0216	Lilyvale 132kV
Moura	132	31.5	3.2	1.5	2.0	4.4	5.4	4.4	5.4	4.4	5.4	1.1545	Gin Gin 275kV
Muranu	275	40	-	-	-	-	-	16.0	14.9	16.3	15.1	-	-
Norwich Park	132	31.5	2.7	1.2	1.1	3.7	2.7	3.7	2.7	3.7	2.7	1.1088	Lilyvale 132kV
Pandoin	132	31.5	5.4	1.2	1.3	7.1	6.1	7.1	6.2	7.1	6.2	1.0971	Gin Gin 275kV
Raglan	275	40	7.7	4.3	3.9	12.7	11.3	12.8	11.3	13.1	11.5	1.0375	Gin Gin 275kV
Rockhampton (1T)	132	31.5	5.1	1.8	2.1	6.6	6.4	6.6	6.4	6.6	6.4	1.1022	Gin Gin 275kV
Rockhampton (5T)	132	31.5	5.0	1.8	2.1	6.4	6.2	6.4	6.2	6.4	6.2	1.1047	Gin Gin 275kV
Stanwell	132	40	4.8	3.7	4.3	6.1	6.5	6.1	6.5	6.1	6.5	1.1085	Gin Gin 275kV
Stanwell	275	40	10.8	9.0	11.3	26.3	27.7	27.3	29.1	27.6	29.3	1.0381	Gin Gin 275kV
Wurdong	275	40	9.4	6.4	6.4	17.5	17.3	17.9	17.5	19.4	18.5	1.0267	Gin Gin 275kV
Wycarbah	132	31.5	3.7	3.0	3.2	4.6	5.4	4.6	5.4	4.6	5.4	1.1346	Gin Gin 275kV
Yarwun	132	31.5	8.0	4.5	6.0	13.2	15.1	13.2	15.1	13.5	15.4	1.0617	Gin Gin 275kV

Table J.3 Indicative short circuit currents – Southern Queensland

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Abermain	110	40	12.9	10.4	11.7	22.6	25.4	22.8	25.6	22.8	25.6	1.0209	Greenbank 275kV
Abermain	275	40	8.1	6.3	7.0	20.7	20.6	21.2	20.9	21.2	21.0	1.0054	Greenbank 275kV
Algester	110	31.5	12.8	11.5	12.5	22.2	21.6	22.4	21.7	22.4	21.7	1.0207	Greenbank 275kV
Ashgrove West	110	31.5	12.1	9.3	10.4	20.1	20.9	20.3	21.1	20.4	21.1	1.0258	Greenbank 275kV
Banana Bridge	275	40	6.6	5.0	6.9	28.9	30.0	29.3	30.7	31.5	34.1	1.0007	Western Downs 275kV
Belmont	275	40	7.8	7.2	8.8	19.1	19.3	19.5	19.6	19.5	19.6	1.0051	Greenbank 275kV
Belmont	110	40	15.3	14.3	18.5	29.8	36.4	30.2	36.8	30.2	36.8	1.0128	Greenbank 275kV
Blackstone	275	40	8.6	7.8	10.0	25.2	27.6	25.8	28.1	25.9	28.1	1.0017	Greenbank 275kV
Blackstone	110	40	14.5	13.3	15.2	27.1	29.3	27.4	29.6	27.4	29.6	1.0160	Greenbank 275kV
Blackwall	275	40	9.8	8.3	10.6	26.1	27.1	27.0	27.8	27.1	27.8	1.0048	Greenbank 275kV
Blythdale	132	31.5	3.1	2.2	3.0	4.4	5.4	4.4	5.4	4.4	5.4	1.1113	Western Downs 275kV
Braemar (East)	330	50	5.7	3.2	3.1	26.1	27.5	26.2	27.6	26.6	28.0	1.0272	Western Downs 275kV
Braemar (West)	330	50	5.3	3.3	3.1	26.1	27.5	26.2	27.6	26.6	28.0	1.0094	Western Downs 275kV
Braemar (East)	275	50	7.8	5.2	7.1	28.8	32.8	28.9	32.9	29.2	33.1	1.0266	Western Downs 275kV
Braemar (West)	275	50	6.5	4.5	6.1	31.2	33.3	31.4	33.6	32.5	34.4	1.0050	Western Downs 275kV
Bulli Creek	330	50	6.8	6.0	6.6	20.6	15.8	20.6	15.8	20.7	15.8	1.0204	Western Downs 275kV
Bulli Creek	132	40	3.0	2.9	3.4	4.3	4.8	4.3	4.8	4.3	4.8	1.1398	Western Downs 275kV
Bundamba	110	31.5	11.1	7.6	7.8	18.0	17.0	18.1	17.1	18.1	17.1	1.0275	Greenbank 275kV
Cameby	132	31.5	4.5	3.5	4.0	9.5	8.7	9.5	8.8	9.5	8.8	1.0659	Western Downs 275kV
Chinchilla	132	31.5	3.7	2.6	3.5	6.6	8.1	6.6	8.1	6.7	8.1	1.0873	Western Downs 275kV
Clifford Creek	132	31.5	3.9	3.2	3.3	6.1	5.4	6.1	5.4	6.1	5.4	1.0810	Western Downs 275kV
Columboola	275	40	4.8	3.7	4.7	15.1	13.9	15.2	14.0	15.5	14.2	1.0125	Western Downs 275kV
Columboola	132	40	6.4	4.7	6.4	17.8	20.9	17.9	20.9	18.0	21.0	1.0370	Western Downs 275kV

Table J.3 Indicative short circuit currents – Southern Queensland *(continued)*

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Condabri Central	132	31.5	4.7	3.7	3.8	9.3	6.9	9.3	6.9	9.4	6.9	1.0609	Western Downs 275kV
Condabri North	132	31.5	5.8	4.4	5.4	14.2	13.1	14.2	13.1	14.2	13.1	1.0438	Western Downs 275kV
Condabri South	132	31.5	3.9	3.2	2.9	6.7	4.5	6.7	4.5	6.7	4.5	1.0804	Western Downs 275kV
Coopers Gap	275	40	8.1	2.8	3.7	18.9	18.4	19.0	18.5	19.1	18.6	1.0181	Western Downs 275kV
Diamondy	275	40	5.9	5.2	6.3	10.2	11.3	10.2	11.4	10.2	11.4	1.0354	Western Downs 275kV
Dinoun South	132	31.5	4.3	3.5	4.0	7.0	7.3	7.0	7.3	7.1	7.3	1.0707	Western Downs 275kV
Eurombah	132	40	4.4	3.3	4.3	7.5	9.1	7.5	9.1	7.5	9.1	1.0672	Western Downs 275kV
Eurombah	275	40	2.6	1.2	1.4	4.9	5.0	4.9	5.0	4.9	5.0	1.0491	Western Downs 275kV
Fairview	132	31.5	2.9	2.4	3.2	4.2	5.2	4.2	5.2	4.2	5.2	1.1177	Western Downs 275kV
Fairview South	132	31.5	3.6	2.8	3.8	5.5	6.9	5.5	6.9	5.5	6.9	1.0895	Western Downs 275kV
Gin Gin	275	40	6.1	4.3	4.5	9.8	9.2	10.3	9.5	10.7	9.6	1.0000	Gin Gin 275kV
Gin Gin	132	40	8.6	6.7	7.6	12.8	13.8	13.1	14.2	13.4	14.3	1.0185	Gin Gin 275kV
Goodna	275	40	7.8	5.5	6.1	18.1	17.2	18.5	17.4	18.5	17.5	1.0287	Western Downs 275kV
Goodna	110	40	14.6	12.9	13.5	27.1	28.7	27.5	29.0	27.5	29.0	1.0164	Greenbank 275kV
Greenbank	275	50	8.5	7.7	10.1	24.1	26.6	24.7	27.0	24.7	27.1	1.0000	Greenbank 275kV
Halys	275	50	12.2	9.6	11.8	36.9	32.0	37.3	32.2	37.7	32.4	1.0167	Western Downs 275kV
Kumbarilla Park	275	40	5.9	1.4	1.6	17.3	16.2	17.3	16.2	17.4	16.3	1.0320	Western Downs 275kV
Kumbarilla Park	132	40	7.2	4.2	5.1	11.7	13.4	11.7	13.4	11.7	13.4	1.0578	Western Downs 275kV
Loganlea	110	40	13.3	12.0	14.9	24.0	28.4	24.2	28.7	24.2	28.7	1.0170	Greenbank 275kV
Loganlea	275	40	7.3	6.0	7.1	16.7	16.6	17.0	16.8	17.0	16.8	1.0059	Greenbank 275kV
Middle Ridge	110	40	10.6	8.8	11.4	22.7	26.5	22.7	26.6	22.7	26.6	1.0350	Greenbank 275kV
Middle Ridge	275	40	7.6	6.7	8.2	20.7	20.1	20.8	20.2	20.8	20.2	1.0136	Greenbank 275kV
Middle Ridge (4T)	330	50	5.8	3.6	3.6	14.3	13.4	14.4	13.5	14.4	13.5	1.0278	Western Downs 275kV

Table J.3 Indicative short circuit currents – Southern Queensland *(continued)*

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Middle Ridge (5T)	330	50	5.9	3.6	3.5	14.7	13.9	14.8	13.9	14.8	13.9	1.0274	Western Downs 275kV
Millmerran	330	50	6.3	5.8	7.4	21.9	23.0	21.9	23.1	22.0	23.1	1.0232	Western Downs 275kV
MISS	330	50	5.2	4.5	5.8	15.4	16.3	15.4	16.3	15.4	16.4	1.0297	Western Downs 275kV
Molendinar	110	40	11.9	10.2	13.4	20.2	25.4	20.4	25.5	20.4	25.5	1.0199	Greenbank 275kV
Molendinar (1T)	275	40	5.0	2.1	2.4	8.7	8.3	8.8	8.4	8.8	8.4	1.0175	Greenbank 275kV
Molendinar (2T)	275	40	5.0	2.1	2.4	8.7	8.3	8.8	8.4	8.8	8.4	1.0176	Greenbank 275kV
Mt England	275	40	9.6	8.1	9.9	25.9	25.1	26.8	25.7	26.8	25.7	1.0072	Greenbank 275kV
Mudgeeraba	275	40	5.4	4.3	4.7	9.9	8.9	10.0	9.0	10.0	9.0	1.0143	Greenbank 275kV
Mudgeeraba	110	40	11.0	10.0	12.6	18.1	21.8	18.2	21.8	18.2	21.9	1.0233	Greenbank 275kV
Murarrie	110	40	13.9	12.7	16.0	25.2	30.0	25.4	30.3	25.5	30.3	1.0164	Greenbank 275kV
Murarrie (1T)	275	40	6.8	2.3	2.6	14.4	13.9	14.6	14.1	14.7	14.1	1.0092	Greenbank 275kV
Murarrie (2T)	275	40	6.8	2.3	2.6	14.4	14.1	14.6	14.2	14.7	14.2	1.0092	Greenbank 275kV
Oakey	110	31.5	4.9	1.3	1.4	10.8	10.9	10.8	10.9	10.8	10.9	1.0935	Greenbank 275kV
Oakey PS	110	31.5	5.1	3.7	5.0	12.1	13.5	12.1	13.5	12.1	13.5	1.0882	Greenbank 275kV
Orana	275	40	5.4	2.9	3.7	17.6	16.7	17.7	16.8	18.3	17.2	1.0073	Western Downs 275kV
Palmwoods	275	40	5.6	3.4	4.1	9.3	9.5	9.7	9.9	9.8	9.9	1.0299	Greenbank 275kV
Palmwoods	132	40	9.2	6.8	8.7	14.0	16.7	14.4	17.1	14.5	17.2	1.0403	Greenbank 275kV
Palmwoods (7T)	110	40	5.7	2.6	2.3	7.4	7.7	7.5	7.7	7.5	7.7	1.0834	Greenbank 275kV
Palmwoods (8T)	110	40	5.7	2.6	2.3	7.4	7.7	7.5	7.7	7.5	7.7	1.0834	Greenbank 275kV
Redbank Plains	110	31.5	13.0	9.5	10.1	22.5	21.4	22.7	21.5	22.8	21.5	1.0207	Greenbank 275kV
Richlands	110	31.5	13.2	11.0	12.6	23.1	23.5	23.4	23.7	23.4	23.7	1.0202	Greenbank 275kV
Rocklea	110	40	14.6	12.9	15.6	26.6	30.3	27.1	30.7	27.1	30.7	1.0180	Greenbank 275kV
Rocklea (1T)	275	40	7.0	2.3	2.6	14.4	13.0	14.7	13.2	14.7	13.2	1.0122	Greenbank 275kV
Rocklea (2T)	275	40	5.4	2.3	2.6	9.4	8.8	9.6	9.0	9.6	9.0	1.0235	Greenbank 275kV

Table J.3 Indicative short circuit currents – Southern Queensland *(continued)*

Substation	Voltage (kV)	Substation Design Rating (kA)	Indicative minimum system normal 3 phase fault level (kA)	Indicative minimum N-1		Indicative maximum short circuit currents						SSLF	Ref Node
				2026/27		2026/27		2027/28		2028/29			
				3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)	3 phase (kA)	L – G (kA)		
Runcorn	110	31.5	11.8	8.6	9.7	19.7	19.8	19.9	19.9	19.9	19.9	1.0237	Greenbank 275kV
South Pine	275	40	9.3	7.9	10.6	22.4	26.0	24.1	28.8	24.2	28.9	1.0099	Greenbank 275kV
South Pine (East)	110	40	13.6	11.5	15.6	24.2	31.3	24.9	32.2	25.0	32.3	1.0253	Greenbank 275kV
South Pine (West)	110	40	12.9	10.1	11.7	21.6	24.8	22.0	25.3	22.0	25.3	1.0249	Greenbank 275kV
Sumner	110	31.5	12.8	9.1	9.9	21.8	21.4	22.0	21.6	22.0	21.6	1.0226	Greenbank 275kV
Swanbank E	275	40	8.5	7.3	9.0	24.7	26.8	25.3	27.2	25.3	27.3	1.0017	Greenbank 275kV
Tangkam	110	31.5	6.0	4.2	5.6	14.8	16.0	14.8	16.0	14.8	16.0	1.0729	Greenbank 275kV
Tarong	275	50	11.8	9.5	12.6	38.6	40.5	39.2	40.8	39.5	41.0	1.0111	Greenbank 275kV
Tarong	66	31.5	12.3	7.0	7.7	15.5	16.6	13.9	23.7	13.9	23.7	1.0642	Greenbank 275kV
Teebar Creek	275	40	4.9	2.3	2.6	7.9	7.4	9.3	10.2	9.4	10.3	1.0319	Gin Gin 275kV
Teebar Creek	132	40	7.2	4.5	5.3	10.8	11.5	11.7	13.0	11.7	13.1	1.0469	Gin Gin 275kV
Tennyson	110	31.5	10.8	1.8	1.9	16.9	16.9	17.1	17.0	17.1	17.0	1.0309	Greenbank 275kV
Tummaville	330	50	6.2	5.8	7.0	20.5	19.1	20.6	19.1	20.6	19.2	1.0242	Western Downs 275kV
Upper Kedron	110	40	13.1	11.4	11.8	22.4	20.0	22.8	20.2	22.8	20.2	1.0227	Greenbank 275kV
Wandoan South	275	40	3.6	2.9	3.9	9.0	10.8	9.1	10.8	9.2	10.9	1.0272	Western Downs 275kV
Wandoan South	132	40	5.3	4.1	5.6	10.7	13.9	10.7	13.9	10.8	13.9	1.0512	Western Downs 275kV
West Darra	110	31.5	14.5	13.3	13.9	26.5	25.0	26.9	25.2	26.9	25.2	1.0173	Greenbank 275kV
Western Downs	275	50	6.8	5.1	7.1	31.6	33.7	32.0	34.6	34.3	37.6	1.0000	Western Downs 275kV
Woolooga	275	40	6.4	5.4	6.9	11.5	13.1	13.2	15.5	13.3	15.7	1.0223	Gin Gin 275kV
Woolooga	132	40	9.0	7.1	9.5	15.8	20.1	16.9	21.5	17.0	21.6	1.0394	Gin Gin 275kV
Yuleba North	275	40	3.2	2.6	3.4	7.0	7.6	7.0	7.6	7.0	7.7	1.0349	Western Downs 275kV
Yuleba North	132	40	4.8	3.8	4.8	8.6	10.3	8.6	10.3	8.6	10.4	1.0590	Western Downs 275kV

Appendix K Designated Network Assets

This appendix provides information about which parts of Powerlink's transmission network are Designated Network Assets (DNAs) and the owners of DNAs.

K.1 Introduction

In July 2021, the Australian Energy Market Commission (AEMC) made the Connection to Dedicated Network Assets Rule. The rule change introduced the concept of a DNA into the National Electricity Rules (NER). Under the new rule, new transmission lines with a total route length in excess of 30 kilometres (km) are adopted as part of the shared transmission network and deemed to be a DNA under the NER.

Powerlink has three DNAs:

- MacIntyre DNA
- Western Downs DNA
- Kidston DNA.

This appendix includes information about which parts of the network are DNAs and the identities of the owners of those DNAs.

K.2 MacIntyre DNA

Powerlink is the owner of the MacIntyre DNA.

Table K.1 identifies the components of the MacIntyre DNA.

Table K.1: Main components of the MacIntyre DNA and tenure arrangements

No	Asset Component	Description	Tenure
1	Network Interface Assets	Cut-in-works and related assets from the Identified User Shared Assets (IUSA) to the existing Shared Transmission Network	Easement
2	IUSA	330kV Tummaville Switching Station	Freehold
3	DNA Component 1	330kV Transmission line between Tummaville Switching Station and MacIntyre Intermediate Switching Station and associated easements	Easement
4	DNA Component 2	330kV MacIntyre Intermediate Switching Station and associated access easement	Freehold (switching station) and easement

More information on the MacIntyre DNA is available on Powerlink's website.

K.3 Western Downs DNA

Powerlink is the owner of the Western Downs DNA.

Table K.2 identifies the components of the Western Downs DNA.

Table K.2: Main components of the Western Downs DNA and tenure arrangements

No	Asset Component	Description	Tenure
1	DNA Component 1	48.5km of 275kV double circuit transmission line between Halys Substation and the Diamondy Switching Station and associated easements	Easement
2	DNA Component 2	275kV Diamondy Switching Station and associated access easement	Freehold (switching station) and easement

More information on the Western Downs DNA is available on Powerlink's website.

K.4 Kidston DNA

Powerlink is the owner of the Kidston DNA.

Table K.3 identifies the components of the Kidston DNA.

Table K.3: Main components of the Kidston DNA and tenure arrangements

No	Asset Component	Description	Tenure
1	DNA Component 1	275kV single circuit transmission line between Guybal Munjan Substation and Aurumfield Switching Station and associated easements	Easement
2	DNA Component 2 Made up of: DNA Component 2 (Shared) and DNA Component 2 (Dedicated Connection Bays)	275kV Aurumfield Switching Station and associated access easement	Freehold (switching station) and easement

More information on the Kidston DNA is available on Powerlink's website.

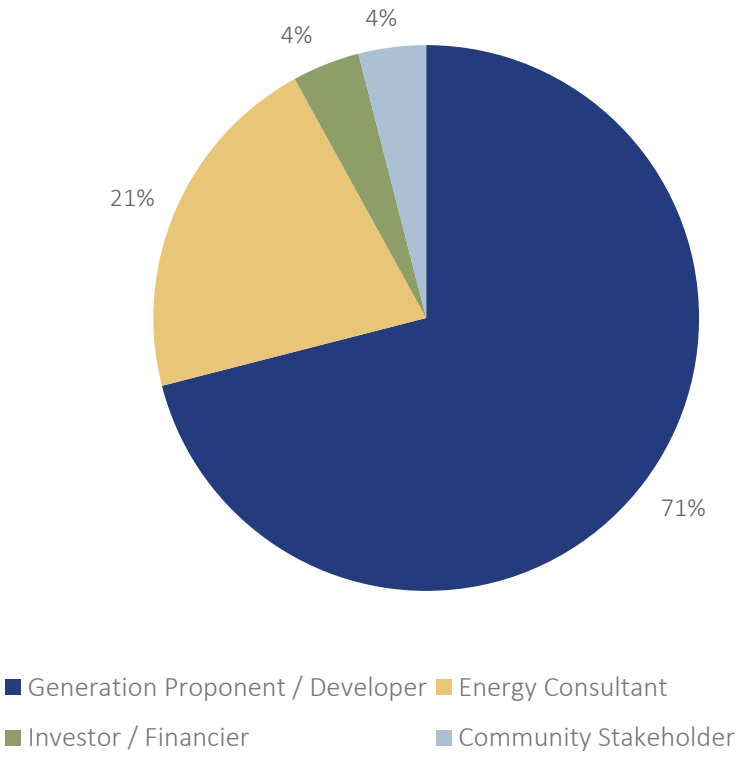
Appendix L TAPR survey

This appendix summarises the key outcomes of the 2025 Transmission Annual Planning Report (TAPR) survey.

Powerlink conducts an annual TAPR survey as a pre-planning activity to seek insights from market participants and interested parties about what can be improved to the quality of information provided in the TAPR and the format it is presented in.

Figure L.1 provides an illustration of the representation of respondents.

Figure L.1 Representation of respondents

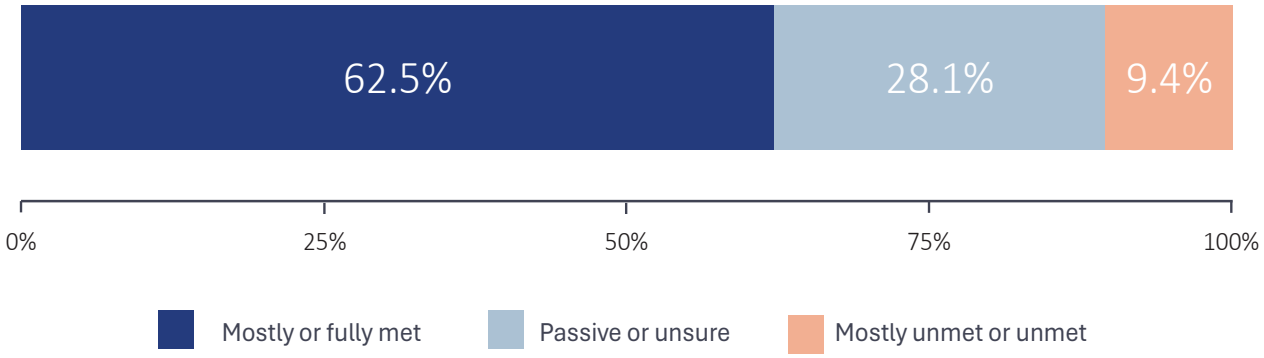


Respondents to the 2025 survey indicated the following primary uses for the TAPR:

- Understanding the best place/s to connect (i.e. connection locations and network capacity)
- Understanding current or future network constraints
- Many used the document and portal together and the most referred to chapters were to understand future network requirements, strategic planning and possible network investments for up to 10 years.

Figure L.2 provides an illustration of the TAPR usefulness according to respondents to the 2025 survey.

Figure L.2 TAPR usefulness
Extent to which TAPR met planning or decision-making needs



- Most responses (62.5%) indicated that the TAPR meets planning or decision-making needs were either mostly met or fully met
- Just over one quarter of responses were passive or unsure about the TAPR usefulness. Potentially among these responses are usability and/or accessibility issues or not knowing how to read or use the data
- Less than 10% were dissatisfied (mostly unmet or unmet).

Table L.1 outlines Powerlink's response to the main improvement requests from the 2025 survey.

Table L.1 Future improvement suggestions

No	Improvement request	Powerlink response
1	Discuss key outages over the next year	Primarily due to security concerns, Powerlink does not release outages in a forum available to the general public. Powerlink customers will continue to be notified by the outage management team and will be kept up to date with any updates. Powerlink customers can also access outage information from the Australian Energy Market Operator's (AEMO) Network Outage Scheduler.
2	Key grid constraints and how they are addressed	This is broadly addressed in Chapter 5, with links to the Queensland Energy Roadmap and AEMO's 2026 Integrated System Plan (ISP). The TAPR maintains confidentiality obligations and does not discuss the impact of grid constraints on individual customers.
3	Access to raw data for graphs used in the report	Data and graphs for the energy and demand projections, and network capability and performance, chapters, are available on Powerlink's website.
4	Portal improvements with more detail on thermal limits, loads, line utilisation, line/ substation ratings, network flow data, time series flows, key outages over the next year and grid constraints.	Summer normal and emergency line ratings are available in the TAPR Portal, accessible in Excel and located in the Useful Links section on the left side bar of the portal. Powerlink is working towards responding to stakeholder requests for more network information and will iteratively release new features. This year we have made usability improvements, and added historical feeder flow data between the regional reference nodes.
5	Two long-term forecast scenarios – 2040 and 2050. The T2040 vision could be included in the TAPR. The purpose of these scenarios is to enable consideration of efficiencies in grid development and longer-term cost optimisation in the planning within the 10-year horizon.	The Queensland Energy Roadmap and the ISP are useful sources of information developed specifically to consider long-term requirements, as opposed to the compliance requirements and purpose of TAPR under the National Electricity Rules (NER) which is bound by a 10-year planning horizon.
6	Open portal access (reduce access controls)	Powerlink's transmission network is identified as critical infrastructure under the *Security of Critical Infrastructure Act 2018* (Cth). This places obligations on Powerlink to manage risks with what a threat actor could potentially do with the information to disrupt the asset or a component/ subcomponent. Scanning registration requests prior to portal access is a measure Powerlink has implemented to minimise risk, support network resilience and ensure data about our network is used for the purpose it is intended. Users can request access to TAPR portal information via our Rosetta-hosted platform by providing their business, government or education institution related contact details. Access requests from gmail, yahoo, hotmail or outlook email accounts are generally not granted, and will require additional verification. Any organisation or individual encountering difficulty obtaining access to the portal can email NetworkAssessments@powerlink.com.au for assistance.
7	More detail on connection works, recently commissioned and committed network developments; Specifically, MWac export capacity and voltage. Greater accuracy on proposed commissioning dates.	The recently commissioned and committed network developments chapter provides information on the status of connection projects since the 2025 TAPR. Available generation capacity for existing and committed generators, including megawatt capacity per year, connected to Powerlink's transmission network is available and can be downloaded in the network capability and performance data workbook published on Powerlink's website. The proposed commissioning dates may be influenced by various factors and requires close coordination between Powerlink and the customer to navigate delivery and technical testing to energise the generation asset. Powerlink has a regulatory obligation to report Key Connection Information (KCI) to AEMO quarterly, which details connection information provided to Powerlink by the connecting customer.
8	Mid-year update on key developments and/or deviations	Powerlink aligns its TAPR preparation and publication with its obligations under Clause 5.12.2 of the NER, which requires Transmission Network Service Providers to publish a TAPR by 31 October each year, reflecting the outcomes of the annual planning review. Further, since publication of the 2025 TAPR, Powerlink has provided email, LinkedIn and web-based regulatory process updates to interested stakeholders, including for our major investment program in Central Queensland.

Table L.1 Future improvement suggestions (*continued*)

No	Improvement request	Powerlink response
9	Using battery energy storage systems (BESS) for active system strength and synthetic inertia	BESS can be used to provide stable voltage waveform ('efficient') level system strength and inertia services. In June 2025, Powerlink completed a Regulatory Investment Test for Transmission (RIT-T) to address system strength requirements in Queensland and has established processes where new proponents can request efficient level system strength services be provided by Powerlink. Demonstrated technical and operational evidence will be required before BESS can be relied on for minimum level system strength. This is subject to ongoing broader industry detailed analysis to understand the benefits and technical contribution that BESS can provide to the minimum level and network security more broadly. Powerlink will contract for the efficient level system strength services when there is a need identified and service available in the area. BESS can also provide synthetic inertia and if there is an identified need in future, Powerlink will contract for the required services, subject to regulatory consultation, and if assessed as prudent and efficient to do so.
10	Transition of Renewable Energy Zones (REZ) to Regional Energy Hubs (Hubs)	Hubs have replaced REZs for gas, renewable energy and storage development. Development of Hubs will take account of broader system requirements, such as resource availability, existing grid infrastructure and proximity to major load centres to ensure efficient outcomes for the whole system. Powerlink is ready to support the Queensland Government in ensuring Hub declarations are market-led and aligned to community expectations. Powerlink continues to progress all connections under the NER.
11	Mining load from 600MW+ demand spike of North Bowen Basin electrification	This is referred to in Chapter 6 (Table 6.4, project NQ-04) which discusses the potential for Northern Bowen Basin reinforcement and Powerlink's proposed contingent project included in the 2027-32 Revenue Proposal.
12	Integrating Social Impact Assessments (SIA) into RIT-T timelines to avoid delivery delays	The Australian Energy Regulator's RIT-T Application Guideline requires Powerlink to consider social licence issues in the identification of credible options to meet identified needs, and notes it is up to Powerlink whether and how it engages relevant communities and interested stakeholders, and that this may differ depending on the nature of the project. SIAs are a supporting input that strengthens our engagement and social performance, considered in RIT-T options and delivery timelines on a case-by-case basis. Many of our RIT-T consultations are asset replacement focused with limited external impact and may not consistently trigger an SIA. For more complex RIT-Ts, such as for actionable ISP projects, system security or for greenfield sites, Powerlink will identify SIA triggers early to inform consultation and engagement timelines. Powerlink's Community Engagement Approach outlines our approach to community engagement and the principles we commit to when maintaining our existing network, or planning and building the network of the future. Our Community Investment and Sponsorships and Community Grants support projects, initiatives and activities in communities where Powerlink operates. Powerlink is also committed to engaging with landholders, and implemented a new Landholder Payment Framework in 2023 to enhance payments for landholders hosting Powerlink infrastructure and introduce a payment for adjacent landholders.
13	Upgrading grid models to reflect extension of state-owned coal assets	For the TAPR, Powerlink's network planning assumptions are based on the Queensland Energy Roadmap, ISP, AEMO generation information and expected unit closure spreadsheet and therefore already reflect extension of state-owned coal assets.

Appendix M Glossary

ABS	Australian Bureau of Statistics
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
AFL	Available Fault Level
AI	Artificial Intelligence
AIS	Air Insulated Switchgear
BESS	Battery Energy Storage System
CAA	Connection and Access Agreement
CBD	Central Business District
CER	Consumer Energy Resources
CPA	Contingent Project Application
CPS	Connection Performance Standard
CQ	Central Queensland
CQ-SQ	Central Queensland to South Queensland
CQ-NQ	Central Queensland to North Queensland
DNA	Designated Network Assets
DNSP	Distribution Network Service Provider
DSM	Demand side management
ECS	Emergency Control Scheme
EFCS	Emergency Frequency Control Schemes
EJPC	Executive Joint Planning Committee
ENA	Energy Networks Australia
EMT	Electromagnetic Transient
EOI	Expression of interest
ESOO	Electricity Statement of Opportunities
EUSE	Expected unserved energy
FCAS	Frequency Control Ancillary Services
FIA	Full Impact Assessment
FNQ	Far North Queensland
FRG	Forecasting Reference Group
FTPWG	Future Transition Points Working Group
GPSRR	General Power System Risk Review
GWh	Gigawatt hours
HV	High Voltage
IBL	Inverted-based Loads
IBR	Inverter-based Resources
ISP	Integrated System Plan
IUSA	Identified User Shared Assets
JPB	Jurisdictional Planning Body
JPC	Joint Planning Committee
kA	Kiloampere
KCI	Key Connection Information
kV	Kilovolts
kW	Kilowatt
MCC	Material Change in Circumstances
MSL	Minimum System Load
MVA	Megavolt Ampere
MVAr	Megavolt Ampere reactive
MW	Megawatt
MWh	Megawatt hour
NEM	National Electricity Market
NEMDE	National Electricity Market Dispatch Engine
NER	National Electricity Rules
NSCAS	Network Support and Control Ancillary Services
NSP	Network Service Providers
NSW	New South Wales
NQ	North Queensland
NWMP	North West Minerals Province
OFGS	Over Frequency Generator Shedding
OTPWG	Operational Transition Points Working Group
PACR	Project Assessment Conclusions Report
PADR	Project Assessment Draft Report
PDA	Priority Development Area
PHES	Pumped Hydro Energy Storage
PoE	Probability of Exceedance
PSCAD	Power Systems Computer Aided Design
PSCR	Project Specification Consultation Report
PSMRG	Power System Modelling Reference Group
PTI	Priority Transmission Investment
PV	Photovoltaic

Appendix M Glossary *(continued)*

QHES	Queensland Household Energy Survey
QIC	Queensland Investment Corporation
QNI	Queensland to New South Wales Interconnector
RAS	Remedial Action Scheme
RIT-D	Regulatory Investment Test for Distribution
RIT-T	Regulatory Investment Test for Transmission
RPRG	Revenue Proposal Reference Group
RWG	Regulatory Working Group
SIA	Social Impact Assessment
SEQ	South East Queensland
SLD	Single Line Diagram
SQ	Southern Queensland
SPS	Special Protection Scheme
SRES	Small Scale Renewable Energy Scheme
SSIAG	System Strength Impact Assessment Guidelines
SSLF	System Strength Locational Factor
SSSP	System Strength Service Provider
SVC	Static VAr Compensator
SWQ	South West Queensland
TAPR	Transmission Annual Planning Report
TNSP	Transmission Network Service Provider
UFLS	Under Frequency Load Shed
UVLS	Under Voltage Load Shed
VCR	Value of Customer Reliability
VRE	Variable Renewable Energy
WAMPAC	Wide Area Monitoring Protection and Control

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