Future network requirements

05

05. Future network requirements

This chapter focuses on potential investments required on the transmission network within the first five years of the 10-year outlook period for the Transmission Annual Planning Report (TAPR). It includes information on forecast network limitations, the management of assets and network risks, Regulatory Investment Tests for Transmission (RIT-Ts), Priority Transmission Investments (PTIs), upcoming programs of work, and actionable projects relevant to Queensland referenced in the 2024 Integrated System Plan (ISP).

Key highlights

- Powerlink's regulated capital expenditure program of work will continue to focus on risks arising from the condition and performance of existing aged assets, as well as emerging limitations in the capability of the network.
- Powerlink's approach to investment decision making includes assessing whether an enduring need exists for assets and investigating alternate network configuration opportunities, and/or non-network solutions where feasible, to manage asset and network risk.
- Powerlink is addressing system strength and inertia limitations identified by the Australian Energy Market Operator (AEMO) within the five-year outlook period.
- Powerlink is working with AEMO and other stakeholders on actionable ISP projects and the Gladstone Project.
- Renewal of secondary systems assets will continue to be a key focus for regulatory consultations in the coming year.
- Local and global demand for resources that are essential for transmission projects continues to put upward pressure on costs and extend equipment delivery timeframes. Powerlink is actively seeking to mitigate these pressures to drive value for customers.
- Powerlink will continue to implement changes to the timing, scope and bundling of proposed transmission line refit works to maximise the potential for more cost-effective solutions as recommended in its Asset Reinvestment Review, concluded in June 2023.
- Powerlink is continuing with the development and roll out of the Wide Area Monitoring Protection and Control (WAMPAC) platform to maximise the capability of the network and provide an additional layer of security and resilience to system disturbances and events.

5.1 Introduction

Powerlink is actively monitoring the changing outlook for the Queensland region of the National Electricity Market (NEM), including the integration of generation and energy storage in future transmission plans. These plans include:

- non-network solutions
- reinvesting in assets to extend their technical service life
- determining optimal locations for new generators
- replacing existing assets with assets of a different type, configuration or capacity
- investing in assets to maintain planning standards and support efficient market outcomes
- removing some assets without replacement where there is no longer an enduring need.

The National Electricity Rules (NER) requires the TAPR to include a forecast of constraints and inability to meet the network performance requirements set out in Schedule 5.1 of the NER, or relevant legislation or regulations, over one, three and five years[1]. The TAPR must also provide estimated load reductions that would defer forecast limitations for a period of 12 months and state any intent to issue request for proposals for augmentation, replacement of network assets or non-network alternatives[2].

Further, the TAPR is required to be consistent with the Australian Energy Regulator's (AER) TAPR Guidelines, and include information pertinent to all proposed:

- augmentations to the network and replacements of network assets
- network asset retirements or asset de-ratings that would result in a network constraint in the 10-year outlook period[3].

1 National Electricity Rules (NER), clause 5.12.2(c)(3).
2 NER, clause 5.12.2(c)(4).
3 NER, clauses 5.12.2(c), (c)(5), and (c)(1A).

05. Future network requirements

This chapter on proposed future network developments contains:

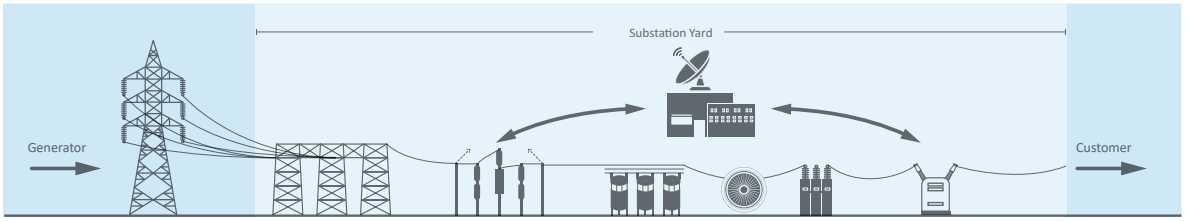
- information regarding assets reaching the end of their technical service life and options to address the risks arising from ageing assets remaining in service, including asset reinvestment, non-network solutions, potential network reconfigurations, asset retirements or de-ratings[4]
- identification of emerging future limitations[5] with potential to affect supply reliability including estimated load reductions required to defer these forecast limitations by 12 months[6]
- a statement of intent to issue requests for proposals, typically undertaken through the RIT-T consultation process, for the proposed augmentation of the transmission network, replacement of ageing network assets, or non-network alternatives, identified as part of the annual planning review[7]
- a summary of network limitations over the next five years[8]
- a table summarising possible connection point proposals
- information on how proposed augmentations and the replacement of network assets relate to AEMO's most recent ISP[9].

Where appropriate, all transmission network, distribution network or non-network alternatives are considered as options for investment. Submissions for non-network alternatives to proposed investments are invited by emailing NetworksAssessment@powerlink.com.au.

The functions performed by the major transmission network assets discussed in this chapter are illustrated in Figure 5.1.

4 See Table A.1 in Appendix A for a description of planning options.
5 Identification of forecast limitations in this chapter does not mean that there is an imminent supply reliability risk. The NER requires identification of limitations which are expected to occur some years into the future, assuming that demand for electricity is consistent with the forecast in this TAPR.
6 NER, clause 5.12.2(c)(4)(iii).
7 NER, clause 5.12.2(c)(4)(iv).
8 NER, clause 5.12.2(c)(3).
9 NER, clause 5.12.2(c)(6).

Figure 5.1 Functions of major transmission 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 Forecast network limitations

5.2.1 Forward planning

Powerlink's forward planning aims to allow adequate time to identify emerging limitations and to implement appropriate network and/or non-network solutions to maintain transmission services to meet the planning standard in our Transmission Authority[10].

Emerging limitations may be triggered by thermal plant ratings (including fault current ratings), protection relay load limits, voltage stability and/or dynamic stability. Appendix I lists the indicative maximum short circuit currents and fault rating of the lowest rated plant at each Powerlink substation and voltage level. The maximum short circuit currents take into account the committed transmission projects listed in Chapter 8 and existing and committed generation listed in Chapter 6.

Based on Powerlink's Central scenario load forecast (refer to Chapter 2), Queensland's transmission delivered maximum demand is expected to have steady growth with an average annual increase of 2.2% per annum over the next 10 years[11].

Notwithstanding network limitations which may result from new loads, such as in the Gladstone zone, Powerlink does not anticipate undertaking any significant augmentation works during the 10-year outlook period based on load growth alone. However, the changing generation mix (and associated peak to average production ratios of variable renewable energy (VRE) generation) may lead to increased constraints across critical grid sections. Powerlink will consider these potential constraints, including the effects of falling minimum demand, holistically with the emerging condition-based drivers as part of the planning process and in conjunction with the most recent ISP (refer to Chapter 7).

Projects that could be triggered by the commitment of large mining, metal processing and industrial loads, and for the electrification of existing loads, are also discussed in Chapter 7.

5.2.2 Forecast network limitations within the next five years

Table 5.1 summarises limitations in the five-year period identified in AEMO's latest System Security Reports.

Table 5.1 Limitations in the five-year outlook period

Limitation	Zone	Reason for anticipated limitation	Time limitation may be reached			TAPR Reference
			1-year outlook (2025/26)	3-year outlook (up to 2028/29)	5-year outlook (up to 2030/31)	
System strength shortfalls	Moreton, Central West and Surat zones	AEMO identified system strength shortfalls December 2024	—	Shortfalls at Greenbank, Lilyvale and Western Downs nodes (1)	—	Section 3.4
Inertia shortfall	Statewide	AEMO identified inertia shortfall December 2024	—	In 2027/28 (2)	—	Section 3.4

Notes:

(1) Refer to AEMO's December 2024 System Strength Report.

(2) AEMO's December 2024 Inertia Report indicated the previously declared inertia shortfall had decreased in magnitude to 256 megawatt seconds in 2027/28.

Based on AEMO's Step Change scenario forecast there are no other network limitations forecast to occur in Queensland in the next five years[12].

10 See Appendix A for discussion of Powerlink's approach to maintaining compliance with its Transmission Authority.
11 Refer to Table 2.2.
12 Refer to NER Clause 5.12.2(c)(3).

5.2.3 Forecast network limitations beyond five years

The timing of forecast network limitations may be influenced by a number of factors, such as:

- load growth
- industrial developments (including electrification of existing industrial processes)
- new and retiring generation
- the planning standard in Powerlink's Transmission Authority
- joint planning with other Network Service Providers (NSP).

Based on Powerlink's Central scenario forecast, there are a small number of areas where network limitations are forecast to emerge due to load growth within the 10-year forecast period.

Gladstone

Load growth in the Gladstone zone, together with the potential retirement of the Gladstone Power Station, requires Powerlink to invest in the network (refer to Section 5.6.2).

Northern Bowen Basin

Network limitations are forecast to exceed Powerlink's reliability obligations in the Northern Bowen Basin due to load growth by the end of the 10-year forecast period (refer to Section 5.5.3). Powerlink will consider this emerging limitation, together with the potential electrification load in the Northern Bowen Basin (refer to Section 7.2.2), emerging condition-based drivers, and non-network developments to understand the most economic development. Network solutions may include advancing condition-based rebuild or a more incremental targeted investment such as flow control devices on the existing assets.

Edmonton

Load-driven limitations are forecast to occur at the Edmonton 132/22kV Substation and the 22kV distribution network supplying the Gordonvale area by the end of the 10-year period. Joint planning has identified that establishing a new 132/22kV substation is the preferred network solution south of Cairns. The new Powerlink substation would be supplied via a cut-in to Powerlink's 132kV circuit between Innisfail and Edmonton substations (Merinda area). Due to changing land usage and constraints, the easement and substation site must be acquired ahead of the identified need.

Loganlea

Load-driven limitations are forecast to occur by the end of the forecast period on Energy Queensland's 110kV feeders supplying the Jimboomba and Yarrabilba area and associated 275/110kV transformation capacity at Powerlink's Loganlea Substation. Joint planning has identified establishing a new 275/110/33kV substation as the preferred network solution (Yarrabilba area). This substation will initially cut into the existing 275kV double circuit between Greenbank and Molendinar substations. Again, due to changing land usage and constraints, the easement and substation site must be acquired ahead of the identified need arising.

5.3 Consultations

Consultation processes for proposed transmission investments are conducted via RIT-Ts, Expressions of Interest (EOI) or Funded Augmentations under the NER[13].

All consultation documents are published and made available on Powerlink's website.

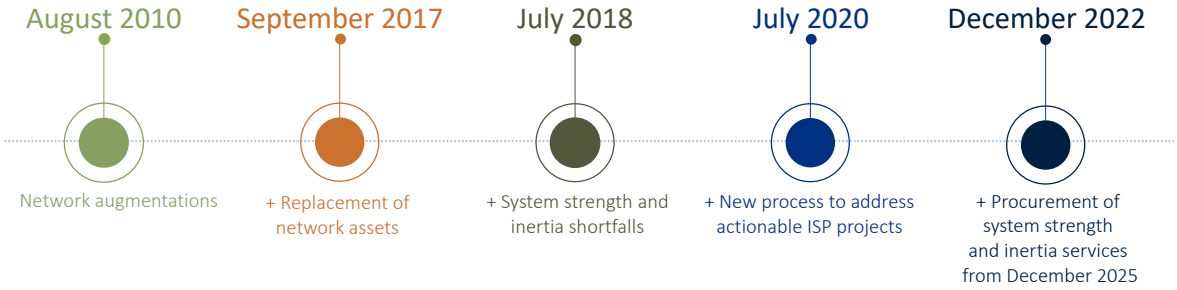
5.3.1 RIT-T Consultation Process

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[14].

[13] Powerlink has not commenced or completed any Funded Augmentations since publishing the 2024 TAPR.

[14] For actionable ISP projects, the RIT-T consultation process is undertaken according to rule 5.16A of the NER. For investments that are not actionable ISP projects, clause 5.16.4 of the NER applies. The NER, clauses 5.15.3(a) and (b)(2), set the RIT-T threshold at $5 million. The AER's latest cost threshold review increased the value to $8 million for three years from 1 January 2025. For a brief discussion of the application of the RIT-T framework to system security services, see Tim Nelson et. al., National Electricity Market Wholesale Market Settings Review, draft report, August 2025, page 176.

Figure 5.2 Expansion of the application of the RIT-T process for proposed transmission network investments



The majority of RIT-T consultations undertaken by Powerlink relate to projects that are not actionable ISP projects.

Figure 5.3 RIT-T consultation process for projects that are not actionable ISP projects

5.3.2 Completed and current consultations – proposed transmission investments

Powerlink completed one PTI assessment since publishing the 2024 TAPR, being for the Gladstone Project. The PTI assessment was undertaken via modifications to the RIT-T framework[15].

Powerlink has completed two RIT-T consultations since publication of the 2024 TAPR.

Table 5.2 RIT-T consultations completed since publication of the 2024 TAPR

Consultation
Maintaining Reliability of Supply to Mansfield (April 2025)
Addressing System Strength Requirements in Queensland from December 2025 (June 2025)

Table 5.3 RIT-T consultations underway (as at 30 September 2025)

Consultation	TAPR Reference
Maintaining Reliability of Supply to Kamerunga, Cairns and Northern Beaches Area	Section 5.5.1
Maintaining Reliability of Supply and Addressing Condition Risks at Ingham South	Section 5.5.2
Addressing the Risk of Premature Current Transformer Failures in Queensland	Section 5.8.2

[15] Powerlink, Gladstone Project: Candidate Priority Transmission Investment Assessment, final assessment report, June 2025, pages 73-76.

5.3.3 Future consultations – proposed transmission investments

Anticipated consultations

Powerlink's capital expenditure program of work in the 10-year outlook period will focus on investment in the transmission network to manage the risks arising from ageing assets remaining in service. These emerging risks are discussed in sections 5.5 to 5.7. Table 5.4 summarises consultations Powerlink anticipates undertaking within the next 12 months under the RIT-T to address either the proposed investment in a network asset or limitation.

Table 5.4 Anticipated consultations (12 months to October 2026)

Consultation (1)	TAPR Reference
Maintaining Reliability of Supply at Chalumbin	Section 5.5.1
Addressing the Static VAr Compensator (SVC) Secondary Systems Condition Risks at Strathmore	Section 5.5.3
Addressing the Secondary Systems Condition Risks at Middle Ridge	Section 5.7.4
Maintaining Power Transfer Capability and Reliability of Supply at Tennyson	Section 5.7.5
Managing the Risk of Specific 275kV Capacitive Voltage Transformers Failures	Section 5.8.2

Note:

(1) The anticipated consultations listed in Table 5.4 reflect the RIT-T status as of 30 September 2025.

Actionable and future ISP projects

The 2024 ISP identified three projects in Queensland as requiring action by Powerlink:

- Gladstone Grid Reinforcement (now referred to as the Gladstone Project)
- Central Queensland to Southern Queensland Connection
- Queensland to New South Wales Interconnector (QNI) Connect.

Table 5.5 Actionable Queensland PTI network projects, 2024 ISP

Project	ISP optimal timing (Step Change scenario)	Brief ISP Description
Gladstone Project	2030-31 Powerlink published the Gladstone Project: Candidate Priority Transmission Investment Assessment Final Assessment Report - 6 June 2025[16] targeting March 2029 for project delivery.	Increase network capacity from Central Queensland into the Gladstone area to support the area's industry once Gladstone Power Station retires[17].
Central Queensland to Southern Queensland Connection	2031-32[18]	Greatly increase the transfer limit between Central and Southern Queensland and connect to the Borumba Pumped Hydro project.

Note:

(1) Source: AEMO, 2024 Integrated System Plan, June 2024, pages 61 and 63.

16 Powerlink, Gladstone Project: Candidate Priority Transmission Investment Assessment final assessment report, June 2025.
17 On 1 October 2025, the expected closure date for the Gladstone Power Station was updated from 2035 to 31 March 2029. See AEMO, Generating Unit Expected Closure Year, October 2025.
18 Borumba PHES was modelled as an anticipated project in the 2024 ISP with a date of 2030-31.

Table 5.6 Actionable ISP network project, 2024 ISP

Project	ISP optimal timing (Step Change scenario)	Brief ISP Description
QNI Connect	2034-35	Add capacity between southern Queensland and New England, following development of the New England Renewable Energy Zone (REZ) Network Infrastructure Project. Project Assessment Draft Report (PADR) due by June 2026.

Note:

(1) Source: AEMO, 2024 Integrated System Plan, June 2024, page 63.

5.3.4 Connection point proposals

Planning of new or augmented 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 DNSP (Energex or Ergon Energy) or be initiated by generators or customers.

Table 5.7 lists connection works that are anticipated to be required within the 10-year outlook period[19].

Table 5.7 Connection point commitments (1)

Connection Point Name (2)	Proposal	Zone
Kidston Pumped Storage Hydro (3)	New PHES	Ross
Broadsound Solar Farm (3)	New Solar Farm	Central West
Lotus Creek Wind Farm	New Wind Farm	Central West
Boulder Creek Wind Farm	New Wind Farm	Central West
Woolooga Battery Energy Storage System (BESS)	New BESS	Wide Bay
Supernode BESS (3)	New BESS	Moreton
Swanbank BESS Stages 1 & 2 (3)	New BESS	Moreton
Wambo Wind Farm Stage 2 (3)	New Wind Farm	South West
Punchs Creek Solar Farm	New Solar Farm + BESS	Bulli
Wandoan Solar Farm Stage 2 (3)	Expanded Solar Farm	Surat

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 2025.

(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 8.2).

Table 5.8 summarises connection point activities undertaken by Powerlink since publication of the 2024 TAPR[20]. Further details on potential new generation connections are available in the relevant TAPR template located on Powerlink's TAPR Portal as noted in Appendix F.

19 NER, clause 5.12.1(b)(2).
20 More broadly, key connection information in relation to the NEM can be found on AEMO's website.

Table 5.8 Connection point activities

Generator Location	Number of Applications	Number of Connection Agreements	Generator Type and Technology
North	11	0	BESS, Wind Farm, Hybrid (Solar + BESS)
Central	13	1	BESS, Wind Farm, Hybrid (Solar Farm + BESS), Gas, Load
South	15	2	BESS, Wind Farm, Hybrid (Wind Farm + BESS), Solar Farm
Total	39	3	

5.4 Proposed network developments

5.4.1 Regulated capital expenditure program

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

As the Queensland transmission network experienced considerable growth in the period from 1960 to 1980, there are a large number of transmission assets ranging from 40 to just beyond 60 years old. A number of these assets are approaching the end of their technical service life and investment in some form is required within the 10-year outlook period to manage risks related to safety, reliability and other factors.

In conjunction with condition assessments and risk identification, as assets approach their anticipated end of technical service life, possible investment options undergo detailed planning studies to confirm alignment with future investment, optimisation and delivery strategies. These studies enable Powerlink to:

- improve and further refine options under consideration
- identify other options from those originally specified which may deliver a greater benefit to customers.

Powerlink also reviews the rating of assets throughout the transmission network periodically and has not identified any required asset deratings that would result in a system limitation as part of the 2025 annual planning review.

Information regarding possible investment alternatives, network limitations and anticipated timing is updated annually in the TAPR and includes discussion on significant changes which have occurred since publication of the previous year's TAPR.

5.4.2 Indicative costs of potential projects

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

- developed alternative supply options for critical equipment such as 275kV circuit breakers
- implemented alternative strategies to transmission line refit works (refer to Section 5.8.1)
- continued to refine transmission augmentations to drive value for customers[21].

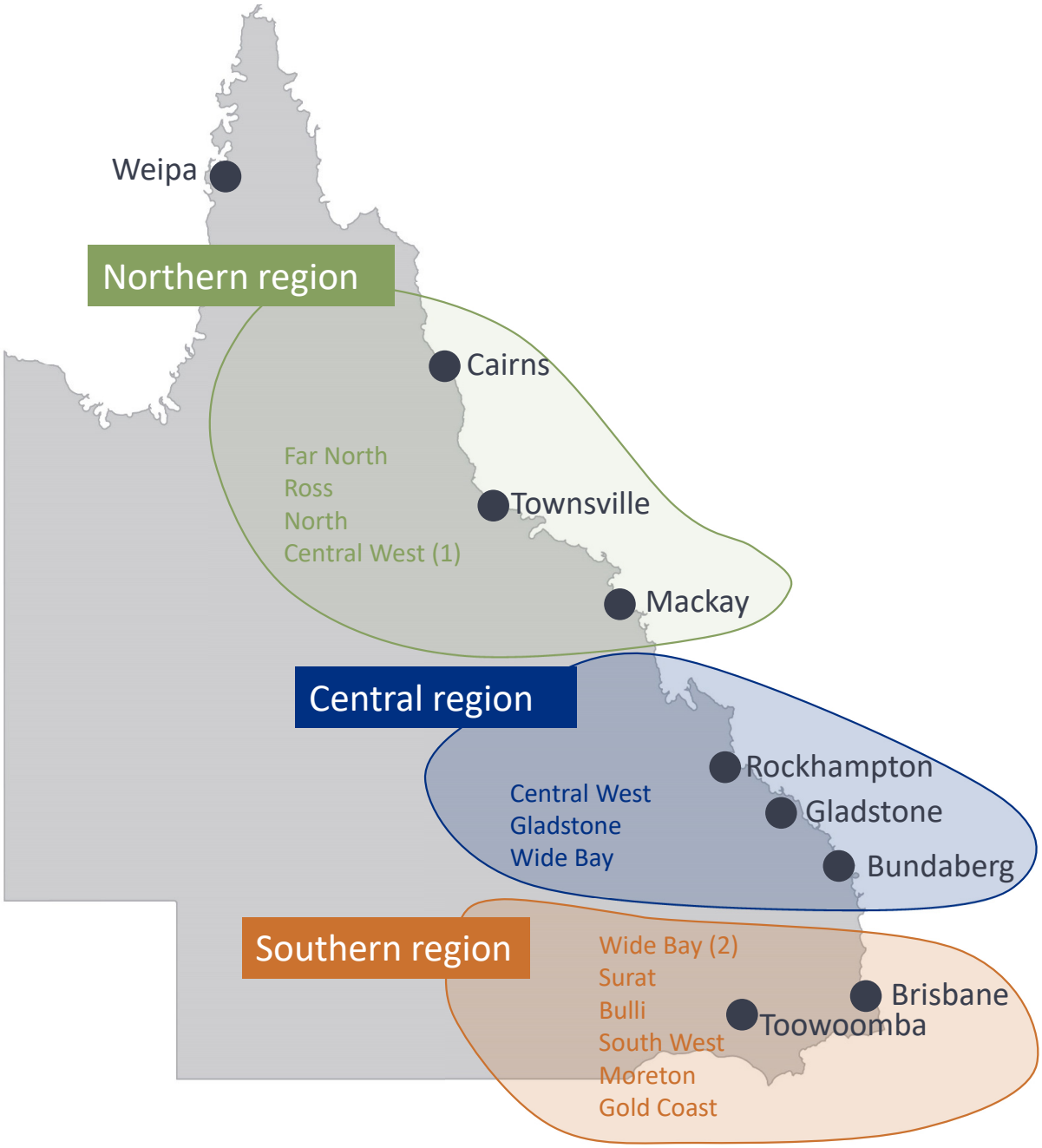
The indicative costs of potential projects identified in this chapter are updated each year to keep pace with external project cost increases, and where possible are based on other recently completed similar projects. Where there may be other factors materially influencing the updated indicative cost, such as a more granular view of condition and project scope, or a new proposed solution is identified, these factors are noted in Appendix E 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.

5.4.3 Geographical context

To provide geographical context, Figure 5.4 shows Queensland's energy regions and zones.

[21] For detail on external cost pressures facing TNSPs see AEMO, 2025 Electricity Network Options Report, final report, July 2025, page 32; and Powerlink, Powerlink 2027-32 Revenue Proposal (Draft), September 2025, pages 11-15.

Figure 5.4 Queensland's energy regions and zones



Notes:

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

(2) The Wide Bay zone traverses the Central and Southern regions.

5.4.4 Investment context, timeframes and description

Powerlink has analysed investment needs and potential limitations across Powerlink's standard geographic zones (refer to sections 5.5 to 5.7).

Powerlink's planning overview (10-year outlook period of the TAPR) considers a range of options to address identified needs. When considering the replacement of existing assets, in conjunction with the broader network topology and changing external environment, Powerlink may also identify potential network reconfigurations or other options to realise synergies and efficiencies in developing the transmission network which would be economically assessed under the RIT-T (if applicable).

Information in relation to potential projects, alternatives and possible commissioning needs is revised annually based on the latest information available at the time of publication. Refer to Appendix E for the complete list of proposed network investments within the 10-year outlook period. Any significant timing and cost differences are noted in the analysis of this program of work.

Possible network investment needs likely to require RIT-T consultation within the five-year outlook period from July 2025 to June 2031 are discussed in this chapter.

Each year, taking the most recent assessment of asset condition and risk into consideration, Powerlink reviews possible commissioning dates and, where safe, technically feasible and prudent, may defer capital expenditure. As a result, there may be timing variances between the possible commissioning dates identified in the 2024 TAPR and 2025 TAPR and TAPR Templates.

5.5 North and Far North Region

The North and Far North Region covers the Far North, Ross and North zones, encompassing the northern most extent of Powerlink's transmission network. Proposed network reinvestments in this region are related to addressing risks arising from the condition of the existing network assets. Without timely intervention, these risks could lead to breaches of Powerlink's obligations under jurisdictional network, safety, environmental and NER requirements.

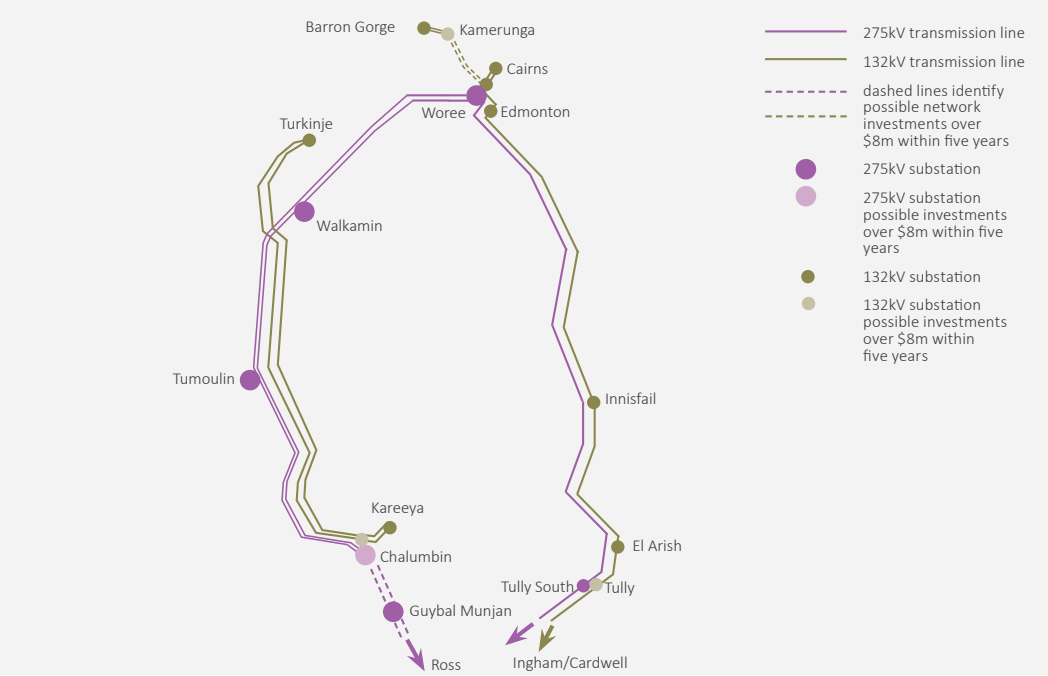
To maintain a safe, reliable and cost-effective supply of electricity to customers in the North and Far North Region, Powerlink is taking proactive steps to address asset condition to ensure ongoing compliance and reliability into the future. Potential solutions include like-for-like replacement, non-network solutions, network reconfiguration, asset retirement, line refit or replacement with an asset of lower capacity.

5.5.1 Far North zone

Existing network

The Far North zone is supplied by a 275kV transmission network with major injection points at Chalumbin, Tully South and Woree, and a coastal 132kV network from Yabulu South to Woree. This network supplies the Ergon Energy distribution network feeding the surrounding areas of Turkinje and Cairns, from Tully to Cooktown. The network also connects various renewable generators including the hydro power stations at Barron Gorge and Kareeya, Mt Emerald Wind Farm near Walkamin and Kaban Wind Farm near Tumoulin.

Figure 5.5 Far North zone transmission network



Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional capacity forecast to be required due to load driven network limitations in the Far North zone within the next five years to meet reliability obligations.

Possible network investments within five years

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

Joint RIT-T consultation – Maintaining Reliability of Supply to Kamerunga and Cairns Northern Beaches Area

The Woree to Kamerunga 132kV double circuit transmission line provides critical supply to the Cairns northern beaches region, as well as connecting the Barron Gorge Hydro Power Station to the transmission network. A significant proportion of the transmission line traverses built-up residential areas, including a significant number of encroachments on the existing feeder easement. There are a number of major and minor road crossings causing access and construction work challenges.

Kamerunga Substation is located in western Cairns and provides bulk electricity supply to Ergon Energy's distribution network in the northern Cairns region which includes Kamerunga, Smithfield and the northern beaches areas, and also provides connection to the Barron Gorge Power Station. The area surrounding the substation is residential and located along the flood plain of the Barron River.

In December 2024, Powerlink issued a joint Project Specification Consultation Report (PSCR) with Ergon Energy to address network needs in the Kamerunga, Cairns and northern beaches area. The PSCR identified two credible options to address the identified need, with the primary difference between options being an additional underground section of the transmission line rebuild. Powerlink did not receive any submissions in response to the PSCR, and is progressing the PADR with Ergon Energy.

Joint RIT-T consultation with Ergon Energy	
Asset details	Transmission line constructed in 1963. Life extension in 2014 on certain components nearing end of technical service life. Kamerunga Substation established in 1976.
Project driver	Transmission line: emerging condition risks due to structural corrosion. Substation: emerging condition, obsolescence and compliance risks on 132kV primary plant and secondary systems and risks related to a potential future flood event.
Project timing	December 2028.
Proposed network solution	Rebuild the existing double circuit transmission line with a new double circuit transmission line (overhead/underground alignment) from Woree to Kamerunga substations and associated Ergon Energy works. Replacement of primary plant including additional switching functionality and secondary systems upfront with Air Insulated Switchgear (AIS) technology on an adjacent substation site at Kamerunga and associated Ergon Energy works. Construction of a new building to contain 22kV primary and secondary systems by December 2028 at an estimated cost of $201 million.
Possible non-network solutions	Potential non-network solutions would need to provide supply to the 22kV network of up to a peak 85MW, and up to a peak 1,200MWh per day on a continuous basis. This transmission line also facilitates the Barron Gorge Hydro Power Station connection in the area.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Transmission Lines

Ross to Chalumbin to Woree 275kV transmission lines

Although renewable generation in Far North Queensland is increasingly supplying load in the Cairns region (refer to Figure 6.11), the 275kV and 132kV transmission system plays a critical role in maintaining reliability of supply by connecting generation in Central and North Queensland to this region.

Remote supply to the Cairns region is delivered through the inland 275kV network to Ross, near Townsville. From Ross it is transferred via a 275kV transmission line to Chalumbin, continuing via a second 275kV transmission line from Chalumbin to the Woree Substation on the outskirts of Cairns. These 275kV transmission lines also provide connections to the Mt Emerald and Kaban Wind Farms and the Kareeya Hydro Power Station. A 275kV connection into Woree Substation was energised in June 2024. Remaining substation works at Tully and Yabulu South substations were completed at the end of September 2024. Minor associated works across Far North Queensland are expected to be completed by the end of 2025.

The double circuit 275kV transmission line between Ross and Chalumbin (via Guybal Munjan Substation) substations is 244km in length and comprises 528 steel lattice towers. The line traverses the Northern Queensland tropical rainforest, passing through environmentally sensitive, protected areas and crossing numerous regional roads and rivers. The delivery of the required renewal works will be complex and need to be completed outside of summer peak load and the wet season.

Potential consultation	Maintaining Reliability of Supply in the Cairns Region Stage 2: Addressing the Condition Risks of the Transmission Towers between Ross and Chalumbin
Asset details	Constructed in 1989.
Project driver	Emerging condition risks due to structural corrosion.
Project timing	June 2031.
Proposed network solution	Refit the double circuit transmission line between Ross (via Guybal Munjan Substation) and Chalumbin substations, at an estimated cost of $39 million by June 2031.
Possible non-network solutions	The Ross to Chalumbin transmission lines 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	Powerlink considers the proposed network solution will not have a material inter-network impact.

Substations

Chalumbin 275/132kV Substation

Chalumbin Substation is a major substation in the 275kV power transfer corridor between the Ross and Far North zones and provides supply to the local 132kV network in the Cairns and Atherton tablelands regions.

Anticipated consultation	Maintaining Reliability of Supply at Chalumbin
Asset details	Established in 1988.
Project driver	Condition driven replacement to address risks on 275kV and 132kV primary plant and secondary systems.
Project timing	June 2031.
Proposed network solution	Substation reinvestment comprising of selected replacement of primary plant and secondary systems at an estimated cost of $58 million by June 2031.
Possible non-network solutions	Powerlink is not aware of any non-network proposals that can address this requirement in its entirety. Potential non-network solutions would need to provide supply to the 132kV network of up to a peak 100MW, and up to a peak 965MWh per day on a continuous basis. For the 275kV Chalumbin works, a non-network solution would need to provide injection to the north area of close to 400MW at peak and up to 6,000MWh per day.
Other possible network solutions	Staged selected replacement of the 275kV and 132kV primary plant and secondary systems by June 2031.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Tully 132/22kV Substation

Tully Substation is located around 120km south of Cairns between Ross and Cairns and provides supply to the local 132kV network in the Cairns and Atherton tablelands regions.

Potential consultation	Maintaining Power Transfer Capability and Reliability of Supply at Tully
Asset details	Established in 1977.
Project driver	Condition driven replacement to address risks on one of the 132/22kV transformer.
Project timing	June 2028.
Proposed network solution	Replacement of Transformer 2 at an estimated cost of $9 million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to provide up to 15MW at peak and up to 200MWh per day on a continuous basis to provide supply to the 22kV network at Tully.
Other possible network solutions	Life extension of Transformer 2 by June 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[22]

Condition assessment has identified emerging condition risks arising from the condition of the 132kV transmission line between Chalumbin and Turkinje around 2035. At this time, an option would be to establish a 275kV substation and cut into an existing 275kV circuit between Chalumbin and Woree substations to supply Turkinje. Should this option proceed, there will be an opportunity to retire the existing 132kV transmission line from Chalumbin to this new substation.

5.5.2 Ross zone

Existing network

The 132kV network between Collinsville and Townsville was developed in the 1960s and 1970s to supply mining, commercial and residential loads. The 275kV network within the zone was developed more than a decade later to reinforce supply into Townsville and Far North Queensland. Parts of the 132kV network are located closer to the coast in a high salt-laden wind environment, leading to accelerated structural corrosion. Townsville is supplied by a 132kV transmission network to the south and west of the greater load area providing supply to Ergon Energy's 66kV distribution network. Connection points are located at the Townsville South 132/66kV, Townsville East 132/66kV, Dan Gleeson 132/66kV, Garbutt 132/66kV, and Alan Sherriff 132/11kV substations.

Figure 5.6 Northern Ross zone transmission network

[22] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Figure 5.7 Southern Ross zone transmission network

Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional capacity forecast to be required due to load driven network limitations in the Ross zone within the next five years to meet reliability obligations.

Possible network investments within five years

Powerlink anticipates 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.

Transmission Lines

Ross to Dan Gleeson 132kV transmission lines

Electricity supply to the Townsville Central Business District (CBD) is provided from Ross Substation by 132kV transmission lines to Dan Gleeson, Alan Sherriff and Garbutt substations.

Potential consultation	Maintaining Reliability of Supply between Ross and Dan Gleeson
Asset details	Constructed in 1963 and operates in an aggressive tropical coastal environment.
Project driver	Emerging condition risks due to structural corrosion.
Project timing	June 2031.
Proposed network solution	Refit of the transmission line between Ross and Dan Gleeson substations, at an estimated cost of $12 million by June 2031.
Possible non-network solutions	The Ross to Dan Gleeson transmission lines provide part of the injection to the Townsville central business area. Potential non-network solutions would need to provide equivalent support of close to 136MW at peak and up to 1,600MWh per day.
Other possible network solutions	Rebuild the 132kV transmission line between Ross and Dan Gleeson substations by June 2031.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Substations

Ingham South 132kV Substation

Ingham South Substation is a major injection point into Ergon Energy's 66kV distribution network, providing supply to Ingham and the surrounding area.

Current consultation	Maintaining Reliability of Supply and Addressing Condition Risks at Ingham South
Asset details	Established in 2005.
Project driver	Condition driven replacement to address emerging obsolescence and compliance risks on 132kV primary plant and secondary systems.
Project timing	December 2028.
Proposed network solution	In June 2025, Powerlink published a PSCR to maintain reliability of supply and address condition risks at Ingham South. The PSCR identified the following preferred option: • replacing the hybrid switchgear modules in-situ with air insulated switchgear and replacing secondary systems in a new control building on existing substation platform as the preferred option. The estimated cost is $26 million with a targeted completion date of December 2028. Powerlink did not receive any submissions on the PSCR and is progressing to the Project Assessment Conclusions Report (PACR) stage of the RIT-T.
Possible non-network solutions	Potential non-network solutions would need to provide supply to the 66kV network at Ingham South of up to 22MW and up to 370MWh per day. 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.
Other possible network solutions	The PSCR described another credible option: • Extend substation platform and replace hybrid switchgear modules with air insulated switchgear using adjacent spare bay locations. Replace secondary systems in a new control building by 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Alan Sherriff 132kV Substation

Alan Sherriff Substation is a major injection point into Ergon Energy's 11kV distribution network providing supply to the Townsville area.

Potential consultation	Addressing the Secondary Systems Condition Risks at Alan Sherriff
Asset details	Established in 2002.
Project driver	Condition driven replacement to address emerging obsolescence and compliance risks on the 132kV secondary systems.
Project timing	June 2028.
Proposed network solution	Selected secondary systems replacement an estimated cost of $26 million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to provide supply to the 66kV and 11kV network at Alan Sherriff of up to 77MW and up to 480MWh per day. 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.
Other possible network solutions	In-situ selected replacement of secondary systems by June 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Townsville South 132kV Substation

Townsville South is a major substation supplying the city of Townsville, the major industrial load of Sun Metals Zinc Refinery and serving as a connection point for the Mt Stuart Power Station.

Potential consultation	Addressing the Secondary Systems Condition Risks at Townsville South
Asset details	Established in 1977.
Project driver	Condition driven replacement to address emerging obsolescence and compliance risks on 132kV secondary systems.
Project timing	June 2028.
Proposed network solution	Selected replacement of secondary systems at an estimated cost of $11million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to provide supply to Townsville East and Townsville South (including Sun Metals) of up to 150MW at peak and up to 3,000MWh per day. It would also need to facilitate the connection of Mt Stuart Power Station.
Other possible network solutions	Full secondary systems replacement by June 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Townsville East 132kV Substation

Townsville East is a major substation supplying the Townsville CBD and port.

Potential consultation	Addressing the Secondary Systems Condition Risks at Townsville East
Asset details	Established in 2008.
Project driver	Condition driven replacement to address emerging obsolescence and compliance risks on 132kV secondary systems.
Project timing	June 2028.
Proposed network solution	Selected replacement of secondary systems at an estimated cost of $10 million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to provide supply to Townsville East of up to 40MW at peak and up to 130MWh per day.
Other possible network solutions	Full secondary systems replacement by June 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Garbutt 132kV Substation

Garbutt Substation is a major injection point into Ergon Energy's 66kV distribution network providing supply to the Townsville area.

Potential consultation	Addressing the Secondary Systems Condition Risks at Garbutt
Asset details	Established in late 1950s; last replacement in 2004.
Project driver	Condition driven replacement to address emerging obsolescence and compliance risks on 132kV secondary systems.
Project timing	June 2029.
Proposed network solution	Full replacement of secondary systems at an estimated cost of $13 million by June 2029.
Possible non-network solutions	Potential non-network solutions would need to provide supply to the 66kV network at Garbutt Substation of up to 120MW and up to 1,350MWh per day. 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.
Other possible network solutions	In-situ replacement of secondary systems by June 2029.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[23]

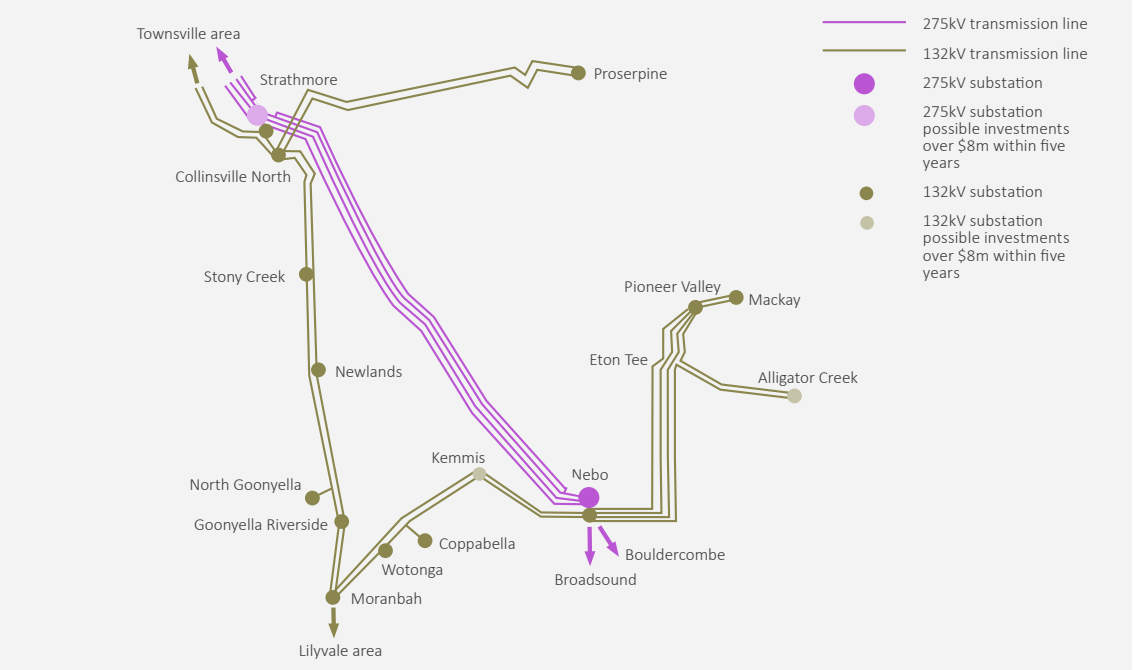
Powerlink has not identified any potential asset retirements in the Ross zone within the 10-year outlook period.

5.5.3 North zone

Existing network

Three 275kV circuits between Nebo (in the south) and Strathmore (in the north) substations form part of the 275kV transmission network supplying the North zone. Double circuit inland and coastal 132kV transmission lines supply regional centres and infrastructure related to mines, coal haulage and ports arising from the Bowen Basin mines. The coastal network in this zone is characterised by transmission line infrastructure in a corrosive environment which make it susceptible to premature ageing.

Figure 5.8 North zone transmission network



Possible load driven limitations

Based on Powerlink's Central scenario forecast, additional capacity is required due to load driven network limitations in the North zone within the next five years to meet reliability obligations. New and expanded mine operations in the Northern Bowen Basin are forecast to exceed Powerlink's reliability obligations at the end of the 10-year forecast period.

There has also been significant interest from customers in the Northern Bowen Basin in electrifying mining operations. This emerging demand may require future load-driven investment within Powerlink's network. Further information is provided in Section 7.2.2.

Possible network investments within five years

Powerlink anticipates 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.

Transmission Lines

Powerlink has not identified any potential network investments to address the risks arising from the condition of transmission lines in the North zone within the next five years.

Substations

Strathmore 275/132kV Substation

Strathmore Substation is a major injection point to supply Ergon Energy's distribution network and Powerlink's direct connected customers in the Northern Bowen Basin.

[23] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Anticipated consultation	Addressing the SVC Secondary Systems Condition Risks at Strathmore
Asset details	Established in 2007.
Project driver	SVC secondary systems condition risks at Strathmore Substation.
Project timing	December 2029.
Proposed network solution	Replacement of the Strathmore SVC secondary systems at an estimated cost of $24 million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to provide dynamic voltage support of up to 260MVAr capacitive and 80MVArs inductive.
Other possible network solutions	Staged replacement of the Strathmore SVC secondary systems by June 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Alligator Creek 132kV Substation

Alligator Creek Substation is a bulk supply point from mines in the Bowen Basin to the coal loading terminals of Hay Point and Dalrymple Bay and provides supply to Ergon Energy distribution network for the surrounding communities to the south of Mackay.

Potential consultation	Addressing Primary Plant and Secondary Systems Condition Risks at Alligator Creek
Asset details	Established in 1982.
Project driver	132kV primary plant and secondary systems condition risks at Alligator Creek Substation.
Project timing	December 2030.
Proposed network solution	Selected 132kV primary plant, and 132kV and SVC secondary systems at an estimated cost of $34 million by December 2030.
Possible 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.
Other possible network solutions	Staged selected replacement of 132kV primary plant, and 132kV and SVC secondary systems by December 2030.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[24]

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

5.6 Central Region

The Central Region covers the Central West and Gladstone zones. This region:

- hosts some of Powerlink's largest industrial customers together with significant coal fired generation
- offers considerable opportunities for the development of new industries
- is pivotal to the supply of power to Northern and Southern Queensland
- plays a major role in supporting industry, rail systems and mines.

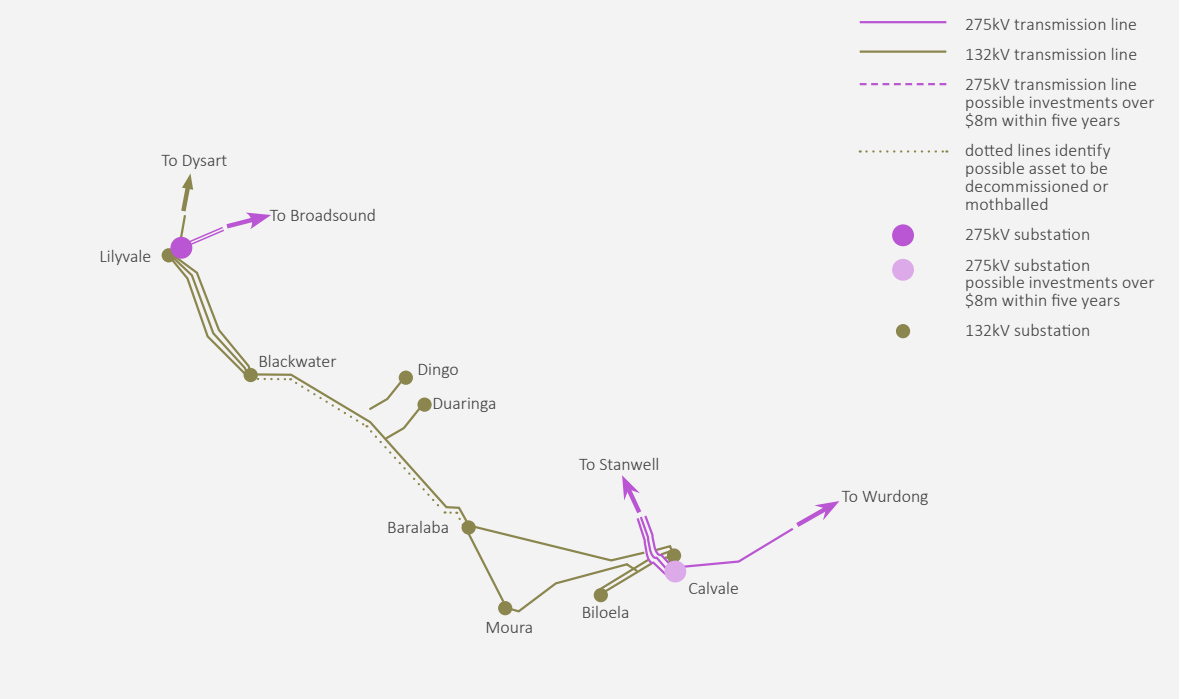
5.6.1 Central West zone

Existing network

The Central West 132kV network was developed between the mid-1960s and late 1970s to meet the requirements of mining activity in the southern Bowen Basin. The 132kV injection points for the network are taken from Calvale and Lilyvale 275kV substations (refer to Figure 5.9). The network is located more than 150km from the coast in a dry environment, making infrastructure less susceptible to corrosion. As a result, transmission lines and substations in this region have met (and in many instances exceeded) their anticipated service life and will require replacement or rebuilding in the near future.

[24] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Figure 5.9 Central West 132kV transmission network



Possible load driven limitations

Based on Powerlink's Central scenario forecast there is no additional capacity forecast to be required in the Central West zone within the next five years to meet load driven reliability obligations. Powerlink is engaging with potential large load customers in the area to firm up new load requirements.

Possible network investments within five years

Proposed network investments (which include reinvestments and augmentations) in this zone are related to addressing risks arising from the condition of the existing network assets. Without timely intervention, these risks could lead to breaches of Powerlink's obligations under jurisdictional network, safety, environmental and NER requirements.

To maintain a safe, reliable and cost-effective supply of electricity to meet the load requirements of customers in the Central West zone into the future, Powerlink is taking proactive steps to address asset condition to ensure ongoing compliance and reliability into the future. Potential solutions include like-for-like replacement, non-network solutions, network reconfiguration, asset retirement, line refit or replacement with an asset of lower capacity.

Transmission Lines

Powerlink has not identified any potential network investments to address the risks arising from the condition of transmission lines in the Central West zone within the next five years.

Substations

Calvale 275/132kV Substation

Calvale Substation is a critical part of the Central West Queensland transmission network and provides connection to Callide B and Callide C generators and potential new generators in the zone. Calvale Substation is also a major transmission node in Central Queensland connecting power flows between northern, central and southern Queensland.

Potential consultation	Maintaining Reliability of Supply at Calvale
Asset details	Established in the mid-1980s.
Project driver	Addressing the 275kV primary plant condition risks.
Project timing	June 2031.
Proposed network solution	Selected primary plant replacement at Calvale Substation at an estimated cost of $39 million by June 2031.
Possible non-network solutions	Potential non-network solutions would need to address two separate areas: • supply to Moura and Biloela loads of approximately 100MW and 2,000MWh per day • supply to Boyne Island Smelter loads of up to 425MW and 9,960MWh per day.
Other possible network solutions	Full primary plant replacement by June 2031.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Broadsound 275kV Substation

Broadsound substation was established in 1984 and is primarily a major transmission node connecting power flows between Northern and Central Queensland. It is also the hub to Lilyvale Substation and Central West loads.

Potential consultation	Maintaining Reliability of Supply at Broadsound
Asset details	Established in 1983. Further extensions have been made with additions of 275kV feeders to the west, south and north.
Project driver	Addressing the 275kV primary plant condition risks.
Project timing	June 2030.
Proposed network solution	Selected primary plant replacement at Broadsound Substation at an estimated cost of $19 million by June 2030.
Possible 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.
Other possible network solutions	Full primary plant replacement by June 2030.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[25]

Calvale to Moura to Baralaba 132kV transmission lines

Subject to the outcome of further analysis and RIT-T consultation, a new 132kV double circuit transmission line may be constructed between Calvale and Moura substations due to a step change in load growth at Moura Substation or end of technical service life of the existing transmission lines within the 10-year outlook period. The reconfiguration would allow Powerlink to mothball the existing single circuit transmission lines between Calvale and Baralaba, and Baralaba and Moura substations, and the Baralaba Substation, at the end of their technical service lives and be retired from service.

Baralaba to Blackwater 132kV transmission line

This 132kV inland transmission line was constructed in the mid-1960s to support loads in the Central West area. Due to network reconfigurations this line has no enduring need, and has been mothballed as part of an economic end of technical service life strategy. The line is energised from Blackwater Substation (and disconnected at the Baralaba Substation end) for maintenance purposes.

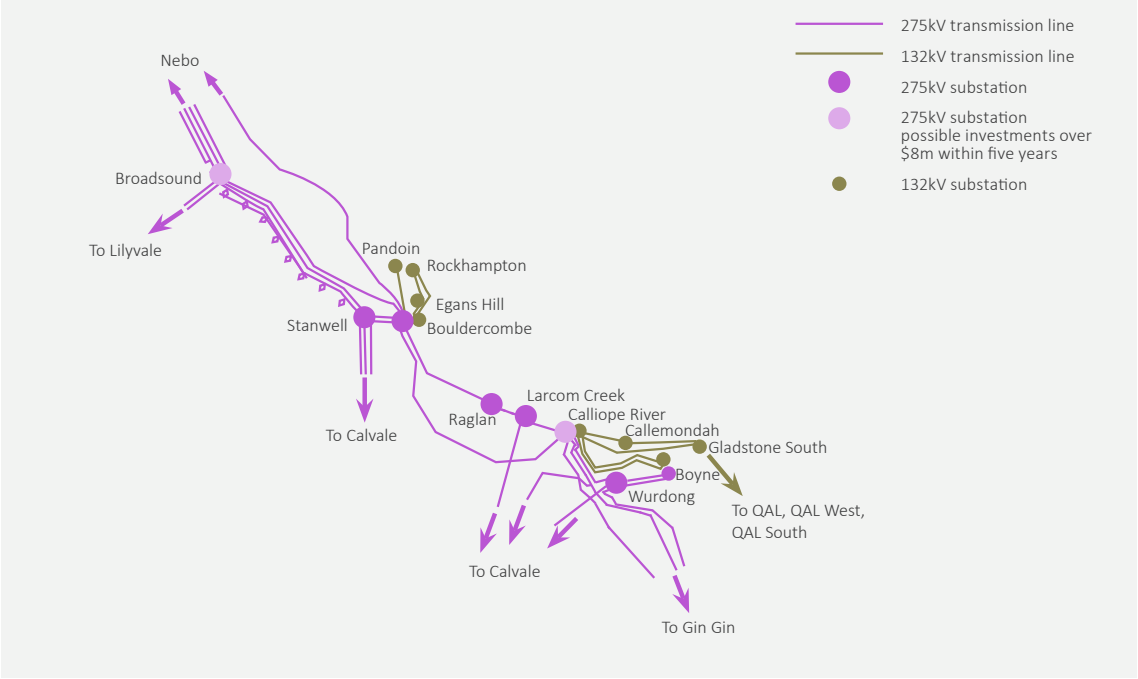
5.6.2 Gladstone zone

Existing network

The Gladstone 275kV network was initially developed in the 1970s with the Gladstone Power Station and has evolved over time with the addition of the Wurdong Substation and 275kV supply into Boyne Smelters Limited in the early 1990s.

[25] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Figure 5.10 Gladstone transmission network



Possible load driven limitations

The network in Gladstone supports a range of industrial customers including:

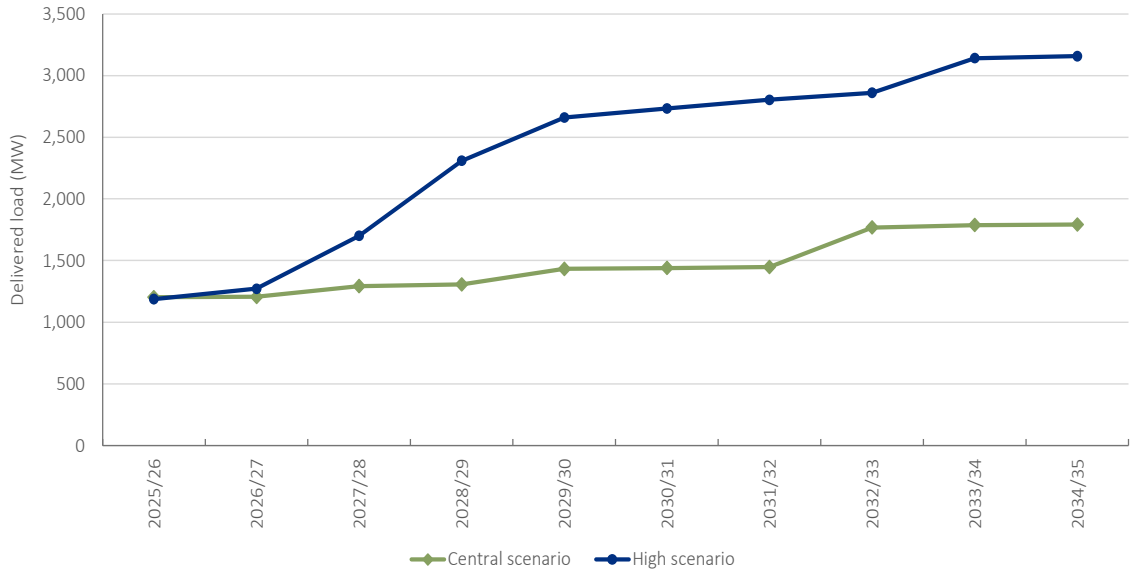
- two alumina refineries
- an aluminium smelter
- chemical manufacturing
- Queensland's largest multi-commodity port
- a range of other economically significant industries.

Many of these large customers are expected to electrify their production processes over the coming years, which will place additional demand on the energy grid, particularly following the potential retirement of the Gladstone Power Station in March 2029[26]. Electrification of industry, and the potential retirement of Gladstone Power Station, will have a significant impact on the transmission capacity required to maintain reliability of supply in the Gladstone zone and power system security.

Powerlink's 2025 demand forecast shows that electrical load in the Gladstone area is expected to increase over the same time period as the potential closure of Gladstone Power Station, increasing the need for new supply to meet demand in the area. Furthermore, there continues to be significant interest from multiple proponents of large direct connect loads, the aggregate of which is depicted by the high scenario trace in Figure 5.11. These loads are not at a stage to be considered in the Central demand forecast scenario (refer to Table 2.1).

[26] AEMO, Generating Unit Expected Closure Year, October 2025.

Figure 5.11 Gladstone zone 10% Probability of Exceedance Forecast (1)



Note:

(1) This equates to a Probability of Exceedance (PoE) where conditions are exceeded once in 10 years.

Refer to Appendix E for possible network reinvestments in the Gladstone zone.

Gladstone Project

Upgrades to the network are required to enable new supply and deliver the necessary power to the Gladstone area. Further future investments will be required beyond the Gladstone Project should one or more large loads reach a sufficiently advanced stage to be incorporated in the central demand forecast scenario.

As part of the PTI framework, Powerlink completed an assessment of the Gladstone Project in June 2025, with the preferred option involving:

- constructing a new 275kV high-capacity double circuit transmission line between Calvale and Calliope River substations, switched through a new substation located at Gladstone West
- establishing a third 275/132kV transformer at Calliope River Substation
- constructing a new 275kV high-capacity double circuit transmission line between Bouldercombe and Larcom Creek substations switched through a new Gladstone West Substation
- investment in assets to compensate for the loss of system security services in the Gladstone area when Gladstone Power Station closes, including a mixture of network and non-network components.

The indicative capital cost of the preferred option $1,788 million (real 2025 dollars)[27]. Powerlink continues to work closely with the Queensland Government on the next phase of the project, noting the Queensland Government Energy Roadmap recognises the project as a critical transmission project for the 2025 to 2030 period[28].

Possible asset retirements[29]

Callide A to Gladstone South 132kV transmission double circuit line

The 132kV transmission line was constructed in the mid-1960s to support the loads in the Gladstone area. Due to reconfiguration in the area, this transmission line is currently disconnected and is not in service. The transmission line will be retired from service within the 10-year outlook period.

5.7 Southern Region

The Southern Region covers the Wide Bay, Surat, Bulli, South West, Moreton and Gold Coast zones. The region includes a diverse range of industries and large load centres with considerable opportunity to connect generation to the transmission network. It also includes the Queensland section of QNI.

27 Powerlink, Gladstone Project: Candidate Priority Transmission Investment, final assessment report, June 2025, page 5.
28 Queensland Government, Energy Roadmap, October 2025, page 39.
29 Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Proposed network reinvestments in this region are related to addressing risks arising from the condition of the existing network assets. Without timely intervention, these risks could lead to breaches of Powerlink's jurisdictional network, safety, environmental and NER requirements.

To maintain a safe, reliable and cost-effective supply of electricity to customers in the Southern Region, Powerlink is taking proactive steps to address asset condition to ensure ongoing compliance and reliability into the future. Potential solutions include like-for-like replacement, non-network solutions, network reconfiguration, asset retirement, line refit or replacement with an asset of lower capacity.

5.7.1 Wide Bay zone

Existing network

The Wide Bay zone supplies loads in the Bundaberg and Maryborough region, and forms part of Powerlink's eastern Central Queensland to South Queensland (CQ-SQ) transmission corridor. This corridor was constructed in the 1970s and 1980s and consists of single circuit 275kV transmission lines between Calliope River and South Pine substations. These transmission lines traverse a variety of environmental conditions and as a result exhibit different corrosion rates and risk profiles.

Figure 5.12 CQ-SQ transmission network

Transmission network overview

In its current form, the CQ-SQ transmission network offers a great deal of flexibility for possible generation dispatches. However, it occasionally imposes constraints to market operation. In order for power to move from Northern and Central Queensland, to Southern Queensland and the southern states, it must be transferred through the CQ-SQ grid section. The utilisation may increase following the final releases of capacity associated with the commissioning of the QNI Minor project (refer to Section 6.6.10).

Possible network investments within five years

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

Transmission Lines

CQ-SQ transmission line

The coastal CQ-SQ transmission network between the Calliope River and South Pine substations provides essential supply sharing between the generation in Central and North Queensland and the loads in Central and Southern Queensland.

This corridor supplies major injection points at Gin Gin, Teebar Creek, Woolooga and Palmwoods 275/132kV substations for the Wide Bay and Sunshine Coast areas. The Ergon Energy 132kV and Energex 132/110kV subtransmission systems supply bulk supply points along these areas. The corridor also provides connection to large-scale VRE and storage projects.

The coastal CQ-SQ transmission network assets are expected to reach the end of their technical service life within the next 20 years. A key consideration is that this corridor is comprised solely of single circuit 275kV towers that may make cost-effective refit strategies less viable compared to double circuit tower rebuilds in targeted sections.

With varying distance from the ocean, and localised industrial pollution, the Calliope River to South Pine 275kV single circuit transmission lines are subject to different environmental and atmospheric conditions and have, over time, experienced structural degradation at different rates.

Emerging condition and compliance risks have been identified that structural repairs due to above ground corrosion may be required on the following assets:

- Within the next five years:
  - One 275kV single circuit transmission line from Woolooga to South Pine substations built in 1972.
- Within the next six to 10 years:
  - Three 275kV single circuit transmission lines from Calliope River to Gin Gin Substation built in 1972, 1976 and 1981
  - One 275kV single circuit transmission line from Gin Gin to Woolooga built in 1972
  - One 275kV single circuit transmission line from Palmwoods to South Pine built in 1976.

Strategies to address the transmission line sections with advanced corrosion in the five-year outlook will be economically assessed in consideration of longer-term network needs. This will also consider increasing line ratings by increasing ground clearances where it is economic to do so.

Powerlink is progressing a holistic planning approach for the coastal 275kV CQ-SQ corridor which recognises the corridor's strategic importance within the Queensland backbone transmission network. An assessment of condition related expenditure against the economic benefits of transmission line rebuild are central to this strategy.

One potential strategy is the progressive rebuild of two of the 275kV single circuit transmission lines from Calliope River to South Pine as high-capacity double circuit lines utilising high temperature conductor, if and when it is economic to do so.

Further information on strategic transmission network developments along this corridor are provided within Section 7.4.

Possible asset retirements[30]

Powerlink has not identified any potential asset retirements in the Wide Bay zone within the next 10 years.

5.7.2 Surat zone

Existing network

The Surat zone is defined as the area north-west of Western Downs Substation. The area has significant development potential given the vast reserves of gas and (more recently) renewable energy. Utilisation of assets in the area is forecast to continue due to new developments of VRE projects, coal seam gas upstream processing facilities by multiple proponents, together with the supporting infrastructure and services.

[30] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Figure 5.13 Surat Basin North West area transmission network

Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional load driven capacity forecast to be required as a result of network limitations in the Surat zone within the next five years to meet reliability obligations.

Possible network investments within five years

Powerlink does not anticipate any potential network investments above the RIT-T cost threshold are required to address the risks arising from the condition of assets in the Surat zone within the next five years.

Possible asset retirements[31]

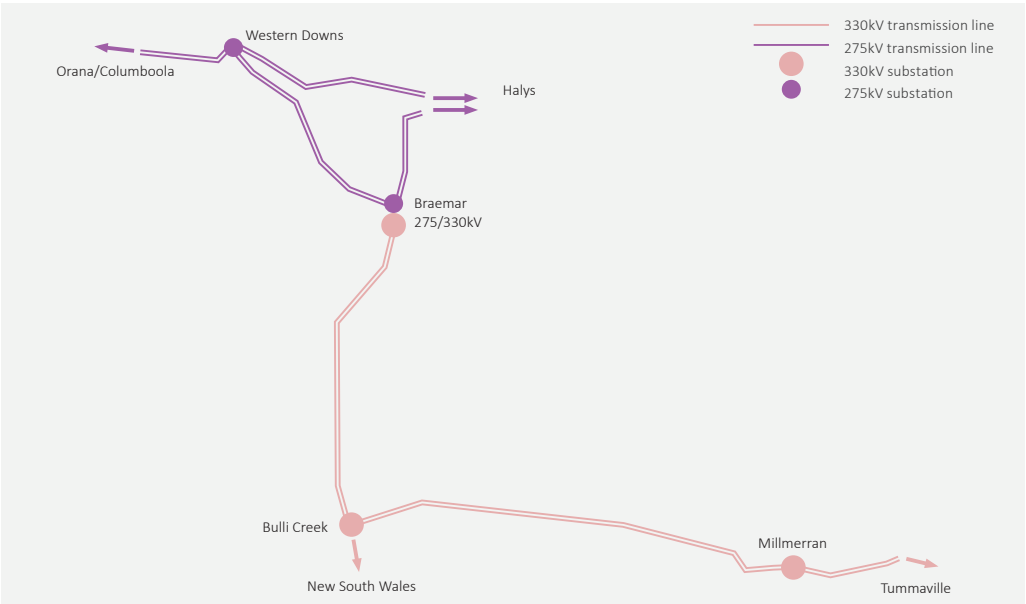
Powerlink has not identified any potential asset retirements in the Surat zone within the next 10 years.

5.7.3 Bulli zone

Existing network

The Bulli zone is defined as the area surrounding Goondiwindi and the 330kV and 275kV network south of Kogan Creek Power Station and west of Millmerran Power Station.

Figure 5.14 Bulli area transmission network



[31] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional load driven capacity forecast to be required as a result of network limitations in the Bulli zone within the next five years to meet reliability obligations.

Possible network investments within five years

Powerlink does not anticipate any potential network investments above the RIT-T cost threshold are required to address the risks arising from the condition of assets in the Bulli zone within the next five years.

Possible asset retirements[32]

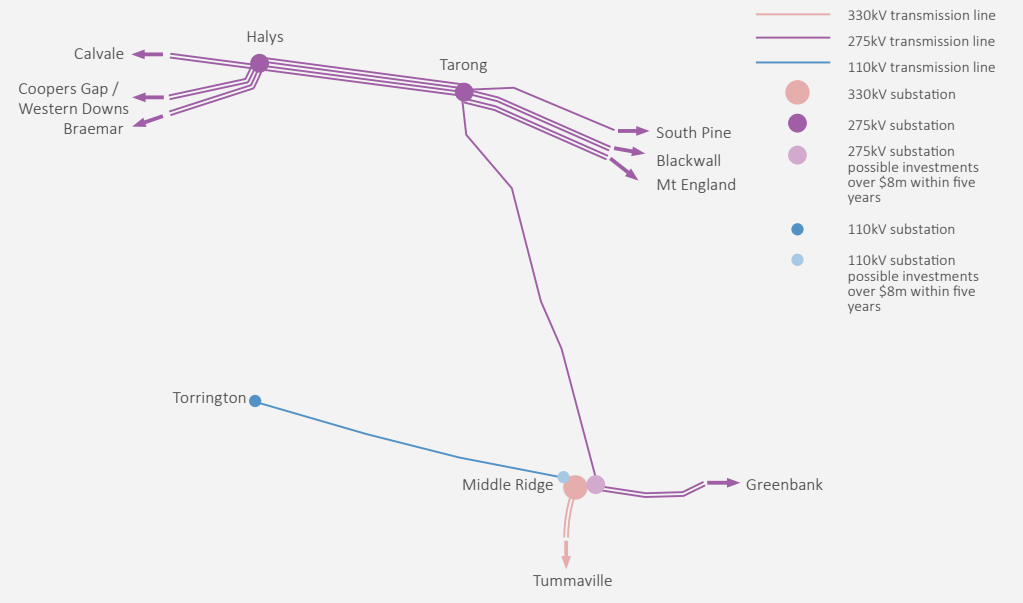
Powerlink has not identified any potential asset retirements in the Bulli zone within the 10-year outlook period.

5.7.4 South West zone

Existing network

The South West zone is defined as the Tarong and Middle Ridge areas west of Postman's Ridge.

Figure 5.15 South West area 300kV and 275kV transmission network



Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional load driven capacity forecast to be required as a result of network limitations in the South West zone within the next five years to meet reliability obligations.

Possible network investments within five years

Powerlink anticipates 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 zone within the next five years.

Transmission Lines

Powerlink has not identified any potential network investments to address the risks arising from the condition of transmission lines in the South West zone within the next five years.

Substations

Middle Ridge 330/275/110kV Substation

Middle Ridge Substation, located south of Toowoomba, is a major transmission node between South West and South East Queensland, as well as an essential bulk supply point for local and South East Queensland loads, including Toowoomba and the Darling Downs area. The majority of secondary systems were commissioned between 2002 and 2007.

[32] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Anticipated consultation	Addressing the Secondary Systems Condition Risks at Middle Ridge
Asset details	Established in 1965.
Project driver	Condition driven replacement to address emerging obsolescence and compliance risks on 275/110kV secondary systems.
Project timing	June 2031.
Proposed network solution	Replacement of all 275/110kV secondary systems at an estimated cost of $63 million by June 2031.
Possible 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.
Other possible network solutions	Selective replacement of 275/110kV secondary systems equipment by June 2031.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[33]

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

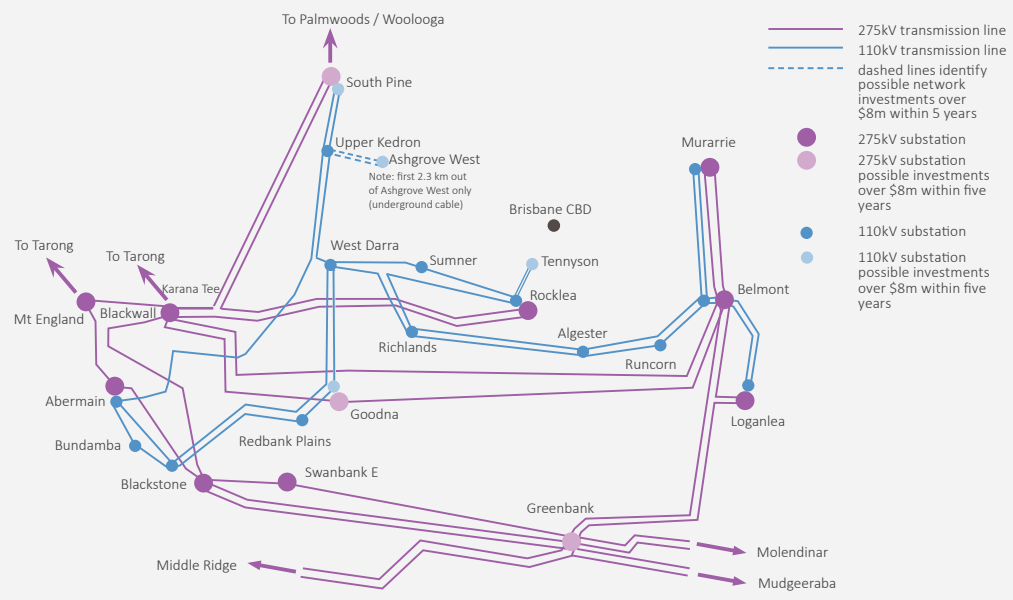
5.7.5 Moreton zone

Existing network

The Moreton zone includes a mix of 275kV and 110kV transmission networks servicing a number of significant load centres in south-east Queensland, including the Sunshine Coast, greater Brisbane, Ipswich and northern Gold Coast regions.

Future investment needs in the Moreton zone are substantially arising from the condition and performance of 275kV and 110kV assets in the greater Brisbane area. The 110kV network in the greater Brisbane area was progressively developed from the early 1960s and 1970s, with the 275kV network being developed and reinforced in response to load growth from the early 1970s. Multiple Powerlink 275/110kV injection points now interconnect with the Energex network to form two 110kV rings supplying the Brisbane Central Business District (CBD).

Figure 5.16 Greater Brisbane transmission network



Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional load driven capacity forecast to be required in the Moreton zone within the next five years to meet reliability obligations.

[33] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Possible network investments within five years

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

Transmission Lines

The 110kV and 275kV transmission lines in the greater Brisbane area are located between 20km and 40km from the coast, traversing a mix of industrial, high density urban and semi-urban areas. The majority of assets are reasonably protected from the prevailing coastal winds and are exposed to moderate levels of pollution related to the urban environment. These assets have, over time, experienced structural corrosion at similar rates, with end of technical service life for most transmission line assets (refer to Table 5.9) expected to occur towards the end of the 2020s and into the early 2030s.

Underground 110kV cable between Upper Kedron and Ashgrove West

The 110kV transmission line between Upper Kedron and Ashgrove West substations is one of the principal sources of supply to the north west Brisbane area, including supply to Ashgrove West, Kelvin Grove, Milton, Roma Street and Makerston Street substations. The transmission line is predominantly overhead, with the final 2.3km long section to Ashgrove West Substation being underground cable.

Potential consultation	Maintaining Reliability of Supply at Ashgrove West
Asset details	Constructed in 1978.
Project driver	Emerging condition, end of technical service life and compliance risks for the Upper Kedron to Ashgrove West underground cables.
Project timing	June 2031.
Proposed network solution	Replacement of the oil-filled cables with new cables in a new easement at an estimated cost of $53 million by June 2031.
Possible non-network solutions	Potential non-network solutions would need to supply approximately 220MW and 2,500MWh per day.
Other possible network solutions	Replacement of existing cables with new cables in the existing easement by June 2031.
Inter-network impact	Powerlink considers the proposed network solutions will not have a material inter-network impact.

Substations

South Pine 275/110kV Substation

Commissioned in 1981 to support regional network expansion, South Pine Substation plays a vital role in the South East Queensland transmission backbone from Central, South West and South East Queensland, providing bulk electricity supply to north Brisbane suburbs and the Brisbane CBD. Located approximately 16km north west of Brisbane's CBD, the substation also includes a 275kV SVC to deliver dynamic reactive power support in the region.

South Pine 275/110kV Transformer

Potential consultation	Maintain Reliability of Supply at South Pine
Asset details	South Pine Substation was constructed in the 1960s with subsequent expansion in the 1970s and 1980s. The relevant transformer asset was installed in 1981.
Project driver	Emerging condition and reliability of supply risks associated with the aged 275/110kV transformer.
Project timing	June 2030.
Proposed network solution	Replacement of the existing 275/110kV transformer at South Pine Substation at an estimated cost of $16 million by June 2030.
Possible non-network solutions	Potential non-network solutions would need to supply approximately 165MW and 1,350MWh per day.
Other possible network solutions	Establishment of a new 275/110kV substation within the north Brisbane area by June 2030.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

South Pine 275kV and SVC secondary systems

Potential consultation	Addressing the 275kV and SVC Secondary Systems Condition Risks at South Pine
Asset details	The 275kV secondary systems at South Pine Substation were installed in 2006. The South Pine SVC was installed in 2008. The SVC provides voltage stability and control services to the transmission network within the greater north Brisbane area. The SVC also provides power systems stability and power oscillation dampening services to support power transfers across the major Queensland 275kV corridors into South East Queensland and QNI.
Project driver	Emerging condition, reliability of supply, and compliance risks associated with the aged components of South Pine 275kV and SVC secondary systems.
Project timing	June 2031.
Proposed network solution	Replacement of the 275kV and SVC secondary systems at an estimated cost of $58 million by June 2031.
Possible non-network solutions	275kV Secondary Systems component: • Potential non-network solutions would need to address the key role that South Pine Substation provides for the connection of 275kV circuits within the South Queensland area. South Pine 110kV West Bus: • Potential non-network solutions would need to supply up to 165MW and 1,350MWh per day. South Pine 110kV East Bus: • Potential non-network solutions would need to supply up to 380MW and 3,340MWh per day. SVC Secondary Systems component: • Potential non-network solutions would need to provide voltage control and stability services for the transmission network supplying the greater north Brisbane area and provide power system dampening services more broadly for the high voltage transmission network and QNI.
Other possible network solutions	Staged replacement of the 275kV secondary systems and full replacement of the SVC secondary systems at South Pine Substation by June 2031.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

South Pine 110kV Secondary Systems

Potential consultation	Addressing the 110kV Secondary Systems Condition Risks at South Pine
Asset details	Established in 2010.
Project driver	Emerging condition secondary systems compliance risks for the 110kV secondary systems.
Project timing	June 2031.
Proposed network solution	Full replacement of the 110kV secondary systems at South Pine Substation at an estimated cost of $38 million by December 2031.
Possible non-network solutions	Potential non-network solutions would need to address the key role that South Pine Substation provides for the connection of 110kV circuits within the South Queensland area. South Pine 110kV West Bus: • Potential non-network solutions would need to provide up to 165MW and 1,350MWh per day. South Pine 110kV East Bus: • Potential non-network solutions would need to provide up to 380MW and 3,340MWh per day.
Other possible network solutions	Staged replacement of the 110kV secondary systems by June 2031.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Ashgrove West 110/33kV Substation

Ashgrove West Substation was established to meet increased demand in the Brisbane CBD and the expanding residential areas to the north and west of Brisbane.

Potential consultation	Addressing the Secondary Systems Condition Risks at Ashgrove West
Asset details	Established 1979.
Project driver	Emerging condition and 110kV secondary systems compliance risks.
Project timing	December 2029.
Proposed network solution	Full replacement of the 110kV secondary systems at Ashgrove West Substation at an estimated cost of $25 million by December 2029.
Possible non-network solutions	Potential non-network solutions would need to provide up to 220MW and 2,500MWh per day.
Other possible network solutions	Staged replacement on 110kV secondary systems by December 2029.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Goodna 275/110kV Substation

Goodna Substation is located approximately 24km south west of the Brisbane CBD and operates as a bulk supply point to the Energex 33kV network.

Potential consultation	Maintaining Reliability of Supply at Goodna
Asset details	Established in 2006.
Project driver	Condition driven replacement to address obsolescence and condition risks the 275kV and 110kV secondary systems.
Project timing	December 2030.
Proposed network solution	Replacement of 275kV and 132kV secondary systems at an estimated cost of $39 million by December 2030.
Possible non-network solutions	Potential non-network solutions would need to supply up to 180MW and 2,800MWh per day.
Other possible network solutions	Staged replacement of 275kV and 110kV secondary systems by December 2030.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Tennyson 110/33/11kV Substation

Tennyson Substation, located approximately 6km south of the Brisbane CBD, is a 110kV substation fed by three 110kV underground feeders from Rocklea. The substation supplies the Energex local distribution network.

Anticipated consultation	Maintaining Power Transfer Capability and Reliability of Supply at Tennyson
Asset details	Established in 2001.
Project driver	Condition driven replacement to address risks on one of the 110/33/11kV transformers.
Project timing	June 2028.
Proposed network solution	Replacement of Transformer 3 at an estimated cost of $11 million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to provide up to 190MW and 2,000MWh per day.
Other possible network solutions	Life extension of Transformer 3 by June 2028.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Greenbank 275kV Substation

Greenbank Substation, located approximately 40km from the coast, is a major node in the transmission network connecting the 330kV and 275kV network from the Southern Downs area into South East Queensland. It is also the major switching station for the 275kV transmission lines supplying the Gold Coast and South Moreton areas.

Potential consultation	Addressing the SVC Secondary Systems Condition Risks at Greenbank
Asset details	The SVC located at Greenbank Substation was installed in 2008. The SVC provides voltage stability and control services to the transmission network within the greater south east Brisbane area. The SVC also provides power systems stability and power oscillation dampening services to support power transfers across the major Queensland 275kV corridors into South East Queensland and across QNI.
Project driver	Emerging condition and reliability of supply risks associated with the aged components of Greenbank SVC secondary systems.
Project timing	June 2030.
Proposed network solution	Replacement of the secondary systems, thyristor valve control systems, and cooling control systems for the SVC installed at Greenbank Substation at an estimated cost of $23 million by June 2030.
Possible non-network solutions	Potential non-network solutions would need to provide voltage control and stability services for the transmission network within the greater south east Brisbane area, and provide stability and power system dampening services more broadly for the high voltage transmission network.
Other possible network solutions	Full replacement of the SVC at Greenbank Substation by June 2030.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[34]

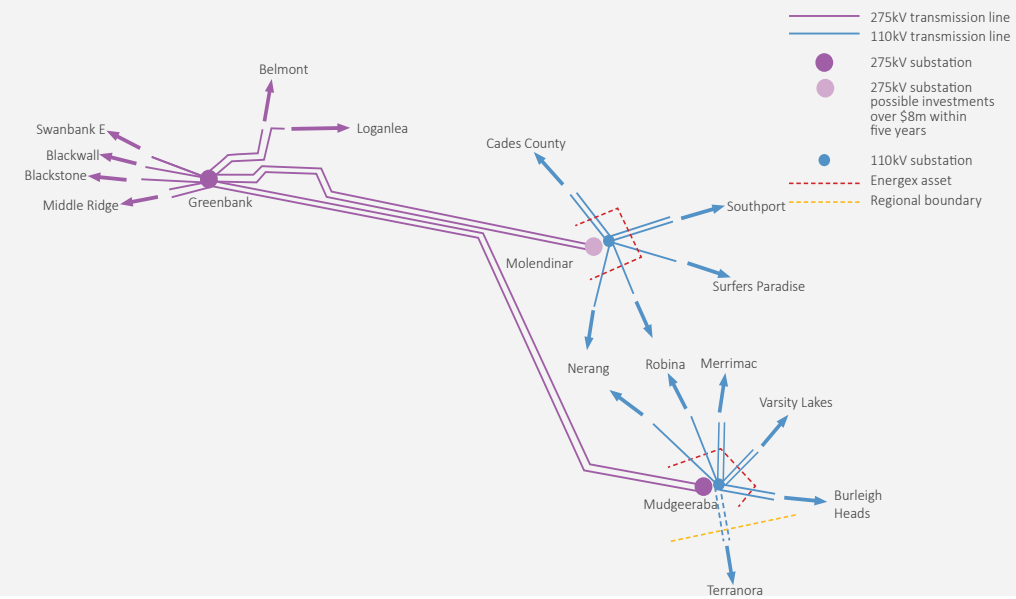
Powerlink has not identified any potential asset retirements in the Moreton zone within the 10-year outlook period.

5.7.6 Gold Coast zone

Existing network

The Powerlink transmission system in the Gold Coast zone was originally constructed in the 1970s and 1980s. The Molendinar and Mudgeeraba substations are the two major injection points into the area via a double circuit 275kV transmission line between Greenbank and Molendinar substations, and two single circuit 275kV transmission lines between Greenbank and Mudgeeraba substations.

Figure 5.17 Gold Coast transmission network



[34] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

Possible load driven limitations

Based on Powerlink's Central scenario forecast, there is no additional load driven capacity forecast to be required as a result of load driven network limitations in the Gold Coast zone within the next five years to meet reliability obligations.

Possible network investments within five years

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

Transmission Lines

Mudgeeraba to Terranora 110kV transmission Line

The existing 110kV transmission line between Mudgeeraba and Terranora substations form the Terranora Interconnector. This transmission line is also a key supply point to loads located in northern New South Wales (NSW). Powerlink owns the section of transmission line from Mudgeeraba Substation to the Queensland-NSW border.

Potential consultation	Addressing Terranora Interconnector Capability
Asset details	Constructed in the mid-1970s.
Project driver	Emerging condition risks within the Powerlink section of Terranora Interconnector due to structural corrosion.
Project timing	June 2028.
Proposed network solution	Refit the Powerlink portion of the existing Mudgeeraba to Terranora 132kV double circuit line at an estimated cost of $8 million by June 2028.
Possible non-network solutions	Potential non-network solutions would need to maintain, as a minimum, existing transmission capability to meet reliability of supply to the northern NSW load area (up to 110MW and 1,500MWh per day) and facilitate inter-regional power transfers.
Other possible network solutions	Rebuild of the Powerlink portion of the Mudgeeraba to Terranora 110kV transmission line.
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 identified need timing and as part of the RIT-T consultation process.

Substations

Molendinar 275/110kV Substation

Molendinar 275/110kV Substation, located approximately 75km south west of the Brisbane CBD, is one of two major connection points for supply into the Gold Coast area. The 110kV network from Molendinar to Mudgeeraba links the coastal bulk supply points at Southport, Surfers Paradise and Broadbeach via underground cable. An inland overhead 110kV network supplies Robina and Nerang substations.

Potential consultation	Addressing the Secondary Systems Condition Risks at Molendinar
Asset details	Established in 2003.
Project driver	Emerging condition risks arising from the condition of the 275kV secondary systems.
Project timing	June 2029.
Proposed network solution	Selected replacement of secondary systems at an estimated cost of $53 million.
Possible 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.
Other possible network solutions	Full replacement of 275kV secondary systems by June 2029.
Inter-network impact	Powerlink considers the proposed network solution will not have a material inter-network impact.

Possible asset retirements[35]

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

[35] Operational works, such as asset retirements, do not form part of Powerlink's capital expenditure budget.

5.8 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 proactive 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.

5.8.1 Transmission line refit works

In mid-2023, Powerlink completed an Asset Reinvestment Review that evaluated targeted investment in life extension of transmission line assets to defer costly rebuilds[36]. Based on the review's recommendations, Powerlink will continue to implement changes to the timing, scope and bundling of proposed transmission line refit works. When identifying potential programs, Powerlink will assess the risks associated with the condition of each transmission line asset individually to ensure solutions are tailored to the specific needs in a prudent and cost-effective manner.

Table 5.9 lists potential transmission line refit works that were identified in the 2024 TAPR currently under consideration for inclusion in Powerlink's line refit programs in the 10-year outlook period.

[36] Powerlink, Asset Reinvestment Review, working group report, June 2023. Also refer to Appendix A for further information on the Asset Reinvestment Review.

Table 5.9 Transmission lines under consideration for inclusion in Powerlink's line refit programs in the 10-year outlook period

Transmission line	Zone	Potential line refit program
Line refit works on the 132kV transmission line between Dan Gleeson and Alan Sherriff substations	Ross	Townsville
Line refit works on the 275kV transmission line between Strathmore and Ross substations	Ross	Townsville
Line refit works on the 132kV transmission line between Nebo Substation and Eton Tee	North	Townsville
Line refit works on the 132kV transmission line between Bouldercombe Substation and Bouldercombe Tee	Central West	Rockhampton-Gladstone
Line refit works on the 132kV transmission line between Bouldercombe Tee and Egans Hill Substation	Central West	Rockhampton-Gladstone
Line refit works on the 275kV transmission line between Wurdong and Boyne Island substations	Gladstone	Rockhampton-Gladstone
Line refit works on the 275kV transmission line between Raglan and Bouldercombe substations	Gladstone	Rockhampton-Gladstone
Line refit works on the 275kV transmission line between Gin Gin and Teebar Creek substations	Wide Bay	Southern
Line refit works on the 275kV transmission line between Gin Gin 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 line between Karana Downs and South Pine substations	Moreton	Southern
Line refit works on the 110kV transmission line between Richlands and Algester substations	Moreton	Southern
Line refit works on the 110kV transmission line between West Darra and Upper Kedron substations	Moreton	Southern
Line refit works on the 275kV transmission line between Bergins Hill and Karana Downs	Moreton	Southern
Line refit works on the 275kV transmission line between Bergins Hill, Goodna and Belmont substations	Moreton	Southern
Line refit works on the 110kV transmission lines between Swanbank, Redbank Plains and West Darra substations	Moreton	Southern
Line refit works on the 110kV transmission line between Blackstone and Abermain substations	Moreton	Southern
Line refit works on the 275kV transmission line between Greenbank and Mudgeeraba substations	Gold Coast	Southern

5.8.2 Condition-based programs

Table 5.10 identifies potential programs of work over the next five years which will be subject to the RIT-T.

Table 5.10 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	June 2030	$37m
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 a proposed ongoing annual program replacing those systems that are at end of life across the Powerlink network.	$60m for the 2027-32 regulatory period
Current Transformer Replacement Program	Addressing the risk of premature Current Transformer failures in Queensland (1)	Staged replacement of current transformers at substations throughout Queensland	Maintain supply reliability to Queensland	June 2031	$87m

Notes:

(1) Powerlink published a PSCR in August 2025 proposing one credible option: replacement of identified current transformers in Northern and Central Queensland by 2029 and replacement of identified current transformers in Southern Queensland by 2031. Submissions are due by 12 November 2025[37].

(2) Powerlink is also progressing a program to install Phase Monitoring Units at a number of sites across the network to meet AEMO requirements.

5.8.3 WAMPAC platform roll-out

Powerlink is progressing with the development and roll out of the WAMPAC platform to maximise the capability of the network and provide an additional layer of security and resilience to system disturbances and events.

WAMPAC schemes rapidly detect specific conditions over geographically diverse transmission assets and initiate appropriate action to rapidly respond to changed power system conditions. The platform is capable of operating in sub-second timeframes enabling the system to dynamically respond to changes in the power system and to avoid adverse operating conditions.

WAMPAC schemes have been implemented for system protection services across the CQ-SQ grid section to enhance the resilience and security of the network during non-credible contingencies. In Far North and North Queensland the WAMPAC scheme will soon be in-service to help to manage the impacts of outages on system strength. Powerlink is progressing the implementation in other parts of the network to increase transmission capability, improve security and resilience, and more effectively manage and operate the transmission network during outages.

The planned roll out of WAMPAC across the state is outlined in Table 5.11.

[37] Powerlink, Addressing the Risk of Current Transformer Premature Failures in Queensland, PSCR, August 2025.

Table 5.11 WAMPAC platform roll-out

Status	Zone/Grid Section	Application
Completed	CQ-SQ	Improve security and resilience under non-credible contingencies (tranche 1)
	Far North and North Queensland	Managing system strength and reduce impacts of network outages
In progress	CQ-SQ	Improve security and resilience under non-credible contingencies (tranche 2)
	Surat	Improve security and resilience under non-credible contingencies
Short to longer term	Management of extreme events	Improve security and resilience under non-credible contingencies, interconnectors, consideration of use with frequency management
	Various Grid Sections	Run-back schemes to provide additional network capacity of the shared grid (e.g. Virtual Transmission Lines)
	N-2 for double circuit generation connection	Increase hosting capacity for new generation double circuits
	Various locations	Provision of non-firm capacity to urgent load connections (e.g. electrification, hydrogen, etc)
	Various locations	Anti-islanding capability (various timings)

5.9 Supply / demand balance

The outlook for the supply / demand balance for the Queensland region was published by AEMO in the 2025 Electricity Statement of Opportunities (ESOO). Interested parties who require information regarding future supply / demand balance should consult the ESOO.

5.10 Existing interconnectors

Powerlink and Transgrid completed a RIT-T in December 2019 to expand transmission transfer capacity between Queensland and New South Wales. The recommended QNI Minor Project included uprating the 330kV Liddell to Tamworth 330kV lines and installing SVCs at Tamworth and Dumaresq substations and capacitor banks at Tamworth, Armidale and Dumaresq substations. Transgrid completed commissioning these works by May 2022 and inter-network testing activities, as required by clause 5.7.7 of the NER, are in the final stages, resulting in increased capacity in both north and south flows.

5.11 Transmission lines approaching end of technical service life beyond the 10-year outlook period

As transmission lines approach their expected end of technical service life, Powerlink conducts detailed planning studies to determine each asset's enduring need. These studies consider the asset condition, risk and alignment with future investment or network optimisation strategies. Possible options include line refit, targeted and/or staged refit or replacement, upfront replacement or rebuild, network reconfiguration, non-network alternatives, asset de-rating or retirement.

The information in Table 5.12 which goes five years beyond the 10-year outlook period of the 2025 TAPR, is provided in good faith[38] as a snapshot and is 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.

Proponents who wish to connect to Powerlink's transmission network are strongly encouraged to contact NetworkAssessments@powerlink.com.au in the first instance.

[38] For completeness, refer to Powerlink's Disclaimer inside the front cover.

Table 5.12 Transmission lines approaching end of technical service: 10-15 years (July 2035 to June 2040)

Region	Zone	Feeder	Voltage	General location
Northern	Far North	7227	132kV	Between Cairns and Woree substations
Northern	Far North	7191, 7192	132kV	Between Kareeya and Chalumbin substations
Northern	Far North	876, 877	275kV	Between Chalumbin and Woree substations
Northern	Ross	8858	275kV	Between Strathmore and Ross substations
Northern	Ross	7130, 7131	132kV	Between Clare South and Townsville South substations
Northern	North	7120, 7304, 7305	132kV	Between Nebo and Pioneer Valley substations
Northern	North	834	275kV	Between Nebo and Broadsound substations
Northern	North	7152	132kV	Between Pioneer Valley and Alligator Creek substation
Northern	North	7119	132kV	Between Nebo and Alligator Creek substations
Northern	North	7238	132kV	Between Pioneer Valley and Mackay substations
Northern	North	856	275kV	Between Stanwell and Broadsound substations
Northern	Central West	820	275kV	Between Bouldercombe and Broadsound substations
Northern	Central West	821	275kV	Between Bouldercombe and Nebo substations
Central	Central West	833	275kV	Between Broadsound and Lilyvale substations
Central	Central West	7370, 7369	132kV	Between Moranbah and Goonyella Riverside substations
Central	Central West	7150	132kV	Between Lilyvale and Dysart substations
Central	Central West	7109	132kV	Between Baralaba and Calvale substations
Central	Central West	7110	132kV	Between Calvale and Moura substations
Central	Central West	7112	132kV	Between Baralaba and Moura substations
Central	Central West	7124	132kV	Between Moranbah and Dysart substations
Central	Central West	848, 849	275kV	Between Stanwell and Bouldercombe substations
Central	Gladstone	8875	275kV	Between Raglan and Larcom Creek substations
Central	Gladstone	7145, 7146	132kV	Between Calliope River and Boyne Island substations
Central	Gladstone	871	275kV	Between Calvale and Wurdong substations
Central	Gladstone	8859	275kV	Between Calliope River and Larcom Creek substations
Central	Gladstone	8877, 8878	275kV	Between Gladstone and Calliope River substations
Central	Gladstone	7194	132kV	Between Gladstone and Calliope River substations
Central	Gladstone	7145, 7146	132kV	Between Calliope River and Boyne Island substations
Southern	Wide Bay	8850	275kV	Between Woolooga and Teebar Creek substations
Southern	Wide Bay	819	275kV	Between Teebar Creek and Wurdong substations
Southern	South West	831	275kV	Between Tarong and Middle Ridge substations
Southern	Moreton	827	275kV	Between Tarong and Blackwall substations
Southern	Moreton	832	275kV	Between Tarong and South Pine substations
Southern	Moreton	825	275kV	Between Mt England and South Pine substations
Southern	Moreton	805	275kV	Between Swanbank and Greenbank substations
Southern	Moreton	829	275kV	Between Loganlea and Belmont substations
Southern	Moreton	8822	275kV	Between Greenbank and Belmont substations