CHAPTER 7

Non-network solution opportunities

7 Non-network solution opportunities

Key highlights

- Powerlink welcomes the opportunity to utilise non-network solutions that have the potential to deliver positive outcomes for customers.
- Non-network solutions, in part or full, may also contribute to an overall network strategy by maintaining a balance between reliability and the cost of transmission services.
- With the continued uptake of rooftop photovoltaic (PV) systems, there will be an increasing need for non-network solutions to assist in managing voltages during minimum demand conditions and more generally as the energy system transforms.
- Opportunities may also be available to assist in managing daily peaks and troughs where economic.
- This chapter summarises potential non-network opportunities which may become available in the next five years.

7.1 Introduction

Powerlink has established processes for engaging with stakeholders for the provision of non-network services in accordance with the requirements of the National Electricity Rules (NER). For a given network limitation or potential asset replacement, the viability and an indicative specification of non-network solutions are first introduced in the Transmission Annual Planning Report (TAPR) and TAPR templates. As the identified need date approaches and detailed planning analysis is undertaken, further opportunities are explored in the consultation and stakeholder engagement processes undertaken as part of the Regulatory Investment Test for Transmission (RIT-T).

Historically, through regulatory consultation processes, Powerlink has implemented a range of non-network solutions in various areas in Queensland to assist, support or augment the power transfer capability of the high voltage transmission grid.

7.2 Increased opportunities for non-network solutions

The uptake of rooftop PV systems is expected to continue within residential and commercial premises. Should this trend progress in the absence of energy storage devices (such as household battery systems) or significant levels of demand time of day shifting, minimum demand will further decrease and there will be a continued widening between maximum and minimum demand. The installation of additional reactive devices and/or non-network solutions are likely to be required to manage voltages during minimum demand conditions.

Continuation of this trend is likely to present further challenges to the energy system. Generating stations will be required to ramp up and down in response to daily demand variations more frequently. Decreasing minimum demand may lower the amount of synchronous generation that is on-line and this could further impact on voltage control, system strength, inertia and the ability for available generators to meet evening peak demand.

There may be opportunities for new technologies and non-network solutions to assist with managing the daily peaks and troughs. Demand shifting and storage solutions have the potential to smooth the daily load profile. These type of services could offer a number of benefits to the electricity system including reducing the need for additional transmission investment. More information on these emerging issues is available in chapters 2 and 3.

Powerlink is committed to understanding the future potential of non-network solutions and implementing where possible and economical to do so:

- to address future network limitations or address the risks arising from ageing assets remaining in-service within the transmission network
- more broadly, in combination with network developments as part of an integrated solution to complement an overall network reconfiguration strategy
- to address voltage instability, inertia, system strength and network support and control ancillary services (NSCAS) requirements, ensuring the secure operation of the transmission network
- to provide demand management and load balancing.

7.2.1 Possible impacts of the energy transformation

Due to the energy transformation, there is the potential to have significantly changed requirements for transmission infrastructure in the 10-year outlook period. Given Powerlink's integrated planning approach, these requirements may result in the need for new investments that impact the proposed future network and non-network solutions identified in Table 7.1 and Chapter 6 and will be updated in subsequent TAPRs if this eventuates.

7.3 Non-network solution providers are encouraged to register with Powerlink

Powerlink has established a Non-network Engagement Stakeholder Register (NNESR) to convey non-network solution providers the details of potential non-network solution opportunities. Interested parties are encouraged to register their interest in writing to networkassessments@powerlink.com.au to become a member of Powerlink's NNESR.

More information on potential non-network solutions is available on Powerlink's website, including details regarding RIT-T and Power System Security consultation processes and Powerlink's Network Support Contracting Framework.

7 Non-network solution opportunities

Table 7.1 Potential non-network solution opportunities within the next five years

Potential project	Indicative cost (most likely network option)	Zone	Indicative non-network requirement	Possible commissioning date	TAPR Reference
Transmission lines					
Woree to Kamerunga 132kV transmission line replacement	$42	Far North	Up to 70MW at peak and up to 1,200MWh per day on a continuous basis to provide supply to the 22kV network	December 2026	Section 6.9.1
Rebuild the 275kV transmission line between Calliope River and Larcom Creek Substation	$35m	Gladstone	Up to 160MW at peak and up to 3,200MWh per day on a continuous basis to provide supply to the 66kV and 132kV loads at Yarwun and Raglan	June 2026	Section 6.10.2
Line refit works on the 275kV transmission line between Wurdong and Boyne	$11m	Gladstone	Up to 400MW at peak and up to 10,000MWh per day on a continuous basis to supply the 275kV network at Boyne Island	December 2025	Section 6.10.2
Rebuild the 132kV transmission line between Callemondah and Gladstone South substations	$25m	Gladstone	Up to 160MW and up to 1,820MWh per day	June 2026	Section 6.10.2
Rebuild of two of the three transmission lines between Calliope River and Wurdong tee as a double circuit by June 2026 Line refit works on the remaining single circuit 275kV transmission line between Calliope River Substation and Wurdong Tee by June 2026	$28m $6m	Wide Bay	Powerlink would consider proposals from non-network providers that can significantly contribute to reducing the load requirement in this region.	June 2026	Section 6.11.1
Line refit works on the 275kV transmission line between Woolooga and South Pine substations	$38m	Wide Bay	Powerlink would consider proposals from non-network providers that can significantly contribute to reducing the load requirement in this region. However, this would result in material intra-regional other impacts.	December 2028	Section 6.11.1

Table 7.1 Potential non-network solution opportunities within the next five years (***continued***)

Potential project	Indicative cost (most likely network option)	Zone	Indicative non-network requirement	Possible commissioning date	TAPR Reference
Replacement of the 110kV underground cable between Upper Kedron and Ashgrove West substations	$14m	Moreton	Up to 220MW at peak to Brisbane's inner north-west suburb (potentially coupled with network reconfiguration)	June 2026	Section 6.11.4
Line refit works on sections of the 275kV transmission line between Greenbank and Mudgeeraba substations	$30-53m	Gold Coast	Proposals which may significantly contribute to reducing the requirements in the southern Gold Coast and northern NSW area	December 2028	Section 6.11.5
Substations - primary plant and secondary systems					
Edmonton 132kV secondary systems replacement	$6	Far North	Up to 55MW at peak and 770MWh per day on a continuous basis to provide supply to the 22kV network at Innisfail	June 2026	Section 6.9.1
Alan Sherriff 132kV secondary systems replacement	$12m	Ross	Up to 25MW at peak and up to 450MWh per day to provide supply to the 11kV network in north-east Townsville	June 2025	Section 6.9.2
Ingham South 132kV secondary systems replacement	$6m	Ross	Up to 20MW at peak and up to 280MWh per day on a continuous basis to provide supply to the 66kV network at Ingham South	June 2026	Section 6.9.2
Garbutt 132kV secondary systems replacement	$10m	Ross	Up to 110MW at peak and up to 800MWh per day on a continuous basis to provide supply to the 66kV network in north east Townsville	June 2026	Section 6.9.2
Townsville South 132kV secondary systems replacement	$16m	Ross	Up to 150MW at peak and up to 3000MWh per day on a continuous basis to provide supply to Townsville East and Townsville South (including Sun Metals). It would also need to facilitate the connection of Mt Stuart Power Station (PS).	June 2028	Section 6.9.2
Strathmore SVC secondary systems replacement	$6m	North	Up to 260MVArs capacitive and 80MVArs reactive dynamic voltage support at Strathmore	June 2026	Section 6.9.3

Table 7.1 Potential non-network solution opportunities within the next five years (*continued*)

Potential project	Indicative cost (most likely network option)	Zone	Indicative non-network requirement	Possible commissioning date	TAPR Reference
Calvale 275kV primary plant replacement	$16m	Central West	More than 100MW and up to 2,000MWh per day on a continuous basis to provide supply to the 132kV network at Moura and Biloela	June 2028	Section 6.10.1
Broadsound 275kV primary plant replacement	$16m	Central West	Up to 250MW and up to 6,000MWh per day on a continuous basis to provide supply to the 275kV network at Broadsound	December 2027	Section 6.10.1
Callemondah Substation primary plant and secondary systems replacement	$7m	Gladstone	Up to 180MW at peak and up to 2,500MWh per day on a continuous basis to provide supply to the 132kV network at Gladstone South and/or Aurizon load at Callemondah	June 2024	Section 6.10.2
Tangkam 110kV secondary systems replacement	$16m	South West	Up to 70MW at peak and up to 700MWh per day on a continuous basis to supply the 110kV network at Tangkam	December 2024	Section 6.11.1 Anticipated RIT-T
One bus reactor each at Woolooga, Blackstone and Belmont substations	$27m	Moreton	Proposals which provide voltage control equivalent to the proposed three reactors across South East Queensland, at a nominal 360MVars. Reactive support would be required to be available on a continuous basis, and not coupled to generation output. Partial solutions to address either the declining minimum day time demand or the increasing early morning leading power factor would be considered on a case by case basis.	December 2022 to December 2025	Section 6.11.4 RIT-T in progress (1)
Ashgrove West 110kV secondary systems replacement	$9m	Moreton	Up to 220MVA at peak to Brisbane's inner north-west suburb (potentially coupled with network reconfiguration)	December 2026	Section 6.11.4

Table 7.1 Potential non-network solution opportunities within the next five years (***continued***)

Potential project	Indicative cost (most likely network option)	Zone	Indicative non-network requirement	Possible commissioning date	TAPR Reference
Murarrie 110kV secondary systems replacement	$22m	Moreton	Proposals which may significantly contribute to reducing the requirements in the transmission network into the CBD and south-eastern suburbs of Brisbane of over 300MW	June 2027	Section 6.11.4
Mudgeeraba 110kV secondary systems replacement	$12m	Gold Coast	Proposals which may significantly contribute to reducing the requirements in the transmission into the southern Gold Coast and northern NSW area	June 2028	Section 6.11.5 Anticipated RIT-T
Mudgeeraba 275kV and 110kV primary plant replacement	$20m	Gold Coast	Proposals which may significantly contribute to reducing the requirements in the transmission into the southern Gold Coast and northern NSW area	June 2028	Section 6.11.5
Substations - transformers					
Tully 132/22kV transformer replacement	$6m(2)	Far North	Life extension of the existing transformer or a non-network alternative of up to 15MW at peak and up to 100MWh per day on a continuous basis to provide supply to the 22kV network at Tully	June 2024	Section 6.9.1
Redbank Plains 110kV primary plant and 110/11kV transformers replacement	$8m	Moreton	Provide support to the 11kV network of up to 25MW and up to 400MWh per day	June 2025	Section 6.11.4 RIT-T in progress

Notes:

(1) The Managing voltages in South East Queensland consultation also takes into consideration the longer term NSCAS gap requirements identified in AEMO's 2021 System Security Reports. The preferred option identified in the subsequent Project Assessment Draft Report may change from the potential project identified in Table 7.1.

(2) TAPR template data associated with emerging constraints which may require future capital expenditure, including potential projects which fall below the RIT-T cost threshold of $7m, is available on Powerlink's TAPR portal (refer to Appendix B, in particular transmission connection points and transmission line segments, regarding Powerlink's methodology for template data development).

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