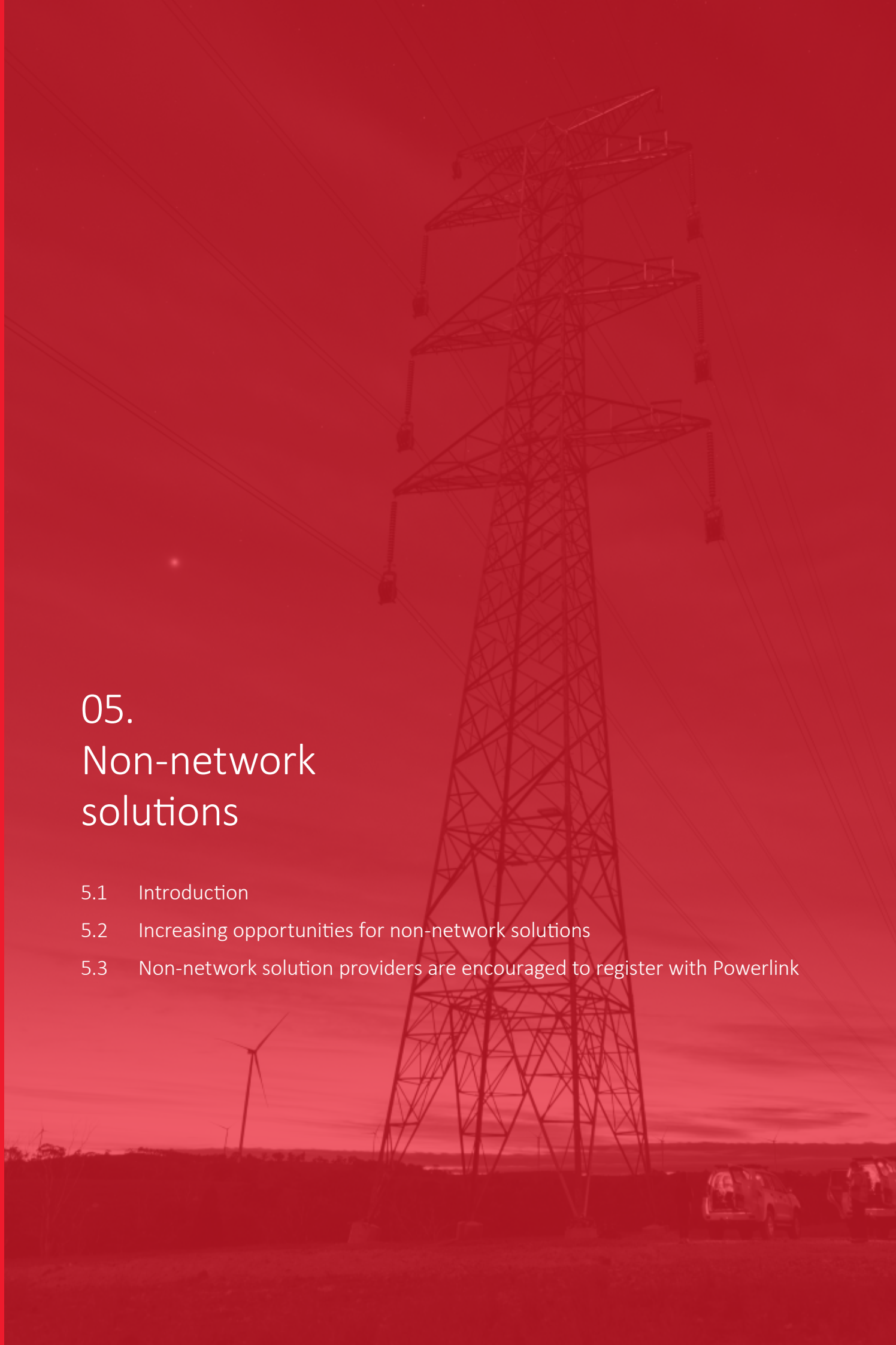

05. Non-network solutions

5.1 Introduction

5.2 Increasing opportunities for non-network solutions

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

The use of non-network solutions is essential to provide reliable and cost effective transmission services for customers. This chapter discusses Powerlink's approach and process for engaging with non-network solution providers and provides a summary of potential non-network solution opportunities anticipated to become available over the next five years.

Key highlights

- As the power system transforms, non-network solutions will be essential to address network needs such as inertia, system strength, Network Support and Control Ancillary Services (NSCAS) and voltage control.
- Flexible demand in a renewable generation future will be essential and non-network solutions will play a key role in managing daily peaks and troughs where economic, delivering positive outcomes for customers.
- Non-network solutions, in part or full, may also contribute to a network strategy by maintaining a balance between reliability and the cost of transmission services for customers.

5.1 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).

In the past, 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 network. Most recently, as an outcome of the Managing voltages in South East Queensland RIT-T, Powerlink has an agreement in place for network support services from CleanCo to operate during times of reactive power absorption, avoiding the need for additional bus reactors in South East Queensland.

Powerlink is continuing discussions with proponents of potential non-network solutions that are expected to materially contribute to meet both the forecast minimum and efficient system strength requirements in Queensland (refer to Addressing system strength requirements in Queensland from December 2025 and Section 6.8.2).

5.2 Increasing opportunities for non-network solutions

Given the scale of the energy transformation, rapid uptake of variable renewable energy (VRE) resources and signalled retirement of synchronous generators, it is critical to find alternate solutions and to procure services to address future power system security requirements such as inertia, system strength and NSCAS. Powerlink expects that non-network solutions will materially contribute to the provision of these services through a suite of solutions with, but not limited to, existing synchronous generation plant, dedicated synchronous condensers, pumped hydro energy storage and grid-forming asynchronous plant.

The uptake of rooftop photovoltaic (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 (refer to Section 3.2). The installation of additional reactive devices and/or non-network solutions are likely to be required to manage high voltages during minimum demand conditions.

Continuation of this trend is likely to present further challenges to the transmission system. Generating stations will be required to ramp up and down in response to daily demand variations more frequently. Decreasing minimum demand will lower the amount of synchronous generation that is online, and this could further impact on voltage control, system strength, and inertia.

Powerlink expects there will also be future opportunities for new technologies and flexible loads, which will be capable of providing non-network solutions to assist with managing daily peaks and troughs in the renewable generation future. Demand shifting and storage solutions have the potential to smooth the daily load profile and could offer a number of benefits to the power system including reducing the need for additional transmission network investments. More information on these emerging issues is available in Chapter 3 and sections 6.9.1 to 6.11.6.

Powerlink is committed to genuine engagement with providers of non-network solutions and the implementation of these solutions where technically feasible and economic to:

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

Potential non-network solution opportunities within the next five years are described in Table 5.1.

5.3 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. The NNESR is comprised of a variety of interested stakeholders who have the potential to offer network support and/or system security services through alternate technologies, existing and/or new generation or demand side management (DSM) initiatives (either as individual providers or aggregators).

More information on potential non-network solutions is available on Powerlink's website, including details regarding current candidate Priority Transmission Investment and RIT-T consultations and Powerlink's Network Support Contracting Framework.

Interested parties are encouraged to contact NetworkAssessments@powerlink.com.au to become a member of Powerlink's NNESR.

Table 5.1 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
Joint planning projects					
Woree to Kamerunga 132kV transmission line replacement, substation establishment on a new site and associated Ergon 22kV works	$200m	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 2028	Section 6.9.1 Anticipated RIT-T
Transmission lines					
Line refit works on the 275kV transmission lines between Ross and Chalumbin	$35m	Far North	The Ross to Chalumbin transmission lines provide injection to the north area of close to 400MW at peak and up to 3,000MWh per day. The network configuration also facilitates generator connections in the area and provides system strength and voltage support for the region.	June 2029	Section 6.9.1
Line refit works on the 132kV transmission lines between Ross and Dan Gleeson	$8m	Ross	Provide close to 130MW at peak and up to 800MWh per day	June 2028	Section 6.9.2
Line refit works on the 132kV transmission lines between Nebo Substation and Eton Tee	$31m	North	Provide close to 80MW at peak and up to 200MWh per day for the region	December 2027	Section 6.9.3
Line refit works on the 275kV transmission line between Bouldercombe and Nebo substations	$15m	Central West	Up to 90MW on the network and up to 450MWh per day on a continuous basis to Nebo and North Queensland loads	December 2026	Section 6.10.1
Rebuild the 132kV transmission line between Calliope River and Gladstone South substations	$53m	Gladstone	Up to 160MW and up to 1,820MWh per day	June 2030	Section 6.10.2
Line refit works on the 275kV transmission line between Woolooga and South Pine substations by June 2029	$39m	Wide Bay	Powerlink would consider proposals from non-network providers that can significantly contribute to reducing the load requirement in south east Queensland	June 2029	Section 6.11.1

Table 5.1 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	$31m	Moreton	Up to 220MW at peak to Brisbane's inner north west suburb (potentially coupled with network reconfiguration)	June 2028	Section 6.11.5 Anticipated RIT-T
Line refit works on the 275kV transmission line between Karana Downs and South Pine substations	$14m	Moreton	Powerlink would consider proposals from non-network providers that can significantly contribute to reducing the requirement in this region	June 2030	Section 6.11.5
Line refit works on sections of the 275kV transmission line between Greenbank and Mudgeeraba substations	$37m	Gold Coast	Proposals which may significantly contribute to reducing the requirements in the southern Gold Coast and northern NSW area	June 2029	Section 6.11.6
Substations - primary plant and secondary systems					
Chalumbin 275kV and 132kV primary plant replacement	$9m	Far North	Up to 100MW and up to a peak of 65MWh per day on a continuous basis to provide supply to the 132kV network at Chalumbin	June 2028	Section 6.9.1
Tully 132/22kV transformer replacement	$6m	Far North	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 2029	Appendix D, Table D.1
Alan Sherriff 132kV secondary systems replacement	$14m	Ross	Up to 35MW and up to 225MWh per day to provide supply to the 66kV network at Alan Sheriff	June 2027	Section 6.9.2
Ingham South 132kV primary plant and secondary systems replacement	$27m	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	December 2027	Section 6.9.2
Garbutt 132kV secondary systems replacement	$10m	Ross	Up o 120MW and up to 860MWh per day to provide supply to the 66kV network at Garbutt	June 2027	Section 6.9.2

Table 5.1 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
Strathmore SVC secondary systems replacement	$12m	North	Up to 260MVArs capacitive and 80MVArs inductive support at Strathmore	June 2026	Section 6.9.3
Nebo SVC primary plant and SVC transformer replacement	$8m	North	Up to 260MVArs capacitive and 80MVArs inductive support at Nebo	December 2029	Section 6.9.3
Calvale 275kV primary plant replacement	$18m	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	December 2027	Section 6.10.1
Broadsound 275kV primary plant replacement	$19m	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	June 2028	Section 6.10.1
Ashgrove West 110kV secondary systems replacement	$22m	Moreton	Up to 220MW at peak to Brisbane's inner north west suburbs	June 2027	Section 6.11.5
Murarrie 275kV and 110kV secondary systems replacement	$21m	Moreton	Up to 500MW and a peak of 5,700MWh per day on a continuous basis	December 2027	Section 6.11.5
Abermain 275kV and 110kV primary plant replacement	$8m	Moreton	Up to a peak of 140MW and a peak of 1,050MWh per day on a continuous basis	June 2030	Section 6.11.5
Molendinar 275kV secondary systems	$28m	Gold Coast	Powerlink would consider proposals from non-network providers that can significantly contribute to reducing the requirement in the Gold Coast region	December 2027	Section 6.11.6
System services					
To be identified through the RIT-T process		State-wide	To address the minimum and efficient levels of system strength in Queensland	From December 2025	Section 6.8.2 Current RIT-T

Notes:

(1) 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 E, in particular transmission connection points and transmission line segments, regarding Powerlink's methodology for template data development).

(2) Refer to Powerlink's website for information regarding potential non-network solution opportunities for the Gladstone Project.