AusNet

Secure supply and enable connections: East Gippsland

Regulatory Investment Test for Distribution (RIT-D)

Options Screening Report

Friday, 14 February 2025

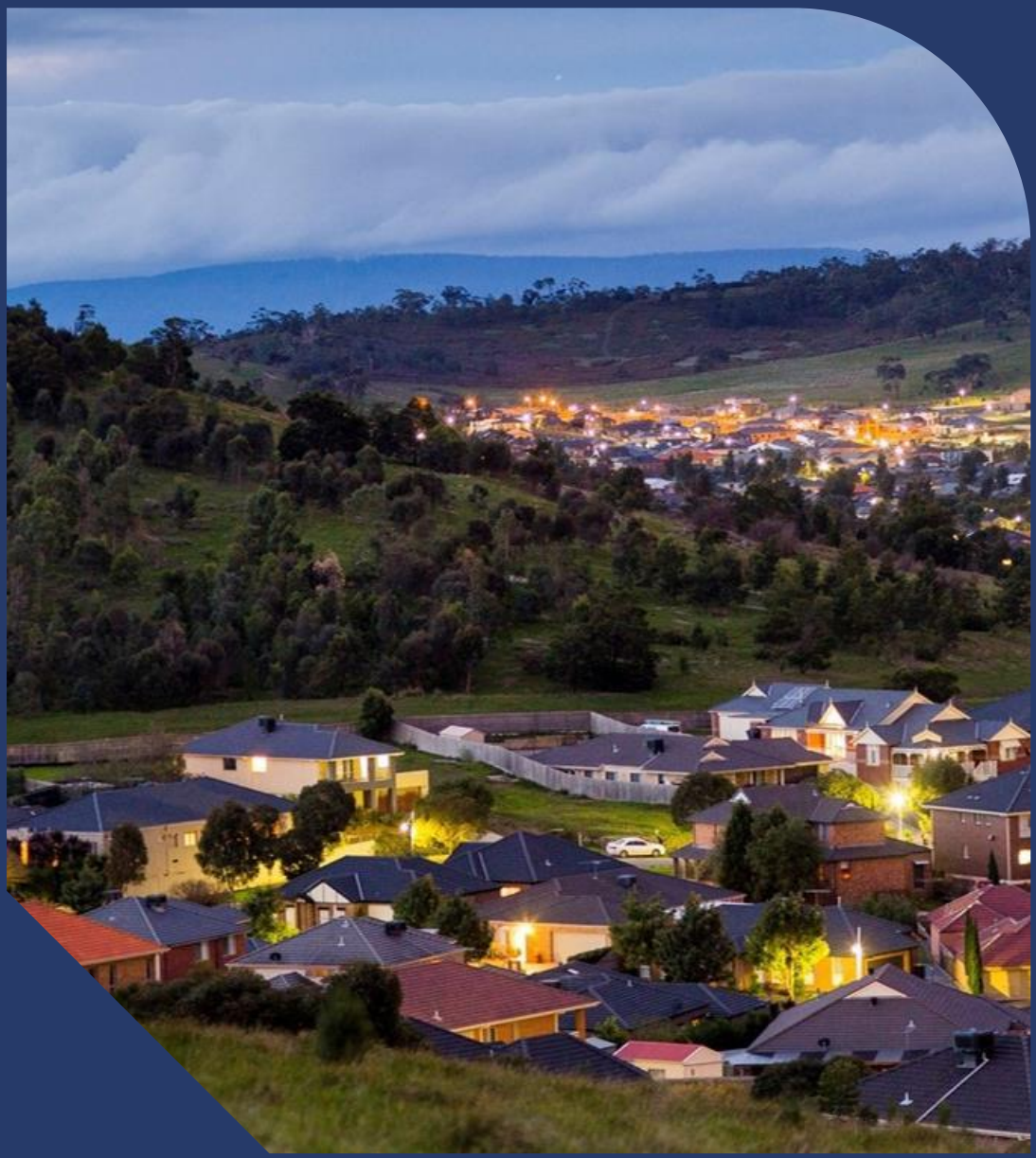


Table of contents

1. Executive summary

AusNet is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 809,000 customers. Our electricity distribution network covers eastern rural Victoria and the fringe of the northern and eastern Melbourne metropolitan area.

As expected by our customers and required by the various regulatory instruments under which we operate, AusNet aims to maintain service levels at the lowest possible cost to our customers. To achieve this, we develop plans that aim to maximise the present value of economic benefit to all those who produce, consume and transport electricity in the National Electricity Market (NEM).

The East Gippsland 66kV network loop, the longest in AusNet's system, supplies over 71,200 customers and is geographically isolated, limiting capacity transfers and making it prone to voltage issues. Originating from the Morwell Terminal Station (MWTS), it comprises six zone substations: Traralgon (TGN), Sale (SLE), Maffra (MFA), Bairnsdale (BDL), Newmerella (NLA), and Cann River (CNR). Demand is rising due to customer growth, home gas electrification, and EV adoption, with coincidental loading expected to exceed the loop's 147MVA N capacity by 2024/25 under Probability of Exceedance (POE)10 conditions and surpass the 180MVA voltage collapse limit by 2031/32. Under worst-case N-1 conditions (MWTS-SLE outage), the loop's 86.5MVA thermal limit would be exceeded under POE50. Without action, summer contingency plans will require significant load shedding during the peak period to prevent voltage collapse and thermal overload, with unserved energy carrying an expected value of $169.50 million in present value terms over the assessment period.

The Regulatory Investment Test for Distribution (RIT-D) is an economic cost-benefit assessment designed to identify the most credible option that addresses an identified need while maximizing net economic benefits for stakeholders in the National Electricity Market (NEM). This involves a probabilistic planning methodology to account for rare but possible scenarios, such as extreme demand or outages, ensuring all credible options are considered.

This Options Screening Report (OSR) marks the first step in the RIT-D process, in line with clause 5.17 of the National Electricity Rules (NER) and section 4.2 of the RIT-D Application Guidelines, published by the Australian Energy Regulator (AER).

AusNet is committed to meeting customer and community energy needs both now and into the future to ensure that our customers have access to reliable and affordable energy that meets their daily needs and supports the electrification of transport, homes and businesses.

AusNet has undertaken a probabilistic planning approach to assess the energy at risk of load not being supplied if no mitigation action is undertaken and whether it is economic to invest in risk mitigation action to reduce the forecast service level risk. Our network planning indicates that to avoid network augmentation, we require approximately 48MW of additional capacity or load reduction/generation of approximately 40MW through alternative non-network approaches, such as demand management or network support agreements at strategic locations on the loop, to maintain the reliable supply of electricity to load served from the loop.

AusNet proposes to investigate and evaluate the following network options to address the identified need:

1. Reconductor the entire Traralgon - Maffra (TGN-MFA) 66 KV line
2. Construct new Traralgon - Sale (TGN-SLE) 66kV line
3. Establish a TGN-SLE/MFA 66kV line
4. Construct a 30MW/150MWh Battery Energy Storage System

Two non-credible options were also identified relating to demand management which was assessed as not meeting the identified need and the establishment of a new Bairnsdale terminal station which was assessed as not being economically viable. However, AusNet remains open to non-network or Standalone Power System (SAPS) options that may partially or wholly meet the identified need.

AusNet welcomes written submissions on the credible options presented in this OSR and invites proposals from proponents of potential non-network and SAPS options (stand-alone or in conjunction with a network solution) that meet the identified need. Any credible non-network options will be assessed alongside the network options at the next stage of the RIT-D.

Submissions should be emailed to ritdconsultations@ausnetservices.com.au on or before 16 May 2025. In the subject field, please reference 'RIT-D OSR LD East Gippsland'. AusNet's preference is that these submissions would be published on its website and AEMO's website. If you do not want your submission to be made public, please clearly stipulate this at the time of lodgement.

Assessments of the options and responses to this OSR will be presented in the Draft Project Assessment Report (DPAR), which we expect to publish by mid-June 2025.

2. Introduction

The RIT-D is an economic cost-benefit test used to assess and rank potential investments capable of meeting the identified need. The purpose of the RIT-D is to identify the credible option that maximises the present value of net economic benefit to all those who produce, consume and transport electricity in the NEM (the preferred option).

The publication of this OSR represents the first step in the RIT-D process in accordance with clause 5.17 of the NER and section 4.2 of the AER's RIT-D Application Guidelines[1]. In accordance with those requirements, this document sets out:

- the identified need that AusNet is seeking to address, together with the assumptions used in identifying this need;
- a description of the potential credible network options that may address the identified need;
- the technical characteristics of each potential credible option;
- the estimated construction timetable and commissioning date of each potential credible option;
- the total indicative capital and maintenance costs for each potential credible option;
- the technical characteristics of the identified need that a non-network or SAPS option would be required to provide; and
- information to assist non-network providers wishing to present alternative potential credible options including details of how to submit a proposal for consideration by the RIT-D proponent.

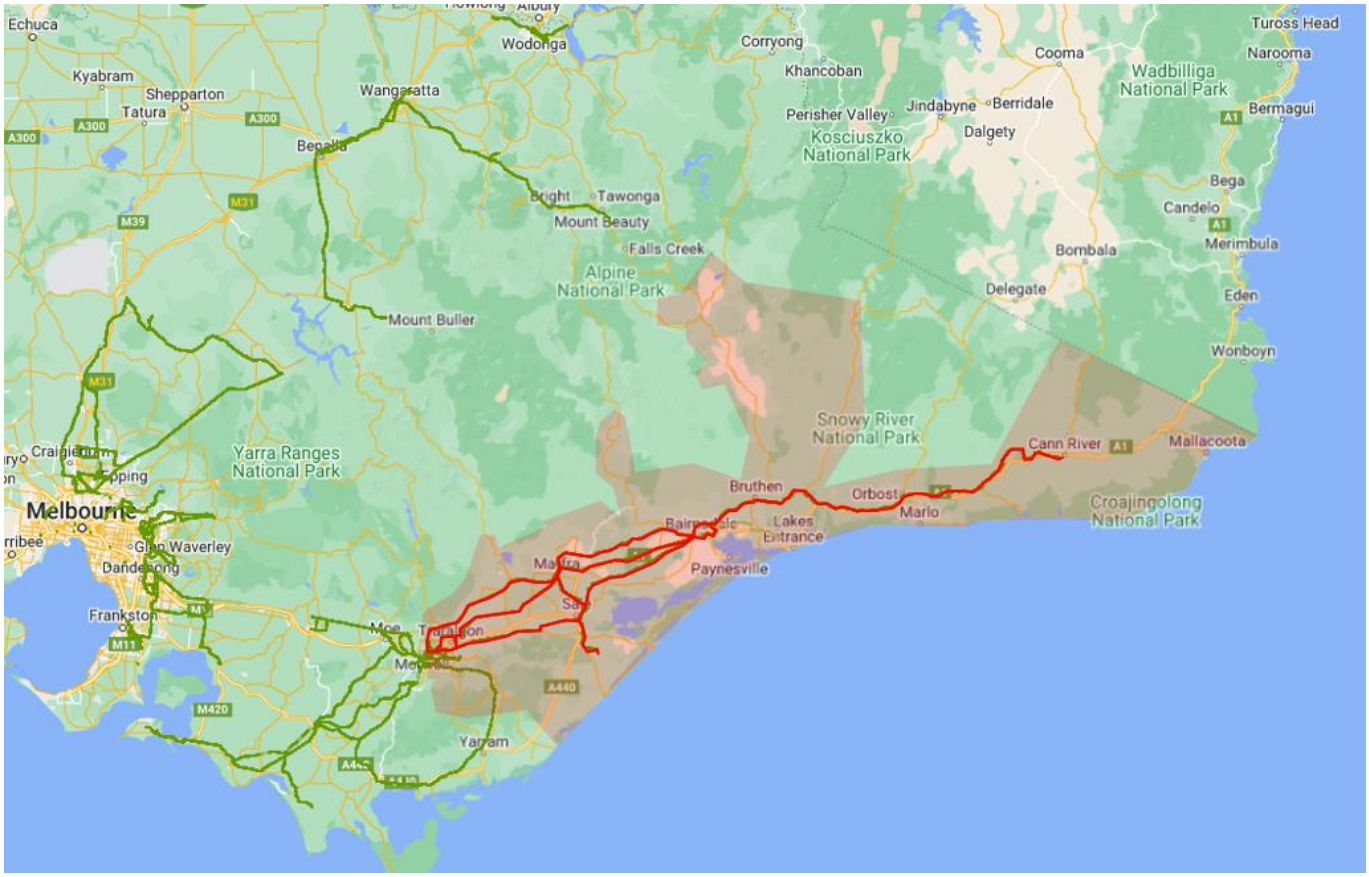
The appendix provides an overview of the RIT-D assessment and consultation process.

[1] Australian Energy Regulator, "*Regulatory investment test for distribution, Application guidelines*", November 2024.

3. Background

This Options Screening Report (OSR) relates to the East Gippsland 66 kV network loop, located within the East part of AusNet's network operating area, as shown by Figure 1.

Figure 1 - AusNet network area map with East Gippsland 66kV network loop



The loop originates from Morwell Terminal Station (MWTS) and comprises six zone substations, including Traralgon (TGN), Sale (SLE), Maffra (MFA), Bairnsdale (BDL), Newmerella (NLA) and Cann River (CNR), as shown by Figure 2. Figure 3 depicts a 66kV network diagram of the region and also indicates the high-capacity lines (these are represented by the thick lines in the diagram) and low capacity lines (denoted by the thin lines) on the East Gippsland network loop.

Figure 2 – Map showing East Gippsland 66kV network loop and location of terminal station and zone substations

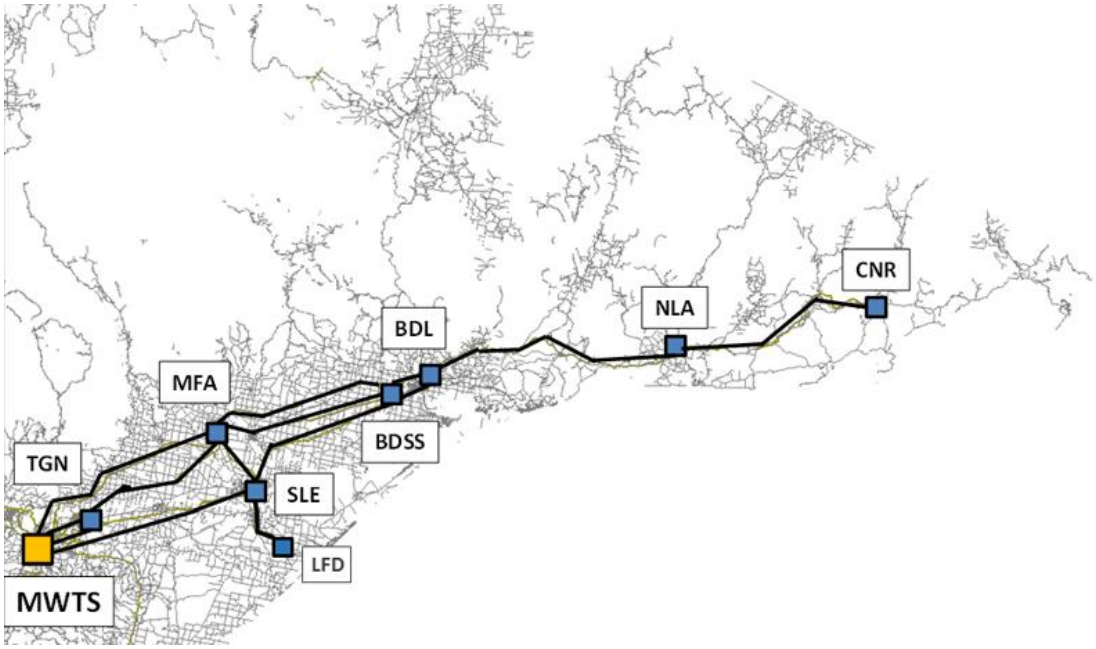
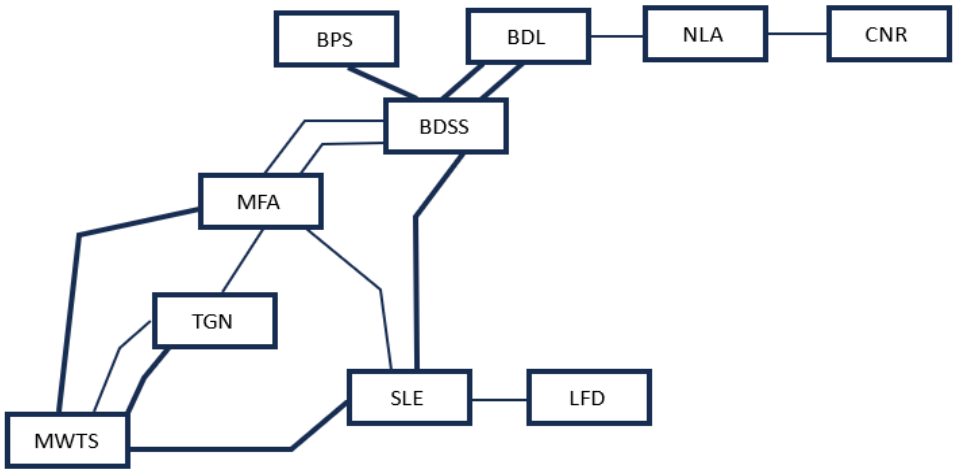


Figure 3 – Location of high-capacity and low-capacity lines on the East Gippsland 66kV network loop



The loop supplies electricity to over 71,200 customers comprising commercial (34%), farms (12%), industrial (10%), and residential consumers (44%). The East Gippsland loop is geographically very isolated, servicing an extensive area between Traralgon and Mallacoota and is the longest sub-transmission network (by distance of line coverage) in AusNet's 66kV network. This characteristic makes the East Gippsland 66kV network particularly prone to voltage issues due to the long line lengths and has necessitated the installation of three voltage regulators to help manage voltage. Additionally, due to the remoteness and geographic isolation from other 66kV networks, this network loop has less transfer capability than other 66kV network loops in AusNet's network, with transfers only available in the west portion of the loop at Traralgon (TGN). All other zone substations on this loop have no available transfers out of the loop, which creates operational challenges in managing the load limit on this loop.

The East Gippsland 66kV loop has:

- A maximum (N) capacity of 147MVA and firm capacity (N-1) of 86.5MVAvoltage limit of 180MVA and 114MVA under (N-1) conditions; and
- transfer capacity of 8MVA which is expected to diminish overtime from load growth at receiving stations. Additionally, as the primary constraint is located further down the subtransmission loop from TGN, these transfers have an extremely limited ability to mitigate risk.

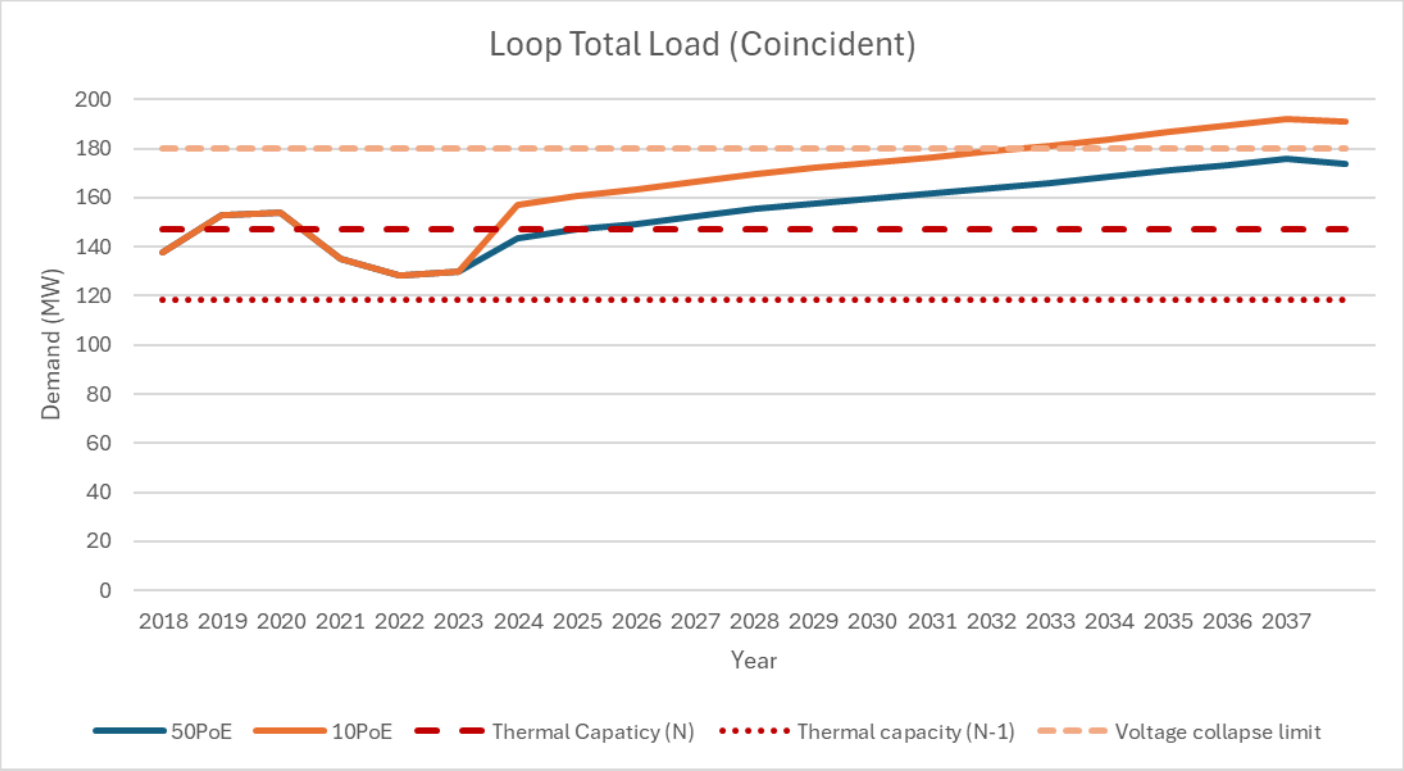
4. Identified need

4.1. Description

AusNet has identified in the Distribution Annual Planning Report (DAPR) 2024-2028 that there is energy at risk over the summer period on the East Gippsland 66kV network loop (MWTS-TGN-SLE-MFA-BDSS-BDL-NLA-CNR), as highlighted by Figure 4, which shows that:

- Demand is forecast to increase sharply in 2024 and continue to increase over the remainder of the regulatory control period. This is primarily driven by customer growth, electrification of homes, and electric vehicle (EV) uptake within the region.[2]
- Coincidental loading at the six zone substations is forecast to reach 160MVA over the 2024/25 summer period under POE10 conditions, which exceeds the loop's N capacity of 147MVA and is expected to exceed capacity under POE50 conditions by 2027.
- The N voltage collapse limit of 180MVA for the loop is expected to be reached by summer 2031/2032 under POE10 conditions.
- Under worst case N-1 conditions (i.e. with the major MWTS-SLE section being out of service), the loop has a thermal capacity limit of 86.5MVA, which has long been exceeded even under POE50 conditions.

Figure 4 - Load capacity of the East Gippsland 66kV network loop



While this loop has experienced N and N-1 thermal capacity exceedance for some time, AusNet has been able to mitigate the risk of thermal overload and voltage collapse under N-1 scenarios and planned maintenance periods through its network support agreement with Bairnsdale Power Station (BPS) to provide generation support under high load scenarios.

Guaranteed network support provided by BPS is no longer available due to the expiry of the network support contract in 2022 and is a compounding factor for growing load constraints on the East Gippsland network loop. BPS now operates as a merchant generator and, as such, market operational drivers may not align with local support requirements, which has resulted in a dramatic increase in the supply risk of the East Gippsland region since the network support agreement's expiry in 2022.

Additionally, anticipated generation from BPS may become unreliable depending on factors beyond AusNet's visibility or control including BPS scheduled generator maintenance, changes to the availability/commerciality of gas

[2] Refer to Victoria State Government, 'Gas Substitution Roadmap – Update: Victoria's Electrification Pathway.'

supply or changes to the particular division of the wholesale market Bairnsdale Power Station may wish to operate in (e.g. FCAS market) – all of which may cause generation from Bairnsdale Power Station to not coincide with loop peak loading times. The Victorian State Government has also signalled its intention to transition away from gas through its Gas Substitution Roadmap as part of its broader plan for navigating the state to a zero emissions future while improving affordability and ensuring reliability.[3]

Network load flow studies have found that with the loss of guaranteed service level network support functions supplied by BPS, there are voltage and thermal capacity issues that need to be addressed, particularly with load starting to exceed N thermal capacity limits from 2024, as shown by Figure 4 above.

This will become a growing issue over the next regulatory control period, given the loop has long exceeded N-1 thermal capacity limits. The emerging issue of voltage collapse limits is a complicating factor that places additional constraints on the network and limits the types of solutions that can be considered.

Economic modelling has found that these conditions result in a material expected cost to customers from energy not supplied and results in a material network reliability risk.

4.2. Thermal Capacity Limitations

From a thermal capacity perspective, without an emergency control scheme to enact load shedding in place the East Gippsland network should not be loaded above its secure system normal planning limit of 99 MVA in summer. Doing so risks 66 kV lines being loaded above 120% of their normal rating immediately following a network outage. Due to conductor thermal inertia characteristics, loading 66 kV lines above 120% of their normal rating does not allow network controllers sufficient time to reduce load to within asset ratings, and can therefore result in irreversible conductor damage and cascade tripping of network elements.

Supply to the East Gippsland region is also limited under network outage conditions by the thermal capacity of some key 66 kV lines. Thermal ratings will be exceeded on the:

- TGN-MFA 66kV line when all lines are in service and net load in the East Gippsland loop exceeds 147MVA.
- TGN-MFA 66 kV line when the MWTS-MFA 66 kV line is out of service and net load in the East Gippsland region exceeds 88.5 MVA.
- TGN-MFA 66 kV line when the MWTS-SLE 66 kV line is out of service and net load in the East Gippsland region exceeds 86.5 MVA.

4.3. Voltage Stability Limitations

The East Gippsland region is supplied by TGN, SLE, MFA, BDL, NLA and CNR zone substations. The 66 kV network supplying the region is subject to voltage instability, where outage of a 66 kV line during high demand periods can cause network voltages to drop uncontrollably (voltage collapse), ultimately leading to cascading 66 kV line trips and loss of supply to the 71,200 customers in the East Gippsland region.

The East Gippsland 66 kV sub-transmission network is voltage stable up to 179 MVA in summer with all lines in service and the BDSS static VAR compensator (SVC) operating at its full reactive power capability of 30 MVAR.

The network is also expected to suffer voltage collapse for any one of the following conditions:

- MWTS-SLE 66 kV line is out of service when net load in the East Gippsland region exceeds 114 MVA.
- MWTS-MFA 66 kV line is out of service when net load in the East Gippsland region exceeds 127 MVA.
- TGN-MFA 66 kV line is out of service when net load in the East Gippsland region exceeds 147 MVA.

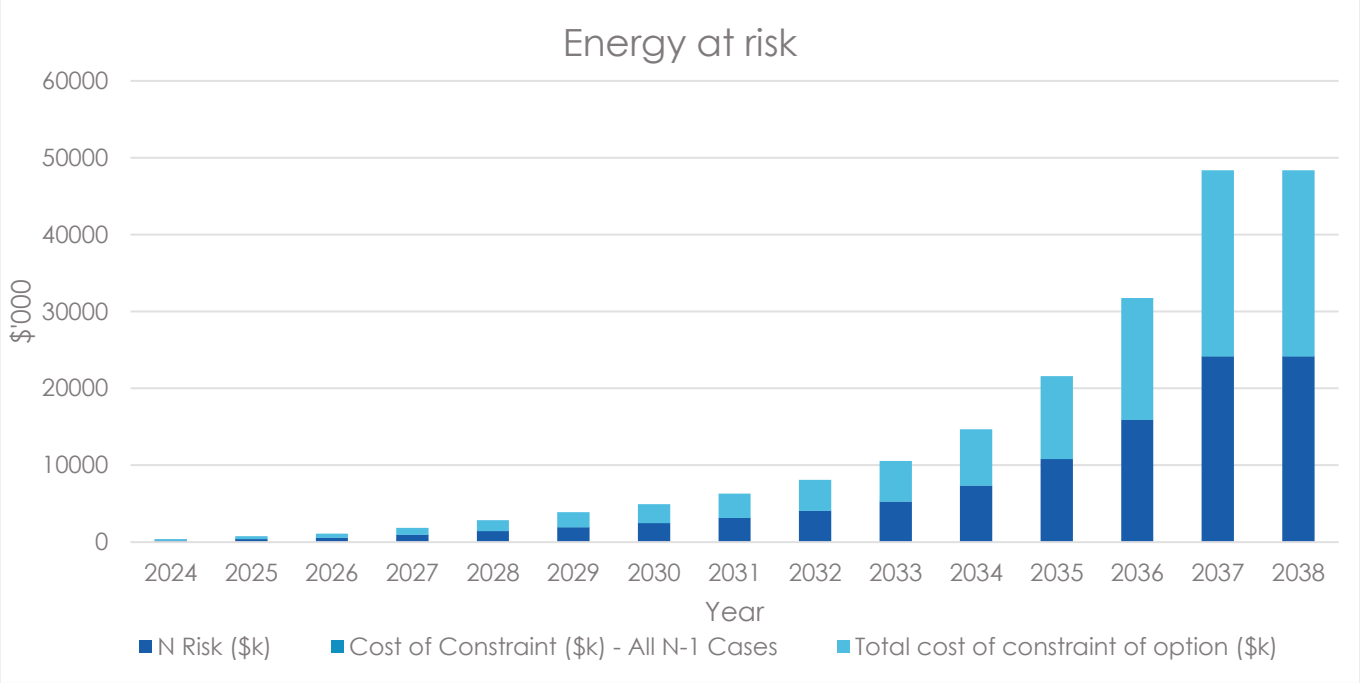
4.4. Risk assessment

If unaddressed, summer contingency plans require immediate load shedding of up to 50% at four major zone substations under certain N-1 scenarios to prevent voltage collapse and thermal overload, resulting in unserved energy with an expected value of $169.50 million in present value terms. This cost, based on AER's Value of Customer Reliability (VCR), reflects the economic impact on customers. This is shown in Figure 5. AusNet is committed to ensuring reliable, affordable energy and supporting electrification. A probabilistic planning approach has been used

[3] https://www.energy.vic.gov.au/renewable-energy/victorias-gas-substitution-roadmap

to assess energy at risk and the economic viability of mitigation. Analysis indicates energy at risk will increase progressively over the 15-year assessment period.

Figure 5 - Energy at risk on the East Gippsland 66kV network loop



In assessing the identified need, AusNet has taken into account the impact of the Connections Enablement Project. This project will increase the capacity of the MWTS-TGN section of the East Gippsland 66kV network loop to enable the connection of a new major customer. The Connections Enablement Project is based solely on generation benefits. In contrast, the East Gippsland 66kV loop augmentation is primarily driven by demand growth and the need to provide additional load capacity and does not consider generation capacity benefits.

Our analysis of forecast demand, coupled with existing thermal and voltage limits on this network loop, indicate that mitigation actions are required to address the increasing risk to the provision of reliable services to our customers.

4.5. Summary of identified need

Our network planning indicates that to avoid network augmentation, we require approximately 48MW of additional capacity or load reduction/generation of approximately 40MW through alternative non-network approaches such as demand management or network support agreements at strategic locations on the loop to maintain the reliable supply of electricity to customers served by the East Gippsland 66kV network loop.

Addressing this identified capacity constraint will help to ensure that AusNet is able to prudently and efficiently meet forecast load growth in the region, address thermal loading issues, and raise the voltage collapse limit of the loop to deliver improved customer outcomes.

Feedback from our customer engagement has underscored the importance of ensuring that we provide our customers with reliable electricity supply, with minimal unplanned disruptions. Customers have expressed concern regarding the impacts of poor reliability given customers' increasing reliance on electricity to meet a range of different needs such as transport, telecommunications, working from home, maintaining comfort during extreme weather conditions, and to meet health needs.

4.6. Assumptions underpinning the identified need

Key factors underpinning the identified need include:

- Demand forecast – the POE10 demand is forecast to exceed the thermal capacity of the line and the POE50 is already exceeded under N-1 conditions. The demand forecast is based on AusNet's standard forecasting methodology and accounts for organic growth and spot loads. It also considers the impact of the Connections Enablement Project.
- Asset capacity ratings – compared to the demand forecast demonstrate capacity limits are being reached.
- Network studies have identified that there is an increasing risk of voltage collapse on the network loop under N-1 scenarios when demand is above 118MW and under N scenarios when coincident demand reaches the modelled limit of 180 MVA which is expected in 2032/33.
- Unavailability rates of sub transmission line segments is based on 5 years of historic unplanned outage data from internal outage logs for the East Gippsland Loop.
- Average unplanned outage time for this sub transmission loop is based on 5 years of historic unplanned outage data from internal outage logs for the East Gippsland Loop.
- Bairnsdale Power Station's network support agreement has lapsed and is not expected to be reinstated. Historically, network support from Bairnsdale Power Station has been relied on to address network issues and defer network augmentation.
- The connection enablement works that will augment MWTS-TGN Lines 1 and 2 will be implemented by 2026, as forecast, which will result in a reduction of $2.7 million capex needed by this project.
- In the case of an N-1 event on the loop, where the loading is above the limit for voltage collapse, all load on the loop is assumed to be lost for a duration of 1 hour.
- Commercial solar generation is not factored into the economic assessment of this business case as peak maximum demand occurs roughly at 19:00pm, when solar PV output has a negligible effect on demand. However, the significant effect of rooftop solar has been considered as a demand reducer at the time of maximum demand and is incorporated in the demand forecasts for each individual zone substation on the East Gippsland 66kV network loop.

In addition to the assumptions set out above that underpin the identified need, further assumptions will be required to quantify the costs and benefits of the credible options that would address the identified need. These further assumptions will be provided in the DPAR, which will set out the cost-benefit analysis for each of the credible options.

5. Potential Credible Options

This section describes the potential credible options that have been considered to address the identified need, including:

- the technical characteristics of each option;
- the estimated construction timetable and commissioning date; and
- the total indicative capital and operating and maintenance costs.

The purpose of this RIT-D is to identify the credible option for addressing the identified need that maximises the net market benefit. An important aspect of this task is to consider non-network and network options on an equal footing, so that the optimal solution can be identified.

5.1. Option 0: Do Nothing

The Do Nothing or business as usual (BAU) option assumes that AusNet would not undertake any investment, outside of normal operational and planning processes for managing peak demand and voltage limits. This option is the counterfactual to the other options considered and establishes the base level of risk (base case) and basis for comparing other credible options.

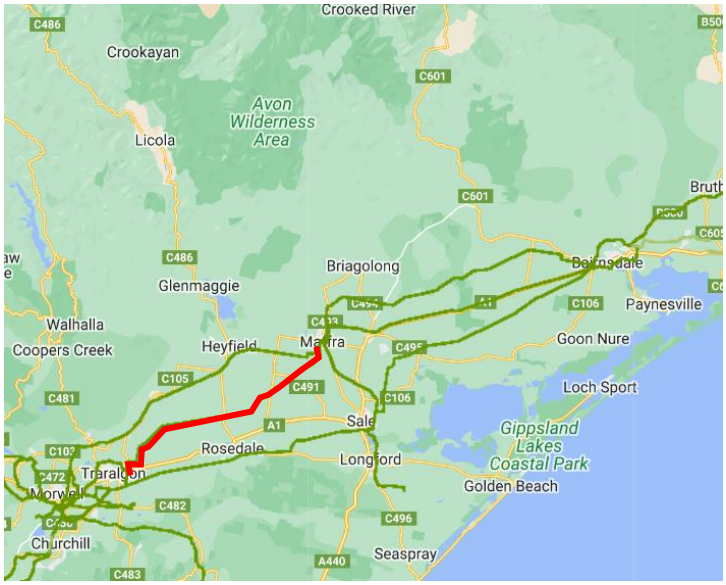
While this option does not entail any upfront capital costs, it exposes customers to the continuing risk of network outages as it does not address the identified need, which is the risk of unserved energy as a result of the capacity and voltage limits on the loop being exceeded. AusNet has quantified the expected value of unserved energy to be $169.50 million in present value terms over the evaluation period.

This option does not meet our customers' expectations of a reliable electricity supply, which requires investment to avoid unplanned network outages. Furthermore, this option does not align with AusNet's asset management objectives of being future ready and meeting customer needs by maintaining the long-term reliability of our distribution network.

5.2. Option 1: Reconductor MFA-TGN line

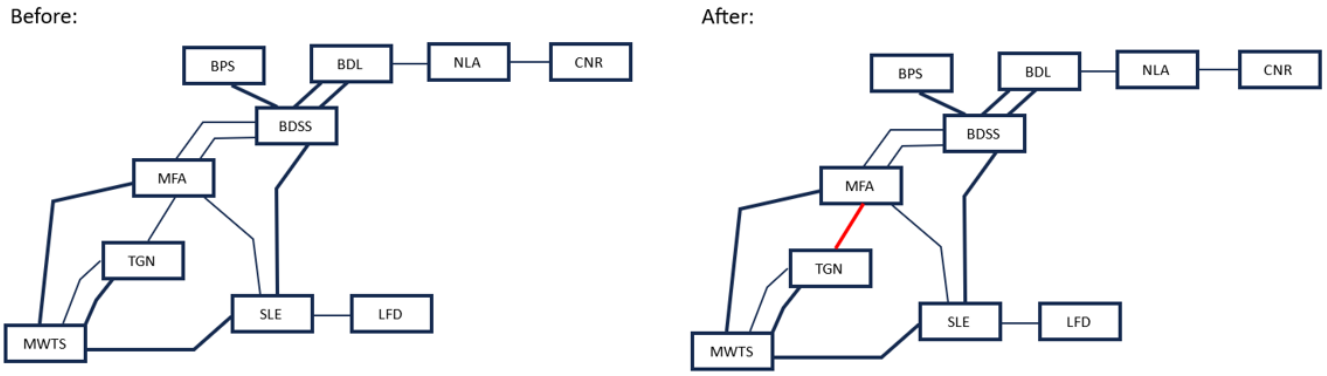
This option involves reconductoring all undersized conductors (6/4.72 7/1.57 ACSR) along the full length of the TGN-MFA 66 kV line (approximately 46.6km) with 19/4.75 AAC conductors and redesigning them to a maximum conductor temperature of 100 degrees Celsius to achieve a minimum summer cyclic rating of 881A.

Figure 6 - Map indicating existing TGN-MFA 66kV line route



Undersized conductors on this network loop have been identified by AusNet with a complete list of conductors that need to be replaced. In total AusNet has identified 46 km of conductor that require replacement. Figure 7 below compares the current configuration of the East Gippsland 66kV loop and the configuration of the loop after the TGN-MFA 66kV line has been reconductored. The bold lines in the diagram indicate 19/4.75AAC and higher rated lines on the network loop, with the red bold line reflecting the work to be carried out under this option.

Figure 7 - Comparison of East Gippsland 66kV loop after reconductoring MFA-TGN 66kV line



Reconductoring undersized conductions along the TGN-MFA line will increase the line rating from 345 A to 881A, while also significantly reducing the impedance of this line. Key benefits from this augmentation would include:

- Significantly increasing the system normal planning limit and thermal capacity of the East Gippsland 66 kV network.
- Significantly increasing the N-1 voltage collapse limits for outages of either the Morwell Terminal Station to Sale (MWTS-SLE) or Morwell Terminal Station to Maffia (MWTS-MFA) 66 kV lines.
- Reducing network losses.

This option assumes the MWTS to TGN Connections Enablement Project is implemented according to the proposed schedule. The Connections Enablement Project will upgrade the lines between MWTS-TGN, whereas this option only considers the TGN-MFA segment.

The construction would commence in August 2028, with project completion expected by December 2029. The estimated capital cost of this option is $26.5 million. In relation to O&M expenditure, AusNet does not expect this option to have a material impact on future O&M costs i.e., routine maintenance expenditure would be substantially unchanged.

5.3. Option 2: Construct new Traralgon - Sale (TGN-SLE) 66kV line

This option involves constructing a new TGN-SLE 66 kV line over a 51.5km route length, by predominately rebuilding 22 kV line segments adjacent to or along the Princess Highway, as shown by Figure 8 below.

Figure 8 - TGN-SLE 66Kv lines works (Reconductoring No1 MWTS - TGN line)

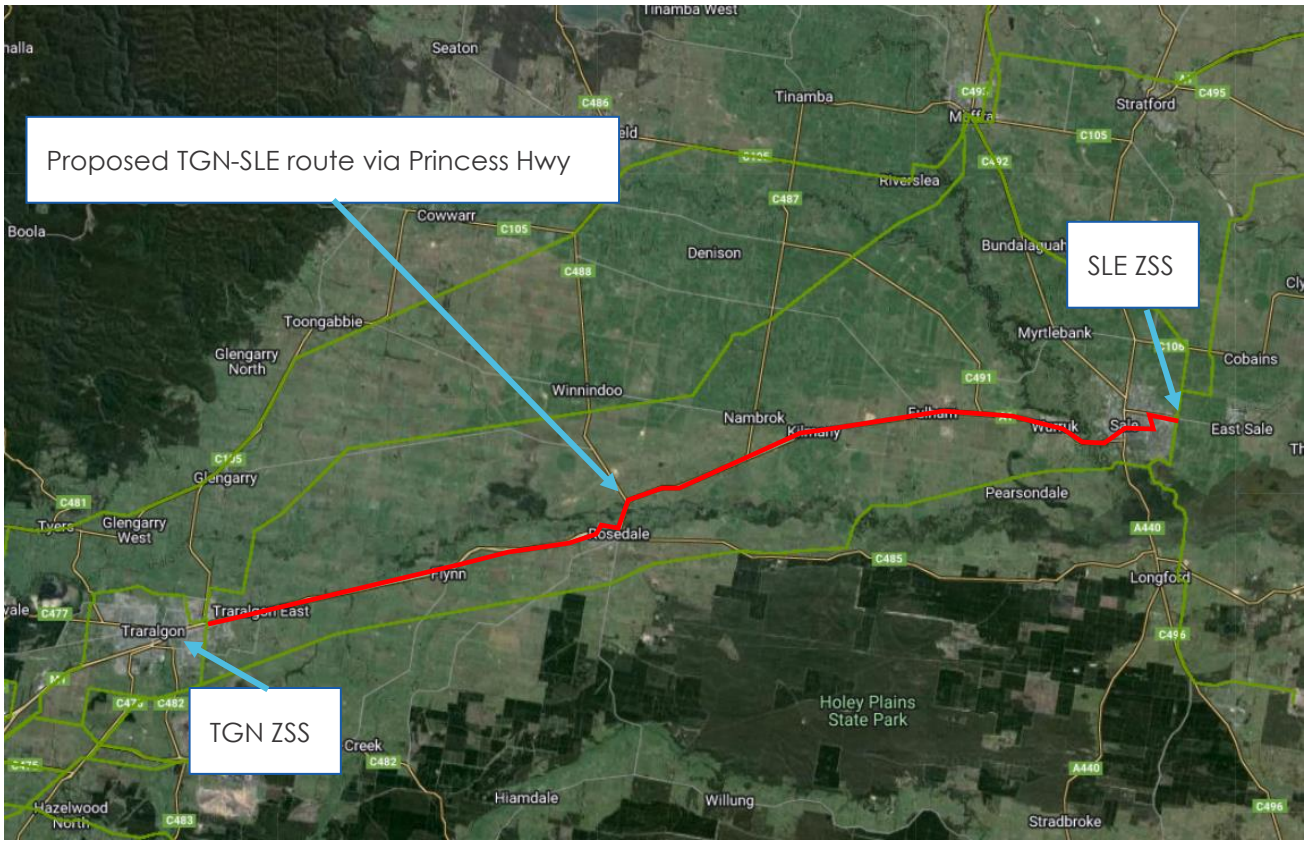
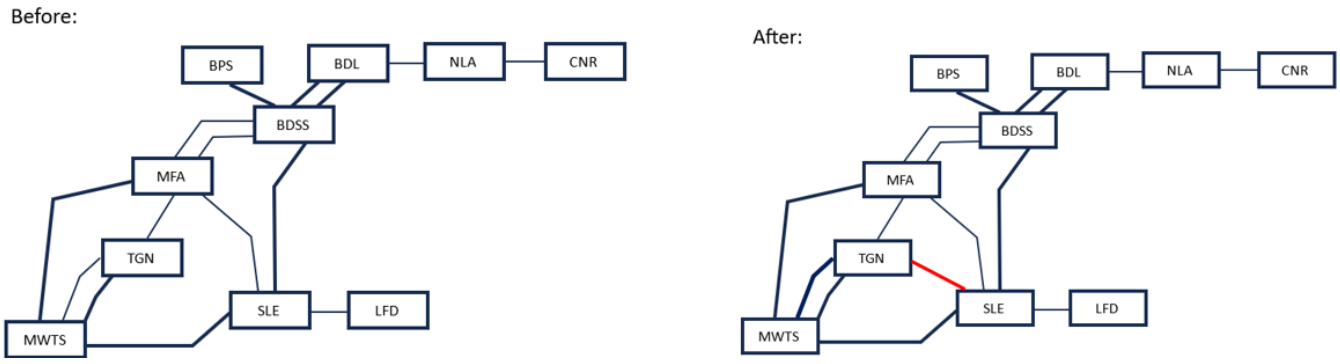


Figure 9 below, compares the current configuration of the East Gippsland 66kV loop and the configuration of the loop after the establishment of a new TGN-SLE 66kV line. The bold lines in the diagram indicate 19/4.75AAC and higher rated lines on the network loop, with the red bold line reflecting the work to be carried out under this option.

Figure 9 - Comparison of East Gippsland 66kV loop after reconductoring TGN-SLE 66kV line[4]



[4] Note. This option only considers the TGN-SLE segment. "Connection Enablement: Morwell East Area" project is expected to upgrade the lines between MWTS-TGN.

These works will establish a new TGN-SLE 66 kV line, constructed from 19/4.75 AAC conductor designed to a maximum conductor temperature of 100 degrees Celsius, rated to 881A which would:

- Increase the thermal capacity of the East Gippsland 66 kV network.
- Significantly increase the N-1 voltage collapse limits for outage of either the Morwell Terminal Station to Sale (MWTS-SLE) and MWTS-MFA 66 kV lines.
- Reduce network losses.

The construction of a new 66kV TGN-SLE line will require enabling works to be carried out at both the Sale and Traralgon zone substations.

There are several possible alternative routes for installing new 19/4.75AAC 66kV line between Traralgon and Sale, along the Princess Highway. Factors that may impact on route selection or the need for undergrounding segments include river, rail, and road crossings, the need to avoid multiple lines on a pole or the lines crossing. The establishment of a new 66kV line will be in bushfire prone areas and subject to stricter design and construction requirements. All new lines are to be constructed using concrete poles to mitigate the risk of bushfire hazards and are subject to stricter vegetation trimming requirements to maintain safe clearances.

The construction would commence in August 2029, with project completion expected by December 2031. The estimated capital cost of this option is $51 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $0.5 million.

5.4. Option 3: Establish a TGN-SLE/MFA 66kV line

This option involves constructing a new 66kV switching station on the existing TGN-MFA 66 kV line (approximately 27.5km from Traralgon), constructing 25km of new 66 kV line from the new 66kV switching station to Sale and reconductoring the 27km of line between Traralgon and the new tee point, as shown by Figure 10 below. These works will replace the existing TGN-MFA 66 kV line with a TGN-SLE/MFA 66 kV line.

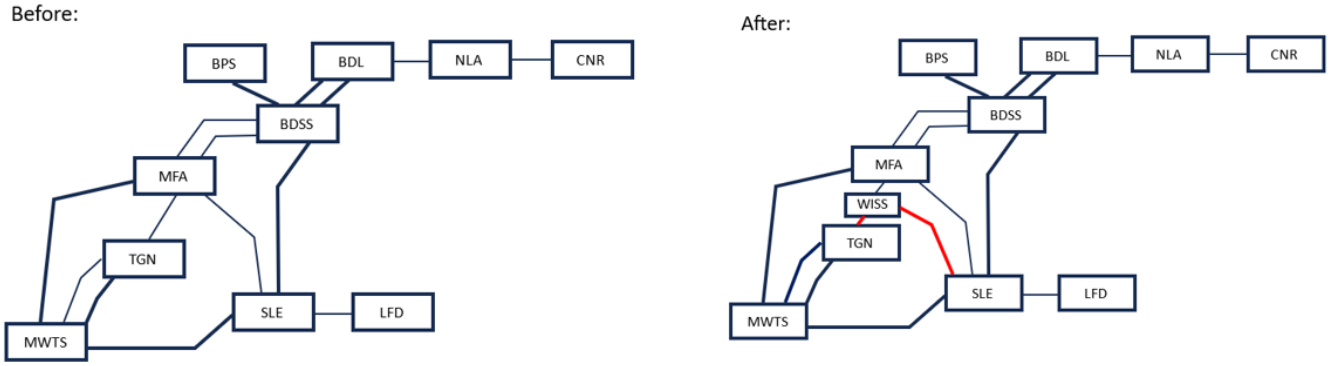
Figure 10 - Map of new TGN-SLE/MFA 66 kV line

The new line segment between the 66kV switching station and the Sale zone substation will utilise the existing 22kV line easement by rebuilding 22kV poles to support the new 66kV line. This option will entail enabling works to the Sale zone substation to facilitate a new 66kV bay.

Sections of the new TGN-MFA line, up to the new 66kV switching station location, are to be reconductored. All reconductoring of undersized conductors and new lines are to utilise 19/4.75 AAC and designed to a maximum conductor temperature of 100 degrees to achieve a minimum 881A summer cyclic rating. Enabling works at the Sale zone substation include installation of one additional feeder.

Figure 11 below, compares the current configuration of the East Gippsland 66kV loop and the configuration of the loop after the establishment of the switching station at Winnindoo between Traralgon and Maffra zone substations and the new SLE-MFA line. The bold lines in the diagram indicate 19/4.75AAC and higher rated lines on the network loop, with the red bold line reflecting the work to be carried out under this option.

Figure 11 - Comparison of East Gippsland 66kV loop after establishing TGN-SLE/MFA 66kV line[5]



These works will result in the TGN to SLE section of the line will being constructed of 19/4.75 AAC conductor designed to a maximum conductor temperature of 100 degrees Celsius, rated to 881 A, and the section between the switching station and MFA remaining rated to 345 A. These works would:

[5] Note, this option only considers the TGN-MFA-SLE segment. "Connection Enablement: Morwell East Area" project is expected to upgrade the lines between MWTS -TGN.

- Increase the thermal capacity of the East Gippsland 66 kV network.
- Significantly increase the N-1 voltage collapse limits for outage of either the MWTS-SLE, MWTS-MFA or BDSS-SLE 66 kV lines.
- Reduce network losses.

There are several possible alternative routes for installing new 19/4.75AAC 66kV line between Traralgon and Sale, along the Princess Highway. Factors that may impact on route selection or the need for undergrounding segments include river, rail, and road crossings, the need to avoid multiple lines on a pole or the lines crossing.

The establishment of a new 66kV line will be in bushfire prone areas and subject to stricter design and construction requirements. All new lines are to be constructed using concrete poles to mitigate the risk of bushfire hazards and are subject to stricter vegetation trimming requirements to maintain safe clearances.

The construction would commence in August 2030, with project completion expected by December 2032. The estimated capital cost of this option is $62 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $0.6 million.

5.5. Option 4: Construct a 30MW/150MWh Battery Energy Storage System at Bairnsdale Switching Station (BDSS)

This option involves constructing a 30MW/150MWh battery at the existing 66kV switching station located at Bairnsdale (BDSS - Bairnsdale Switching Station) to provide support at a major load centre on the loop. This analysis assumes a battery life of 15-years. At battery end of life or loading increase beyond the 15-year forecasting period, it is expected the entire existing TGN-MFA 66kV line will need to be reconductored (approximately, existing 46.6 km, as per Option 1). These reconductoring works will replace all 6/4.72 7/1.57 ACSR conductor with 19/4.75 AAC and redesigning them to a maximum conductor temperature of 100 degrees Celsius.

The battery will reduce the loading requirement on the loop by providing a temporary source close to the major load centre of Bairnsdale, reducing the current through major legs MWTS-SLE, MWTS-MFA and TGN-MFA. Support provided by the battery will significantly defer the requirement to reconductor TGN-MFA to beyond the forecasting period, however, this will still be required at either battery end of life or should load increase beyond the forecasting period. The battery has been sized to support the loop for 5 hours – based on historic peak load duration. The proposed battery and associated works would:

- Significantly increase the system normal planning limit and thermal capacity of the East Gippsland 66 kV network.
- Significantly increase the N-1 voltage collapse limits for outage of either the MWTS-SLE and MWTS-MFA lines.
- Reduce network losses.

The construction would commence in August 2035, with project completion expected by December 2037. The estimated capital cost of this option is $180 million. In relation to O&M expenditure, annual routine maintenance expenditure would be $1.8 million. While this option reduces residual risk from the base case, the quantum of the reduction is significantly less than options 1, 2, and 3. Furthermore, as the optimal timing for this option is not until 2037, it would mean that customers would face a greater risk of supply interruptions which is not consistent with customers' expectations of a reliable electricity supply with minimal interruptions.

5.6. Options considered and not progressed

5.6.1. Demand management

There is limited ability for demand reductions to reduce peak demand on the East Gippsland 66kV network loop of the magnitude required to defer the need for augmentation. There is only one customer directly connected to the 66kV loop at Longford, which is radially supplied from Sale. This customer has indicated their intent to increase loading, but has agreed to reduce load at peak loop times to avoid paying 66kV augmentation costs to run their increased load at peak times. Similarly, while there is the potential for 750kW of demand reduction on the 22kV networks this does not deliver the necessary load reduction required to address the identified need. This would total 0.5% of the expected coincident demand in 2024 under 50POE conditions which is insufficient to defer augmentation under AusNet's 50POE summer forecasts.

5.6.2. Establishment of new Bairnsdale Terminal station

The establishment of a new Bairnsdale Terminal Station would entail extending the 220kV network from Morwell Terminal Station (MWTS) to a new Bairnsdale Terminal Station (BDTS) via approximately 130km of new 220kV line. While this option has several advantages such as increasing loop overload thresholds significantly, improving voltage constraints, and increasing generation capacity and reliability for the region it has been assessed as not currently economically viable and has been identified as having several technical challenges associated with EHV installations that need to be resolved.

6. Non-network or SAPS options

This section provides information regarding the non-network or SAPS services that would be required to address the identified need, including:

- The technical characteristics that a non-network or SAPS option would be required to deliver;
- The estimated maximum deferred augmentation charge that would be available to pay for the non-network service; and
- The information that a non-network proponent should provide to AusNet to explore the potential provision of a non-network service.

6.1. Required technical characteristics of a non-network option

Table 1 below sets out the load that a non-network or SAPS option, preferably in the vicinity of any Zone Substations in the loop would be required to deliver. The objective would be to mitigate the risks associated with the unserved load in the Eastern Gippsland loop. The information presented provides an indication of the required operating profile, noting that prospective non-network service providers may not be able to exactly match these requirements.

Table 1 Load and respective duration to be catered by the non-network solution

SUMMER YEAR	MAXIMUMUNSERVED TOTAL TOTAL LOOP LOAD AT RISK (MVA)	HOURS AT RISK (H)
2025/2026	69	6
2026/2027	103	8
2027/2028	154	10.5
2028/2029	224	12.5
2029/2030	283	14
2030/2031	338	14.5
2031/2032	398	15.5
2032/2033	465	17
2033/2034	538	17.5
2034/2035	624	18.5
2035/2036	719	20.5
2036/2037	820	22.5
2037/2038	935	25

SUMMER YEAR	MAXIMUMUNSERVED TOTAL TOTAL LOOP LOAD AT RISK (MVA)	HOURS AT RISK (H)
2038/2039	889	23.5

6.2. Power system security, reliability and fault levels

A non-network option must be capable of reliably curtailing load under a range of conditions and scenarios. The non-network solution will contribute to system security and reliability to the extent that it addresses the risks arising from the identified need. The non-network option is not required to address any existing issues in relation to fault levels.

If the non-network option is an inverter-based generator operating in parallel with AusNet's network, the generator must comply with the requirements set out in document SOP 33-05 and other connection requirements which are set out in AusNet Services' embedded generator connections page.

6.3. Guidance on potentially feasible options

The following non-network solutions are likely to be potentially feasible options to address the identified need:

- New embedded energy storage systems or load connections;
- Modifications to existing customer generation to include embedded energy storage systems; and
- Modifications to existing load connections to reduce load capacity.

Without limiting the potential for non-network solutions, the following types of non-network options are unlikely to be feasible:

- Renewable generation not coupled with storage or dispatchable generation; and
- Unproven, experimental or undemonstrated technologies.

6.4. Information to be included in non-network solution proposals

Non-network service providers interested in alleviating the network constraints outlined above are advised to begin engagement with AusNet as soon as possible. A detailed proposal including the information listed below should be submitted by the requested date.

Details required include:

- Name, address and contact details of the person making the submission.
- Name, address and contact details of the person responsible for non-network support (if different to above).
- A detailed description of the services to be provided, including:
  - Size and capacity (MW/MVA/MWh).
  - Location(s).
  - Frequency and duration.
  - Type of action or technology proposed, including response / ramp rate information, where applicable.

  - Proposed dispatching arrangement (e.g. telephone, web-based trigger, automated means via RTU).
  - Availability and reliability performance details.
  - Period of notice required to enable dispatch of non-network support (e.g. to allow time for charging of energy storage solutions or market-based limitations).
  - Proposed contract period and staging (if applicable).
  - Proposed timing for delivery (including timeline to plan and implement the proposal).
- High-level electrical layout of the proposed site (if applicable).
- Evidence and track record proving capability and previous experience in implementing and completing projects of the same type as the proposal.
- Preliminary assessment of the proposal's impact on the network.
- Breakdown of the lifecycle costs for providing the service, including:
  - Capital costs (if applicable).
  - Annual operating (i.e. set up and dispatch fees) and maintenance costs.
  - Other costs (e.g. availability, project establishment, etc.).
  - Tariff assumptions.
  - Expected annual payment for providing the non-network solution.
- A method outlining measurement and quantification of the agreed service, including integration of the proposed solution with the network.
- A statement outlining that the non-network service provider is prepared to enter into a Network Support Agreement (NSA) (subject to agreeing terms and conditions).
- Letters of support from partner organisations.
- Any special conditions to be included in an NSA.

All proposals must satisfy the requirements of any applicable laws, rules, and the requirements of any relevant regulatory authority, including following the normal network connection processes where applicable. Any network reinforcement costs required to accommodate the non-network solution will typically be borne by the proponent of the non-network solution.

For further details on AusNet's process for engaging and consulting with non-network service providers, and for investigating, developing, assessing and reporting on non-network options as alternatives to network augmentation, please refer to the Non-Network Solutions and Demand Management webpages, which contain the Demand Side Engagement Strategy and other relevant demand management documentation:

https://www.ausnetservices.com.au/Electricity

6.5. Potential payments to non-network proponents

An assessment in evaluating the annualised cost and optimal timing was performed. The resultant total annualised cost that could be deferred by engaging a non-network solution is $1.1 million and is based on Option 1 proceeding. However, the payment for a non-network solution may vary according to availability, capacity, dispatch duration and firmness of the non-network service, and the responses received from other non-network proponents. The actual payment to a non-network proponent will also be subject to negotiation.

AusNet welcomes the submission of non-network option proposals for review of the potential payment amount on a case-by-case basis. For more information or enquiries regarding non-network solutions to address the identified need, please ritdconsultations@ausnetservices.com.au. In the subject field, please reference 'RIT-D OSR LD East Gippsland'.

7. Compliance with NER

In accordance with clause 5.17.4 of the NER, we certify that the screening for non-network options satisfy the first stage of regulatory investment test for distribution. The Table 2 shows how each of these requirements have been met by the relevant section of this report.

Table 2: Compliance with regulatory requirements

REQUIREMENT	SECTION
Clause 5.17.4 of the NER, Non-network options report must include the following:	Noted. See details below.
(1) a description of the identified need;	Section 4.
(2) the assumptions used in identifying the identified need (including, in the case of proposed reliability corrective action, why the RIT-D proponent considers reliability corrective action is necessary);	Section 4.6.
(3) if available, the relevant annual deferred augmentation charge associated with the identified need;	Section 6.5.
(4) the technical characteristics of the identified need that a non-network option or (in relation to a SAPS enabled network) a SAPS option would be required to deliver, such as:	Section 6.
(i) the size of load reduction or additional supply;	Section 6.1.
(ii) location;	Section 6.1.
(iii) contribution to power system security or reliability;	Section 6.2.
(iv) contribution to power system fault levels as determined under clause 4.6.1; and	Section 6.2.
(v) the operating profile;	Section 6.1.
(5) a summary of potential credible options to address the identified need, as identified by the RIT-D proponent, including network options, non-network options and (in relation to a SAPS enabled network) SAPS options.	Section 5.
(6) for each potential credible option, the RIT-D proponent must provide information, to the extent practicable, on:	Section 5.
(i) a technical definition or characteristics of the option;	Section 5.
(ii) the estimated construction timetable and commissioning date (where relevant); and	Section 5.
(iii) the total indicative cost (including capital and operating costs); and	Section 5.
(7) information to assist non-network providers wishing to present alternative potential credible options including details of how to submit a non-network proposal for consideration by the RIT-D proponent.	Section 8.

8. Information to assist non-network and SAPS options providers during consultation period

8.1. Request for submissions

AusNet invites written submissions and any queries, on the matters set out in this OSR, from Registered Participants, AEMO, interested parties, non-network providers and persons registered on our demand-side engagement register. As explained in section 6.4, prospective non-network service providers interested in alleviating the network constraints outlined in this OSR are advised to begin engagement with AusNet as soon as possible.

All submissions and enquiries should be directed to:

Email: ritdconsultations@ausnetservices.com.au

Submissions are due on or before 16 May 2025 and should refer to 'RIT-D OSR LD East Gippsland' in the subject heading.

Submissions will be published on AusNet's and AEMO's websites. If you do not wish to have your submission published, please clearly stipulate this at the time of lodging your submission.

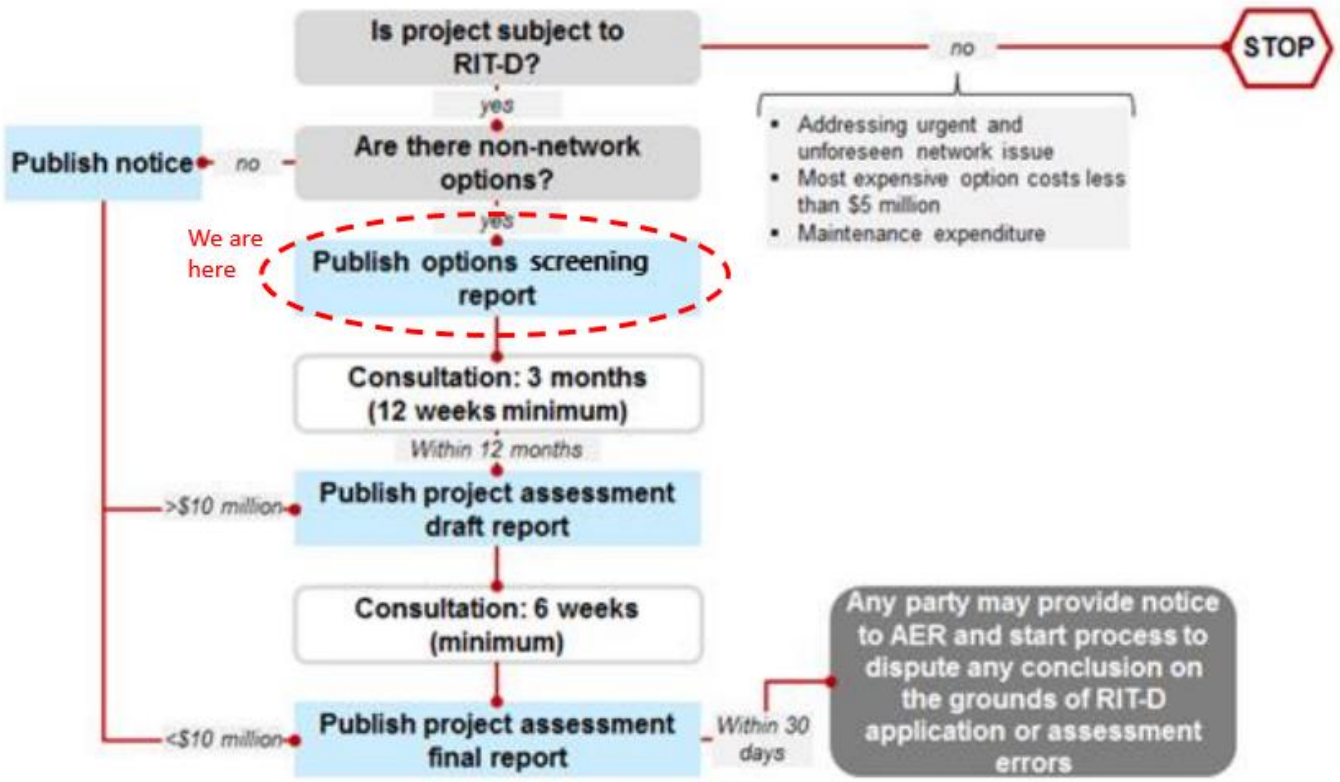
8.2. Next stage of RIT-D process

Following the conclusion of the consultation period for this report, AusNet will, having regard to any submissions received, prepare and publish the DPAR which will include:

- A summary of, and commentary on, any submissions on this OSR.
- A detailed market benefit assessment of the proposed credible options to address the identified need.
- Identification of the proposed preferred option to meet the identified need.

AusNet expects to publish the DPAR by mid-June 2025.

Appendix – RIT-D assessment and consultation process[6]



[6] Australian Energy Regulator, *"Regulatory investment test for distribution, Application guidelines", Section 4,* November 2024.

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