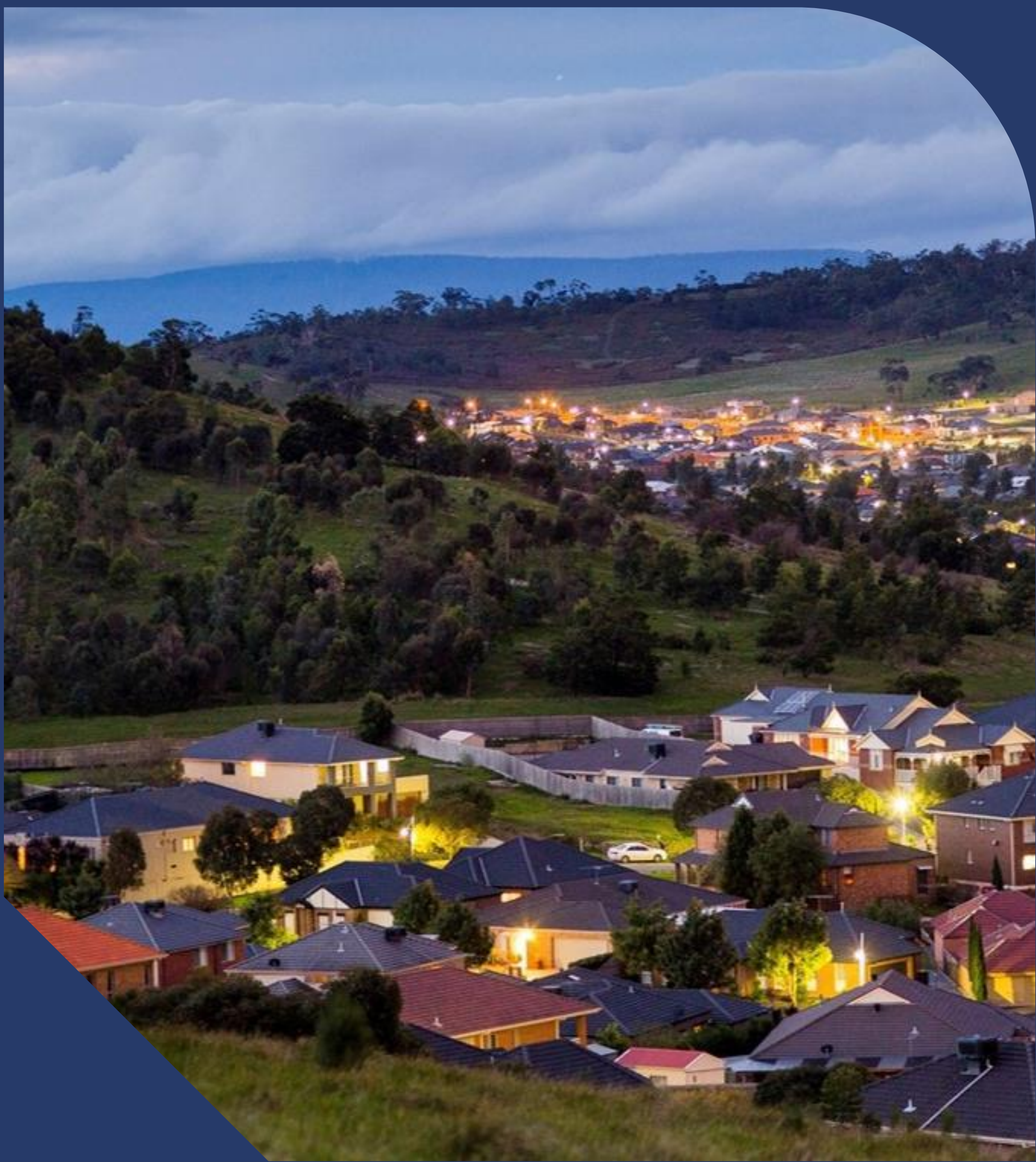
Connection Enablement: Morwell South Area

Regulatory Investment Test for Distribution (RIT-D)

Draft Project Assessment Report

Thursday, 10 October 2024



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1. Executive summary

AusNet is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to approximately 809,000 electricity 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 that we operate under, 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).

AusNet has received connection inquiries to connect 860 MW of renewable generation to the Morwell South sub-transmission (66 kV) network. The Morwell South sub-transmission network already has 146.36 MW of connected generation. Originally AusNet's sub-transmission network was planned to supply the electricity demand, rather than accommodate renewable generation. The Morwell South sub-transmission network was planned, built, and maintained to meet the demand in that area and is not strong enough to connect significant additional renewable generation.

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

AusNet initiated this RIT-D by publishing an Options Screening Report (OSR) in January 2024 in accordance with clause 5.17 of the NER and section 4.2 of the AER's RIT-D Application Guidelines to investigate and evaluate options to address the constraints in the MWTS South sub-transmission network which are restricting new renewable generation connections. Publication of this Draft Project Assessment Report (DPAR) represents the second step in the RIT-D process.

AusNet received two non-network proposals in response to the OSR. One of the proposals was not progressed further due to insufficient information. The other proponent proposed a 5-year battery option to address the identified need. The proponent proposed two different locations to connect the battery, which AusNet treated as two options and evaluated each separately. For evaluation purposes, AusNet has assumed that the most economic network option would be implemented at the end of 5-year period.

AusNet followed the AER's RIT-D application guidelines to analyse and rank the economic cost and benefits of the investment options considered in this RIT-D. The robustness of the ranking was investigated through sensitivity analysis that involve variations in the input assumptions and other parameter values.

AusNet evaluated the following network and non-network options to select the option that provides the highest net economic benefits:

1. Network Option 1: Augment MWTS – LGA No.2 line with 19/3.25 conductor
2. Network Option 2: Augment MWTS – LGA both lines with 19/4.75 conductor
3. Network Option 3: Augment MWTS – LGA both lines with 37/3.75 conductor
4. Non-network Option 1: Connecting a 60 MW / 240 MWh utility BESS (LGA BESS) connected to MWTS-LGA No. 3 66 kV line close to LGA ZS
5. Non-network Option 2: Connecting a 60 MW / 240 MWh utility BESS (LGA BESS) connected to LGA/WGI-LSSS2 66 kV line close to LGA ZS

The offered non-network option is proposed for a contract period of 5 years. However, AusNet also tested the evaluation outcome of options 4 and 5 if the non-network option contract period could be extended by another 5 years so that the network option could be deferred by 10 years.

The economic analysis demonstrated that Option 3 "Augment MWTS – LGA both lines with 37/3.75 conductor" provides the highest net economic benefits for the two ISP scenarios that we have adopted in this DPAR, as shown in the table below. Further information on the scenario selection is provided in section 6.5 of this DPAR.

The following points should be noted in relation to the data provided in the table below:

- Financial data are expressed in present value terms and $M, real 2024 prices; and
- The assessment period is over 50 years (2024/25 to 2073/74).

Table 1: Net economic benefit of each option for the assessed ISP scenarios in present value terms ($M, real 2024)

Option	Progressive Change ISP Scenario	Step Change ISP Scenario
Option 1 - Augment MWTS – LGA No.2 line with 19/3.25 conductor	$32.86M	$18.594M
Option 2 - Augment MWTS – LGA both lines with 19/4.75 conductor	$75.02M	$34.57M
Option 3 - Augment MWTS – LGA both lines with 37/3.75 conductor	$79.98M	$73.22M
Option 4 - Connecting a 60 MW / 240 MWh utility BESS (LGA BESS) connected to MWTS-LGA No. 3 66 kV line close to LGA ZS (5 years)	-$3.07M	-$16.15M
Option 4a - Connecting a 60 MW / 240 MWh utility BESS (LGA BESS) connected to MWTS-LGA No. 3 66 kV line close to LGA ZS (5+5 years)	-$29.91M	-$67.23M
Option 5 - Connecting a 60 MW / 240 MWh utility BESS (LGA BESS) connected to LGA/WGI-LSSS2 66 kV line close to LGA ZS (5 years)	$45.83M	$32.51M
Option 5 - Connecting a 60 MW / 240 MWh utility BESS (LGA BESS) connected to LGA/WGI-LSSS2 66 kV line close to LGA ZS (5+5 years)	$21.27M	$5.65M

AusNet tested the robustness of the investment decision against four inputs in the sensitivity analysis. As shown in the diagram below, Option 3 provides the highest net economic benefit for almost all the sensitivities considered.

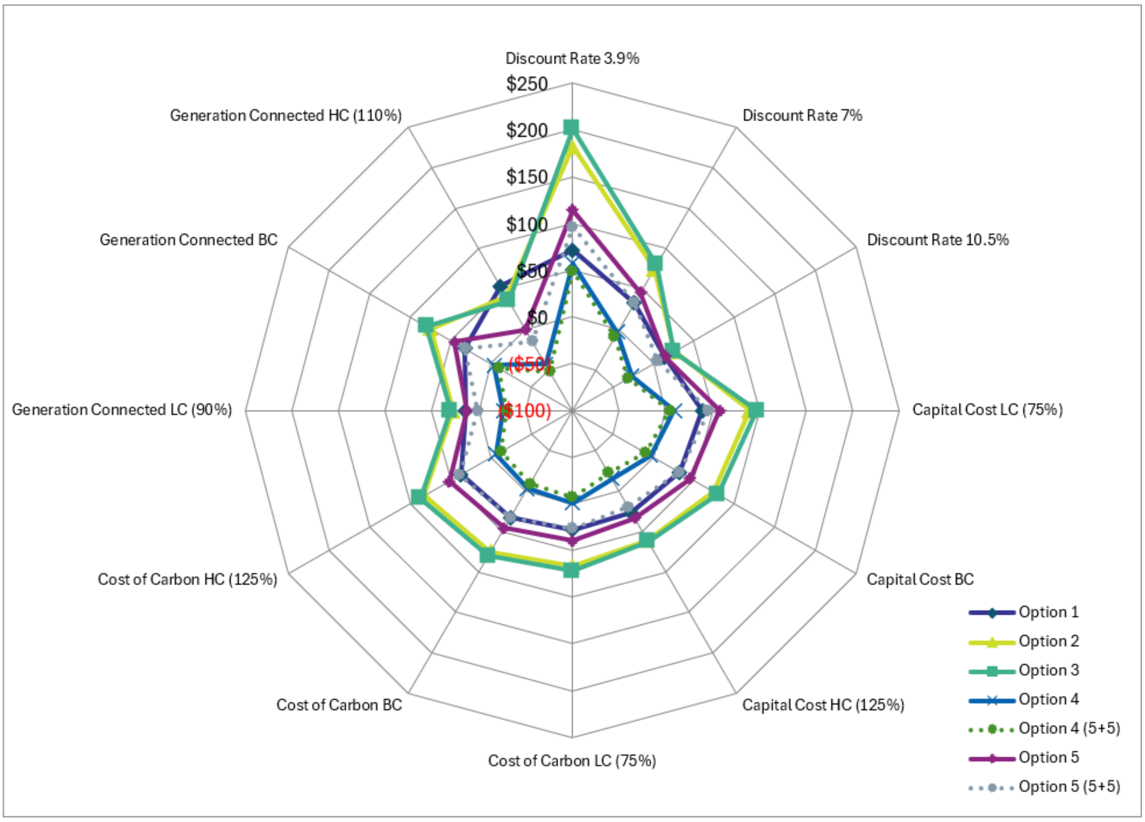

Figure 1: Sensitivity analysis of the four shown inputs on the net present value of each option ($M, real 2024)

On the basis of the analysis presented in this DPAR, AusNet concludes that Option 3 "Augment MWTS – LGA both lines with 37/3.75 conductor" is the preferred option to address the identified need described in this RIT-D. The estimated capital cost of this option is $106.1 million (nominal).

AusNet welcomes written submissions on the credible options evaluation and draft conclusion presented in this DPAR. Submissions should be emailed to rittconsultations@ausnetservices.com.au on or before 27 November 2024. In the subject field, please reference 'RIT-T DPAR CE Morwell South'. 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.

AusNet expects to publish the Final Project Assessment Report (FPAR) with the responses to the submissions received before March 2025.

2. Introduction

The RIT-D is an economic cost-benefit test used to assess and rank potential options that are 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).

AusNet published an Options Screening Report (OSR) in January 2024 in relation to the identified need arising in relation to the renewable generation connections in Morwell South area in accordance with clause 5.17 of the NER and section 4.2 of the AER's RIT-D Application Guidelines[1]. Publication of this Draft Project Assessment Report (DPAR) represents the second step in the RIT-D process and describes the following:

- the identified need that AusNet is seeking to address;
- credible network options that may address the identified need;
- a summary of the submissions to the OSR
- the assessment approach and assumptions that AusNet has employed for this RIT-D assessment as well as the specific categories of market benefits that are unlikely to be material; and
- the identification of the proposed preferred option.

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

[1] Australian Energy Regulator, "*Application guidelines Regulatory investment test for distribution*", October 2023.

3. Background

Morwell Terminal Station (MWTS) 66 kV is the main source of supply for a major part of south-eastern Victoria including Gippsland. AusNet is responsible for planning the transmission connection and distribution network for this region.

MWTS 66 kV is supplied by two 150 MVA 220/66 kV transformers and one 165 MVA 220/66 kV transformer. Maximum demand at MWTS 66 kV typically occurs in summer. The station recorded a maximum demand of 452 MW (464 MVA) in early January 2013. The maximum demand on the station reached 422.3 MW (425 MVA) in winter 2022. The maximum demand period is usually quite short and coincides with a few weeks of peak tourism from Christmas to early January along the east coast of Victoria – however, driven by unusually cool 2022/2023 summer conditions, the maximum demand occurred in winter 2022. The maximum demand at MWTS 66 kV is forecast to increase over the ten-year planning horizon.

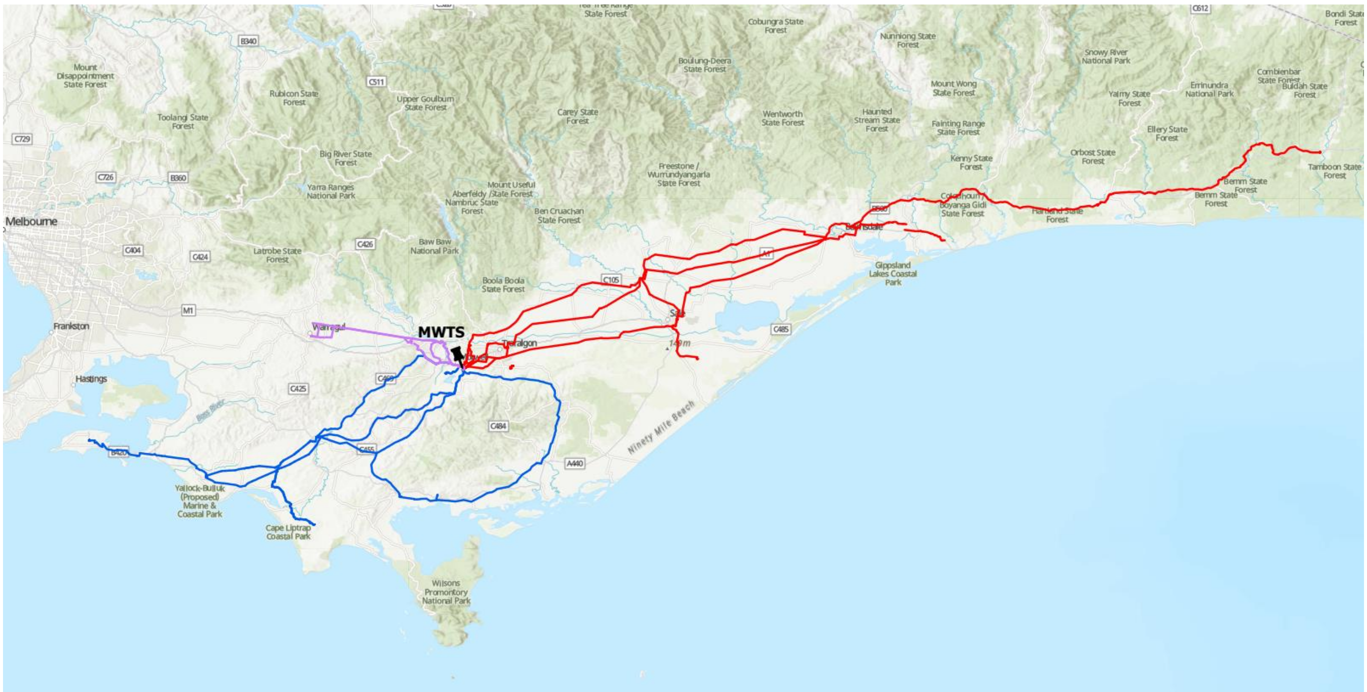

Figure 2: Map showing Morwell Terminal Station and the Morwell sub-transmission network

Morwell South (in blue colour) supplies Phillip Island, Wonthaggi and Leongatha as shown above. Morwell East network (in red colour) supplies Omeo in the north and Bairnsdale and Mallacoota in the east.

A total of 523.7 MW of embedded generation capacity is installed on the AusNet sub-transmission and distribution networks connected to MWTS[2]. It consists of:

- 277.4 MW of large-scale embedded generation; and
- 246.3 MW of rooftop solar PV, including all the residential and small-scale commercial rooftop PV systems that are smaller than 1 MW.

Of this generation connected to MWTS, Morwell South network has 146.36 MW (more than half) of the large-scale connected generation. In addition, AusNet has received another 860 MW of large-scale generation connection inquiries to connect to the Morwell South network[3].

[2] 2023 Transmission Connection Planning Report (TCPR)
[3] UpToDate information is available at Subtransmission Ratings and Connections dashboard

4. Identified need

4.1. Description

As explained in section 3, there is already 141.36 MW of large-scale embedded generation connected to Morwell South network. Recently AusNet has received connection inquiries to connect 860 MW of renewable generation to Morwell South sub-transmission (66 kV) system.

The Morwell Terminal Station (MWTS) to Leongatha (LGA) to Foster (FTR) to Wonthaggi (WGI) to Phillip Island (PHI) 66 kV network supplies over 54,700 customers via the four zone substations at Leongatha, Foster, Wonthaggi and Phillip Island[4]. The following diagram sourced from the Distribution Annual Planning Report (DAPR) – 2024-2028 shows the Morwell South sub-transmission network (note that MWTS-LGA No.2 line is marked in red due to summer load constraint with the line above this being the No.3 line).

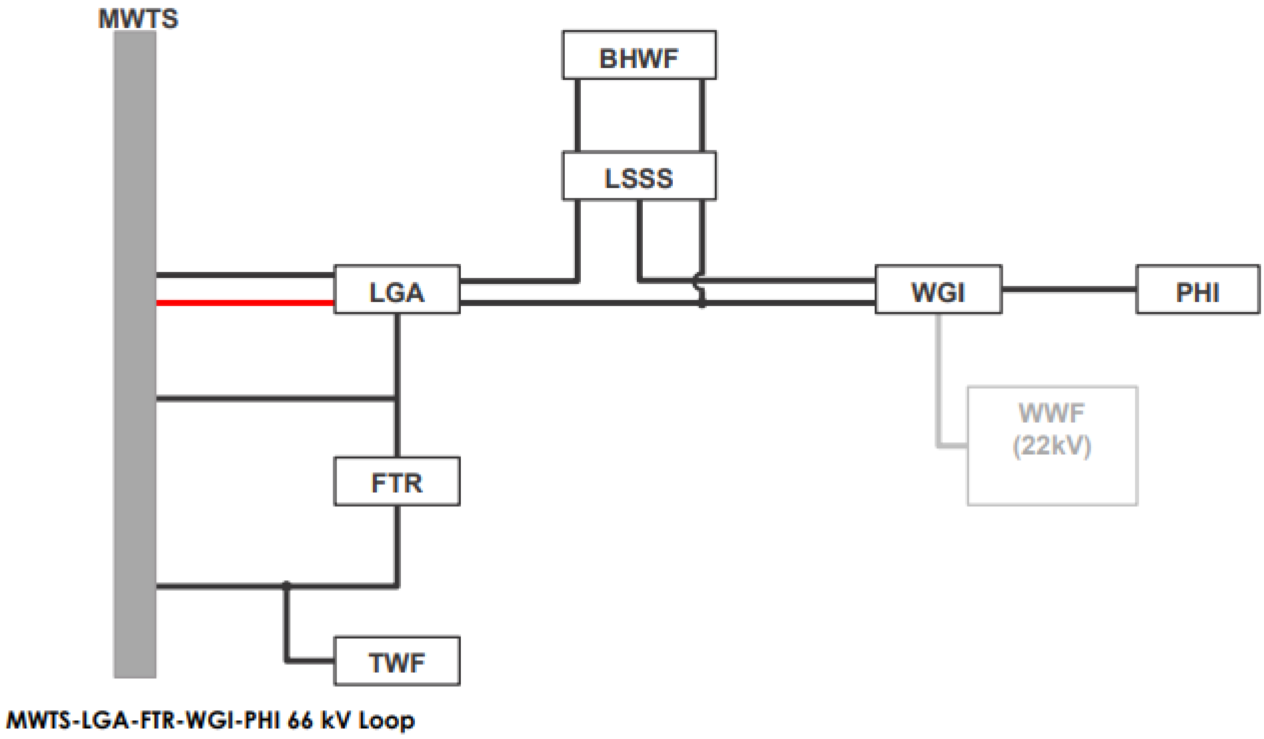

Figure 3: Morwell South sub-transmission network

As shown above a significant portion of the Morwell South (LGA, WGI, PHI substations, Bold Hills wind farm, Wonthaggi Wind farm etc) is connected to MWTS through two 66 kV lines between MWTS and LGA. One of these lines (No.2 line) has a lower summer rating (39.44 MVA) constraining the other line (No.3 line with summer rating 64.59 MVA) operating in parallel. It is evident that this line segment is a major constraint to connecting new generation to the Morwell South network.

Through preliminary studies AusNet has found that only a portion of the proposed generation connections could be connected by the existing assets, and the output of the connected generation would have to be curtailed during peak generation due to the existing constraints of the network.

The identified need for this RIT-D is therefore to address the sub-transmission constraints between MWTS - LGA zone substation (approximately 59 km) to enable more renewable generation to connect to AusNet's sub-transmission and distribution network in Morwell South network.

[4] AusNet Distribution Annual Planning Report (DAPR) – 2024-2028

4.2. Assumptions

The identified need described in the previous section is underpinned by a number of assumptions, including the projected growth in renewable generation given the connection inquiries received. In addition to these assumptions, AusNet adopted the assumptions detailed in the following subsection to quantify the risks associated with the identified need.

4.2.1. Market impact costs

Market models produce three key values for assessing net economic benefits:

- savings in total generation costs when new low-cost generation is introduced;
- curtailment of new low-cost generation; and
- savings in total generation costs when a network augmentation is introduced to reduce curtailment.

To determine whether enabling new generation connections is beneficial to electricity consumers as a whole, compared to the case without new generation:

- the sum of capital expenditure for the new generation and NEM-wide generation operating costs must be lower;
- curtailment of existing and new generation must be within bounds that are reasonably acceptable for generation proponents; and
- the capital cost of network augmentation must be lower than the savings developed by introducing the new generation.

Adhering to these three determinants leads to a future generation and transmission mix that reduces total costs to consumers. AusNet undertakes market modelling to assess hosting capacity, with and without the proposed augmentation. The assessment is performed using time-sequential modelling that takes account of:

- Projected changes in demand, with specific components that track potential growth in rooftop solar systems, electric vehicle (EV) penetration and charging habits, domestic and commercial battery installations, demand-side participation, and virtual power plant schemes utilizing aggregated batteries and vehicle-to-grid technologies.
- Addition of new transmission-connected generators and retirement of existing ageing generators according to AEMO's latest-available ISP projections.
- Addition of new interconnector projects according to AEMO's ISP projections.
- Projected changes in fuel costs for coal and gas-fired generators.
- Projected changes in fixed and variable generator operating costs, maintenance cycles and unplanned outages.
- National Electricity Market Dispatch Engine (NEMDE) constraint equations for regions outside Victoria.
- NEMDE constraint equations for electricity system stability in Victoria.
- Secure thermal operation under N-1 contingency conditions within Victoria, with reference to future changes in power flow.
- Multiple macroeconomic growth scenarios according to AEMO's latest-available Input Assumptions and Scenarios Report (IASR).
- Federal and State-based targets for renewable energy and emissions reduction.

Modelling is performed using hourly time intervals over multiple years to develop a long-term view that aligns with the operational lifetime of generation and transmission assets.

4.2.2. Emission reduction costs

Greenhouse gas emissions would be reduced by replacing fossil fuel powered generation with renewable generation. AusNet quantified the benefits from reductions in carbon emissions using the cost of carbon as given in the draft guidance published by the AER[5].

[5] https://www.aer.gov.au/documents/aer-valuing-emissions-reduction-draft-guidance-march-2024

4.2.3. Supply risk costs

In calculating the supply risk costs, AusNet estimates the expected unserved energy based on the most recent demand forecasts, and valued this expected unserved energy with the latest AER Value of Customer Reliability (VCR)[6]. In relation to the identified need considered in this DPAR, however, the risks associated with unserved energy is expected to be very small and immaterial to the assessment of the competing options. For that reason, the supply risk costs have not been included in this DPAR.

4.2.4. Safety risk costs

The Electricity Safety Act 1998[7] requires AusNet to design, construct, operate, maintain, and decommission its network to minimise hazards and risks to the safety of any person as far as reasonably practicable or until the costs become disproportionate to the benefits from managing those risks. By implementing this principle for assessing safety risks from asset failures, AusNet used:

- a value of statistical life[8] to estimate the benefits of reducing the risk of death;
- a value of lost time injury[9]; and
- a disproportionality factor[10].

AusNet's approach, including the use of a disproportionality factor, is consistent with the guidance provided by the AER. Similar to the observations in relation to supply risk costs, the safety impact in addressing the identified need is not material and has been excluded from this DPAR.

4.2.5. Financial risk costs

In the event of an asset failure, costs will be incurred in replacing the failed assets (and any consequential damage to other assets). Where the financial impact is expected to vary for different credible options, an assessment of these costs should be included into the cost-benefit assessment. For this identified need, however, this is not the case because asset condition is not a relevant consideration in the identified need. For that reason, financial risk costs are not included in this DPAR.

4.3. Summary of submissions to Options Screening Report

AusNet received two submissions for Morwell South OSR consultation. One of the submissions received was for a software-based solution. The proponent did not provide sufficient information to progress this option in accordance with section 6 of the OSR.

The other proposal was from BNRG Leeson, which was founded in 2007 to partner with project developers, technology providers and investors to finance, build, manage and own renewables projects. The submission explained that the company's operating assets currently produce Emore than 150GWh of clean energy annually, with Australia being a strategic focus area since 2019.

BNRG Leeson proposes implementing a non-network option as an effective interim solution to address the identified constraint. The submission noted that this approach will allow AusNet Services time to evaluate and implement any longer-term solutions, which may include augmentation and upgrades to the line capacity thereby facilitating the connection of additional generators. BNRG Leeson proposes a 60MW 4-hour BESS (LGA BESS) close to the LGA ZS to alleviate the identified constrain by 5.5-6 hours (average daily hours). As a system connected at 66 kV, key features will include:

- AusNet Owned Switching Station including network circuit breakers;

[6] In dollar terms, the Value of Customer Reliability (VCR) represents a customer's willingness to pay for the reliable supply of electricity. The values produced are used as a proxy, and can be applied for use in revenue regulation, planning, and operational purposes in the National Electricity Market (NEM).
[7] Victorian State Government, Victorian Legislation and Parliamentary Documents, *"Electricity Safety Act 1998,"* available at Electricity Safety Act 1998 (legislation.vic.gov.au)
[8] Department of the Prime Minister and Cabinet, Australian Government, *"Best Practice Regulation Guidance Note: Value of statistical life,"* available at https://www.pmc.gov.au/resource-centre/regulation/best-practice-regulation-guidance-note-value-statistical-life
[9] Safe Work Australia, "The Cost of Work-related Injury and Illness for Australian Employers, Workers and the Community: 2012-13," available at https://www.safeworkaustralia.gov.au/system/files/documents/1702/cost-of-work-related-injury-and-disease-2012-13.docx.pdf
[10] Health and Safety Executive's submission to the1987 Sizewell B Inquiry suggesting that a factor of up to 3 (i.e. costs three times larger than benefits) would apply for risks to workers; for low risks to members of the public a factor of 2, for high risks a factor of 10. The Sizewell B Inquiry was public inquiry conducted between January 1983 and March 1985 into a proposal to construct a nuclear power station in the UK.

- Revenue meters;
- Leongatha BESS circuit breaker; and
- Protection and constraint run-back comms.

The submission explained that pending review of the load-duration data and expected new connections, a dispatch hierarchy can be developed to ensure optimal utilisation of resources, enhancing overall system stability, and enabling responsive management of demand fluctuations, noting that:

- 24 hours notice is required for the system to prepare for a generation event (charging the BESS to provide network support); and
- 24 hours notice is required for the system to be in a state of readiness for a demand support event (discharging the BESS).

AusNet welcomes the submissions from the non-network proponents. The remainder of this DPAR explains how we have evaluated these options alongside the potential network solutions.

5. Credible options

This section describes the 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, evaluated and determined.

None of the options considered are expected to have an inter-regional impact. Each credible option is discussed below, including the Do Nothing/BAU option. The network option costs have been updated to reflect our latest cost estimates.

5.1. Option 0: Do Nothing/BAU

The Do Nothing/BAU (Business as Usual) option assumes that AusNet would not undertake any investment, outside of the normal operational and maintenance processes. The Do Nothing/BAU option establishes the base level of risk (base case) and provides a basis for comparing other credible options.

5.2. Option 1: Augment No.2 line with 19/3.25 conductor

The existing summer rating of the No.2 MWTS – LGA 66 kV line is 39.44 MVA. During the investigation it was found that a section of the line is already using higher rated AAC (All Aluminium Conductor) conductor, but the rest of the line is using lower rated ACSR (Aluminium Conductor Steel Reinforced) conductor which is constraining the overall line summer rating to 39.44 MVA. This option includes replacing the lower rated line sections with higher rated 19/3.25 AAC conductor to increase the overall line summer rating to match that of the No.3 line, which is operating in parallel. This option is expected to increase the summer rating of both lines from 79 MVA (39.44 x 2) to 128 MVA (64 x 2).

The construction would commence in March 2025, with project completion expected by December 2029. The estimated capital cost of this option is $36.6 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: Augment both lines with 19/4.75 conductor

This option includes augmenting both MWTS – LGA No.2 and No.3 lines with higher rated 19/4.75 AAC conductor. The summer rating of each line is expected to increase to 105 MVA each, making the overall summer rating between MWTS – LGA close to 210 MVA (105 x 2).

The construction would commence in March 2025, with project completion expected by December 2029. The estimated capital cost of this option is $88.4 million.

In relation to operation and maintenance (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.

5.4. Option 3: Augment both lines with 37/3.75 conductor

This option is similar to option 2 above, the only difference is that this option includes replacing both lines with a higher rated 37/3.75 AAC conductor. When replacing an existing line with a higher rated conductor, most of the poles will have to be replaced with new poles due to the higher weight of the conductor. Due to other factors like outage requirements, planning permits etc it may be economical to augment with a higher rated conductor. This augmentation will increase the summer rating of each line to 118 MVA, making the new overall MWTS – LGA summer rating 236 MVA (118 x 2).

The construction would commence in March 2025, with project completion expected by December 2029. The estimated capital cost of this option is $106.1 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.

5.5. Non-network options

As explained in section 4.3, AusNet received two submissions for Morwell South OSR consultation. AusNet has analysed the proposed solutions from one of those proponents, which involves a 60 MW / 240 MWh utility BESS (LGA BESS) connected to either MWTS-LGA No. 3 66 kV or LGA/WGI-LSSS2 line close to LGA ZS. The proposed contract period is 5 years with 24 months to deliver. The expected annual payment for providing the non-network solution is $4.2 million.

AusNet considered the two locations suggested by the proponent and evaluated each as a separate option. For evaluation purposes, AusNet assumed that the most economical network option would be implemented at the end of the 5-year period.

5.6. Options considered and not progressed

The option of augmenting the No.2 line with 19/4.75 AAC or 37/3.75 AAC was considered, but did not adequately address the identified need. Specifically, in the absence of augmenting the No.3 line, this option would not provide any additional benefits as No.2 and No.3 lines operate in parallel. Under this option, the No.3 line rating would be the constraining factor and the overall summer rating between MWTS – LGA would be limited to 128 MVA (64 x 2).

5.7. Material inter-regional network impact

The proposed augmentations between MWTS - LGA will not change the transmission network configuration and none of the network options considered are likely to have a material inter-regional network impact. A 'material inter-regional network impact' is defined in the NER as:

> "A material impact on another Transmission Network Service Provider's network, which may include (without limitation): (a) the imposition of power transfer constraints within another Transmission Network Service Provider's network; or (b) an adverse impact on the quality of supply in another Transmission Network Service Provider's network."

6. Economic assessment of the credible options

6.1. Assessment approach

Consistent with the RIT-D requirements and RIT-D Application guidelines[11], AusNet undertook a cost-benefit analysis to evaluate and rank the net economic benefits of the credible options over a 50-year period.

All options considered has been assessed against a business-as-usual or base case where no proactive capital investment to address the identified need is made.

6.2. Material classes of market benefits

Clause 5.17.4 (j)(5) of the NER requires the RIT-D proponent to consider whether each credible option provides the classes of market benefits described in clause 5.17.1(d). To address this requirement, the table below discusses our approach to each of the market benefits listed in that clause for each credible option.

Table 2: Analysis of Market Benefits

Class of Market Benefit	Analysis
(i) changes in voluntary load curtailment;	Any changes in voluntary load curtailment will be valued in accordance with any applicable network support agreements that may be in place.
(ii) changes in involuntary load shedding and customer interruptions caused by network outages, using a reasonable forecast of the value of electricity to customers;	The credible options may reduce involuntary load shedding, by increasing network capacity. As explained in section 4.2.3, however, it is not a material consideration and has not been included in this DPAR.
(iii) changes in costs for parties, other than the RIT-D proponent, due to differences in: *(A) the timing of new plant;* *(B) capital costs; and* *(C) the operating and maintenance costs;*	There is not expected to be any difference between the credible options.
(iv) differences in the timing of expenditure;	There is not expected to be any difference between the credible options.
(v) changes in load transfer capacity and the capacity of distribution connected units to take up load	There is not expected to be any difference between the credible options.
(vi) any additional option value (where this value has not already been included in the other classes of market benefits) gained or foregone from implementing the credible option with respect to the likely future investment needs of the NEM	There will be no impact on the option value in respect of the likely future investment needs of the NEM.

[11] Australian Energy Regulator, "*Application guidelines – Regulatory investment test for distribution*" available at https://www.aer.gov.au/documents/aer-rit-d-guidelines-final-amendments-clean-6-october-2023

(vii) changes in electrical energy losses;	The credible options are not expected to result in material changes to electrical energy losses.
(viii) changes in Australia's greenhouse gas emissions	The credible options may reduce greenhouse gas emissions. Our approach to estimating this market benefit is explained in section 4.2.2
(ix) any other class of market benefit determined to be relevant by the AER.	There are no other classes of market benefit that are relevant to the credible options.

6.3. Methodology

The purpose of this section is to provide a high-level explanation of our methodology for identifying the preferred option. As a general principle, it is important that the methodology takes account of the identified need and the factors that are likely to influence the choice of the preferred option. As such, the methodology is not a 'one size fits all' approach, but one that is tailored to the particular circumstances under consideration.

For this project, there is a significant market benefit component, which is addressed by the market modelling, as described in 4.2.1. Specifically, the reduction in wholesale energy costs that arise from the augmentation is a key factor in the cost benefit analysis.

The preferred option is the one that delivers the lowest total cost to customers, which is the sum of the cost of implementing that option and any residual risk-cost. The identification of the preferred option is complicated by the fact that the future is uncertain and that various input parameters are 'best estimates' rather than known values. Therefore, the RIT-D analysis must be conducted in the face of uncertainty.

To address uncertainty in our assessment of the credible options, we use sensitivity analysis and scenario analysis in our cost benefit assessment. As recommended by the AER's application guidelines, we use sensitivity analysis to assist in determining a set of reasonable scenarios. The relationship between sensitivity analysis and scenarios is best explained by the AER's practice note:[12]

> *Scenarios should be constructed to express a reasonable set of internally consistent possible future states of the world. Each scenario enables consideration of the prudent and efficient investment option (or set of options) that deliver the service levels required in that scenario at the most efficient long run service cost consistent with the National Electricity Objective (NEO).*
>
> *Sensitivity analysis enables understanding of which input values (variables) are the most determinant in selecting the preferred option (or set of options). By understanding the sensitivity of the options model to the input values a greater focus can be placed on refining and evidencing the key input values. Generally, the more sensitive the model output is to a key input value, the more value there is in refining and evidencing the associated assumptions and choice of value.*
>
> *Scenario and sensitivity analyses should be used to demonstrate that the proposed solution is robust for a reasonable range of futures and for a reasonable range of positive and negative variations in key input assumptions. NSPs should explain the rationale for the selection of the key input assumptions and the variations applied to the analysis.*

In applying sensitivities and scenarios to our cost benefit assessment, we have regard to the different circumstances that may eventuate that would affect the choice of the preferred option. Where our analysis shows that an option is clearly preferred, we will not undertake further testing. This approach is consistent with clause 5.17.1(c)(2) of the Rules, which states that the RIT–D must not require a level of analysis that is disproportionate to the scale and likely impact of each credible option considered.

In preparing the RIT-D, we have also had regard to AEMO's 2023 Inputs, Assumptions and Scenarios Report (IASR) and its 2024 Integrated System Plan (ISP). We note that the current IASR scenarios are Progressive Change, Step Change and Green Energy Exports, which are expressed in terms of their respective contributions to Australia's possible decarbonisation future, as depicted in the figure below.

12 AER, Asset replacement planning, January 2019, page 36.

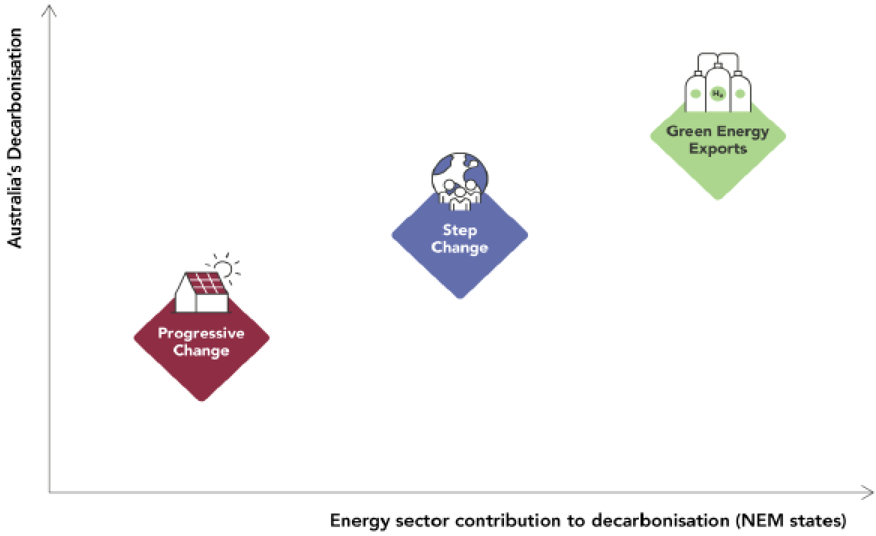

Figure 4: AEMO's scenarios for its 2023 IASR[13]

We note that the scenarios adopted by AEMO in its 2023 IASR are focused principally on the matters that are relevant to major transmission investments, rather than smaller sub-transmission investments of the type considered in this report. Furthermore, we are also conscious that the identified need arises from the connection inquiries that we have already received, rather than projected changes in renewable generation connecting to this portion of our network.

In conducting the net economic benefit analysis, we focused our initial analysis on the step change and progressive change scenarios, to determine whether we were obtaining a consistent decision signal in relation to one of the options. Depending on the outcome of this initial analysis, our methodology is to assess at that stage whether further market modelling for the Green Energy Exports scenario is warranted. In our view, we regard this two-step approach as a pragmatic way of balancing the costs of undertaking further market modelling against the benefits that it would provide in relation to the investment decision. We discuss our findings and scenario selection in section 6.5.

6.3.1. Modelling approaches and sensitivities

To perform a robust assessment of the proposed non-network options, AusNet has undertaken two approaches to determine the preferred option:

1. The **first method**, cost benefit analysis which considers the reduction in wholesale energy costs that arise from the augmentation using the market modelling described in 4.2.1.
2. The **second method**, an alternative approach where the key factor in the cost benefit analysis is the value of the reduction on curtailment of the renewable generation in Morwell South sub-transmission (66 kV) system that arise from the augmentation using the market modelling described in 4.2.1.

AusNet also tested a sensitivity, on both approaches, where an additional 5-year contract extension to the initial proposed 5-year contract for the non-network option.

1. First method with a 5-year contract for the non-network option and then the most economical network option comes in.
2. First method with 5+5-year contract for the non-network option and then the most economical network option comes in.
3. Second method with a 5-year contract for the non-network option and then the most economical network option comes in.
4. Second method with a 5+5-year contract for the non-network option and then the most economical network option comes in.

6.4. Key variables and assumptions

Table 3 below lists the key variables and assumptions applied in the economic assessment, which are essential inputs to our methodology for the purpose of this DPAR. The table also sets out the upper and lower bounds of the range of

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13 AEMO, Inputs, Assumptions and Scenario Report 2023, July 2023, page 4.

forecasts adopted for each of these variables. The lower bound and upper bound estimates are used to undertake sensitivity testing and scenario analysis. The detailed results of this modelling are provided in the next section.

In relation to the discount rate, we have adopted central, upper and lower bound estimates that are consistent with AEMO's IASR in July 2023. We note that discount rates are subject to change, particularly in the current economic climate. As such, the rates employed in this DPAR are considered reasonable in exploring the impact of different rates on the cost-benefit assessment of the competing options to address the identified need.

Table 3: Input assumptions used for sensitivity studies

Parameter	Lower Bound	Central (Base) Case	Higher Bound
Project Cost	AusNet estimate - 25%	AusNet estimate	AusNet estimate + 25%
Cost of Carbon[14]	AER estimate - 25%	AER estimate	AER estimate +25%
Discount Rate	3.9%	7.0%	10.5%
Generation Connected	90% of the generation modelled	100% of Generation Modelled	110% Of Generation Modelled

6.5. Cost benefit analysis

The economic analysis allows comparison of the economic cost and benefits of each option to rank the options and to determine the optimal timing of the preferred option. It quantifies the capital costs and the cost of the residual risk for each option, to determine a total cost for each option. The net economic benefit for each credible option is the total cost associated with that option minus the costs of the Do Nothing/BAU option.

AusNet considered the following 3 network options and 2 non-network options in the evaluation to select the preferred option to address the identified need.

1. Augment MWTS – LGA No.2 line with 19/3.25 conductor
2. Augment MWTS – LGA both lines with 19/4.75 conductor
3. Augment MWTS – LGA both lines with 37/3.75 conductor
4. Connect a 60 MW / 240 MWh utility BESS (LGA BESS) to MWTS-LGA No. 3 66 kV line (4.5km to LGA ZS)
5. Connect a 60 MW / 240 MWh utility BESS (LGA BESS) to LGA/WGI-LSSS2 66 kV line (8km to LGA ZS)

As already explained, each of these options will provide additional network capacity to enable more renewable generation to connect, deliver positive market benefits and reduce carbon emissions, in accordance with the National Electricity Objective.

Table 4 presents the costs and benefits for the Step Change and Progressive Change scenarios. As explained in section 6.3, the results from this initial assessment will determine whether it is necessary to undertake market modelling for the Green Energy Exports scenario. The data presented is expressed in present value terms and in $m real 2024 prices. The assessment period is 50 years covering the period from 2024/25 to 2073/74.

The presentation of the data in Table 4 shows the costs of each option, which are the same for both scenarios. This is followed by data on the total benefits and net economic benefits for each option under the Step Change and Progressive Change scenarios.

[14] AER, Valuing emissions reduction - AER guidance and explanatory statement, May 2024.

Table 4a: Cost benefit analysis and net economic benefits for each option in present value terms ($M, real 2024) – First method

	Option 1	Option 2	Option 3	Option 4	Option 4 (5+5)	Option 5	Option 5 (5+5)
Costs							
Capital Expenditure	-$24.39M	-$58.92M	-$70.71M	-$93.92M	-$99.12M	-$93.92M	-$99.12M
Total costs	**-$24.39M**	**-$58.92M**	**-$70.71M**	**-$93.92M**	**-$99.12M**	**-$93.92M**	**-$99.12M**
Step Change scenario: Total benefits and net economic benefits							
Generation Redispatch + Unserved Energy + Demand-side Participation	$12.76M	$10.34M	$27.48M	$23.40M	$19.26M	$33.78M	$43.30M
Emissions Reductions	$46.96M	$85.52M	$93.02M	$50.44M	$29.87M	$84.99M	$73.64M
Total Benefits	**$59.73M**	**$95.86M**	**$120.51M**	**$73.84M**	**$49.99M**	**$118.77M**	**$116.94M**
Option Net Economic Benefit	**$35.33M**	**$35.96M**	**$49.79M**	**-$20.08M**	**-$42.37M**	**$24.85M**	**$17.82M**
Progressive Change scenario: Total benefits and net economic benefits							
Generation Redispatch + Unserved Energy + Demand-side Participation	$10.80M	$10.95M	$17.61M	$9.98M	-$2.68M	$18.06M	$9.63M
Emissions Reductions	$33.47M	$55.61M	$98.45M	$49.14M	$11.94M	$84.03M	$57.89M
Total Benefits	**$44.26M**	**$66.56M**	**$116.06M**	**$59.12M**	**$9.26M**	**$102.08M**	**$67.52M**
Option Net Economic Benefit	**$19.87M**	**$7.64M**	**$45.35M**	**-$34.80M**	**-$89.50M**	**$8.16M**	**-$31.25M**

Table 5b: Cost benefit analysis and net economic benefits for each option in present value terms ($M, real 2024) - Second method

	Option 1	Option 2	Option 3	Option 4	Option 4 (5+5)	Option 5	Option 5 (5+5)
Costs							
Capital Expenditure	-$24.39M	-$58.92M	-$70.71M	-$93.92M	-$99.12M	-$93.92M	-$99.12M
Total costs	**-$24.39M**	**-$58.92M**	**-$70.71M**	**-$93.92M**	**-$99.12M**	**-$93.92M**	**-$99.12M**
Step Change scenario: Total benefits and net economic benefits							
Reduction in Curtailed Energy	$10.29M	$48.43M	$57.67M	$40.41M	$39.34M	$54.76M	$46.75M

Emissions Reductions	$46.96M	$85.52M	$93.02M	$50.44M	$29.87M	$84.99M	$73.64M
Total Benefits	**$57.25M**	**$133.94M**	**$150.69M**	**$90.85M**	**$69.21M**	**$139.75M**	**$120.21M**
Option Net Economic Benefit	**$32.86M**	**$75.02M**	**$79.98M**	**-$3.07M**	**-$29.91M**	**$45.83M**	**$21.27M**

Progressive Change scenario: Total benefits and net economic benefits							
Reduction in Curtailed Energy	$9.52M	$37.88M	$45.48M	$28.63M	$19.95M	$42.41M	$35.59M
Emissions Reductions	$33.47M	$55.61M	$98.45M	$49.14M	$11.94M	$84.03M	$57.89M
Total Benefits	**$42.99M**	**$93.50M**	**$143.93M**	**$77.77M**	**$31.89M**	**$126.43M**	**$93.47M**
Option Net Economic Benefit	**$18.59M**	**$34.57M**	**$73.22M**	**-$16.15M**	**-$67.23M**	**$32.51M**	**$5.65M**

Table 4a and Table 5b show the net economic benefit for each of the three network options and two non-network options (with original 5 year offer and assuming the offer can be extended for 5 more years) compared to the 'do nothing/BAU' option for the Step Change and Progressive Change scenarios with two methods used for the evaluation. Option 3 is the most economical in both methods. Both scenarios also show that Option 3 is preferred, delivering a net economic benefit of $49.79 million and $45.35 million in present value terms for the Step Change and Progressive Change scenarios in the first method, and $79.98 million and $73.22 million in present value terms for the Step Change and Progressive Change scenarios in the second method. The weighting of the options has no bearing on the selection of the preferred option.

In our view, given the consistent results for both scenarios, we do not consider it necessary to undertake modelling for the Green Energy Exports Scenario.

6.6. Sensitivity analysis

AusNet has tested the robustness of the investment decision by varying four inputs for the Step Change scenario, as shown below. Figure 5a and Figure 5a: Sensitivity analysis of the four shown inputs on the net present value of each option ($M, real 2024). The sensitivity study results show that Option 3 "Augment MWTS – LGA both lines with 37/3.75 conductor" provides the highest net economic benefits in almost all cases.

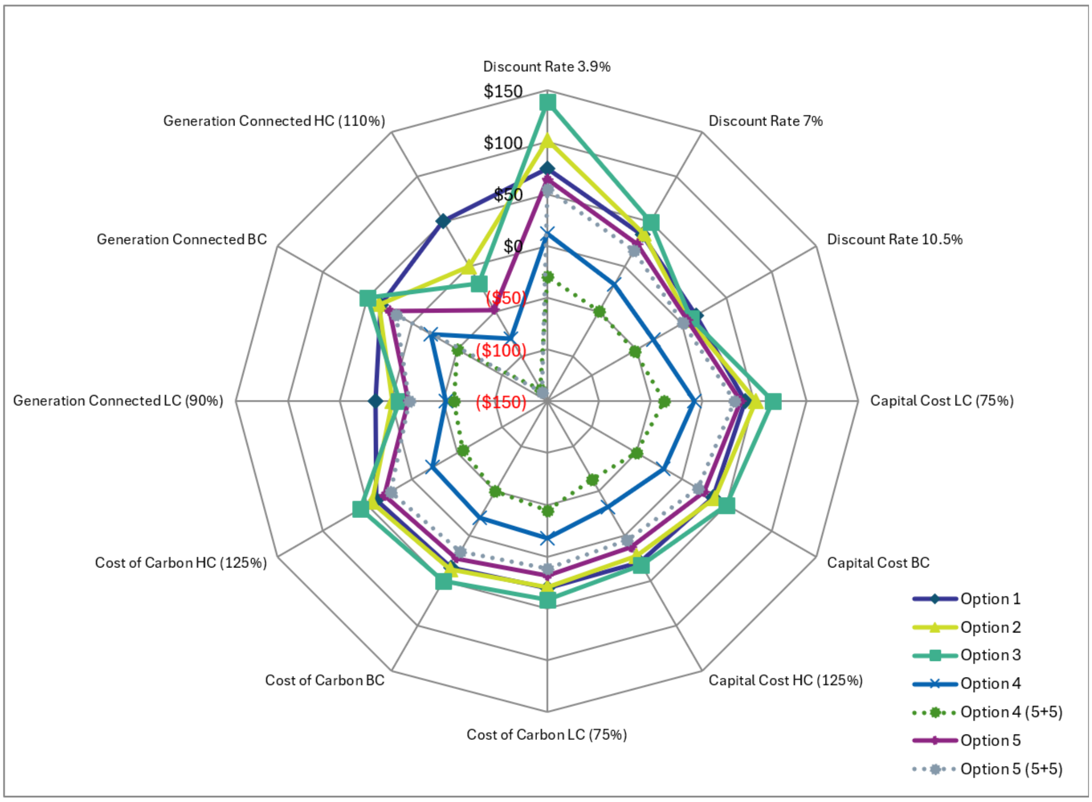


Figure 5a: Sensitivity analysis of the four shown inputs on the net present value of each option ($M, real 2024) - First method

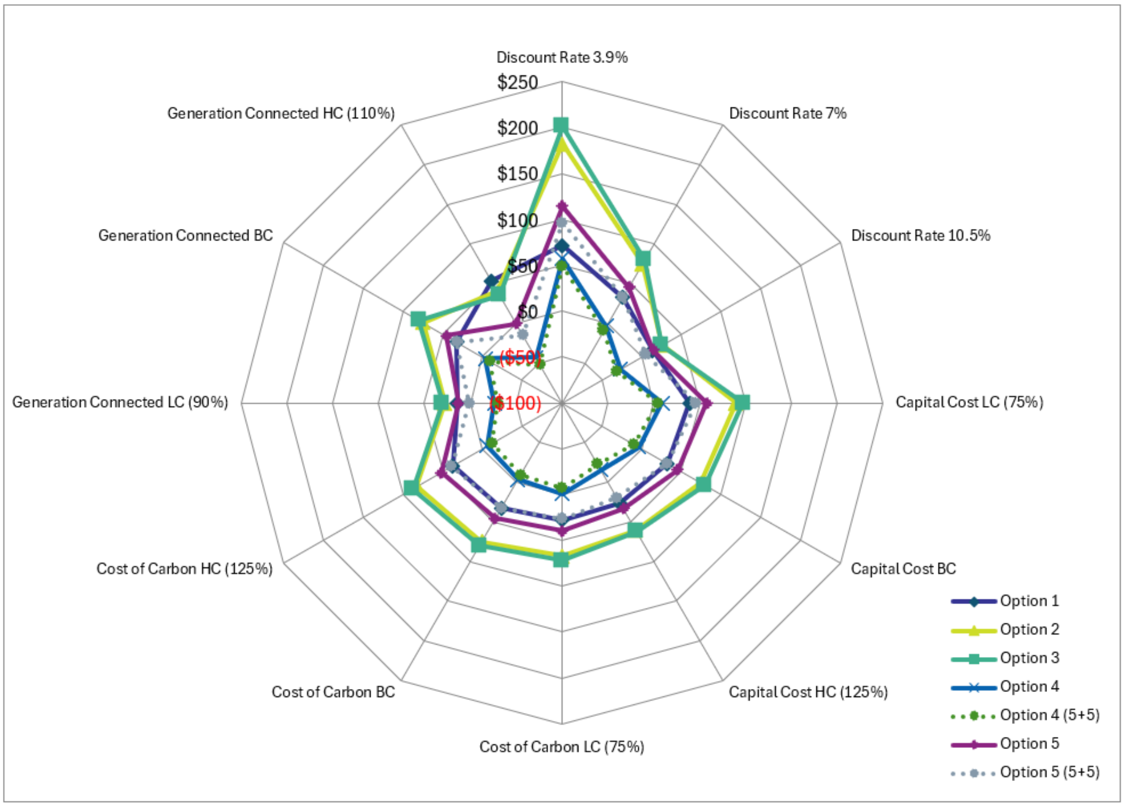


Figure 6b: Sensitivity analysis of the four shown inputs on the net present value of each option ($M, real 2024) – Second method

6.7. Preferred option

The preferred option (Option 3) is to:

- Augment the MWTS – LGA No.2 and No.3 66kV lines with 37/3.75 conductor to increase the overall summer rating of MWTS – LGA to 236 MVA, including the installation of conductor, poles and associated equipment.

The construction would commence in March 2025, with project completion expected by December 2029. The estimated capital cost of this option is $106.1 million (nominal).

In accordance with the RIT-D, this option is expected to maximise the present value of the net economic benefit to all those who produce, consume and transport electricity in the NEM.

6.8. Capital and operating costs of the preferred option

The capital expenditure of the preferred option (Option 3) is $106.1 million ($, nominal). The capital expenditure elements, expressed in nominal terms, are:

- Design and internal labour, $8.89 million;
- Materials, plant and equipment, $81.26 million;
- Contracts, $8.12 million; and
- Other, $7.85 million.
- AusNet does not expect the preferred option to have a material impact on future O&M costs.

7. Next steps

7.1. Request for submissions

AusNet invites written submissions, on the matters set out in this report, from Registered Participants, AEMO, interested parties, non-network providers and those registered on our demand-side engagement register.

All submissions and enquiries should be directed to:

Email: ritdconsultations@ausnetservices.com.au

Submissions are due on or before 27 November 2024 and should refer to 'RIT-D DPAR CE Morwell South' 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.

7.2. 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 FPAR which will include:

- A summary of, and commentary on, any submissions received;
- Preferred option to meet the identified need.

AusNet expects to publish the FPAR before March 2025.

8. Satisfaction of the RIT-D

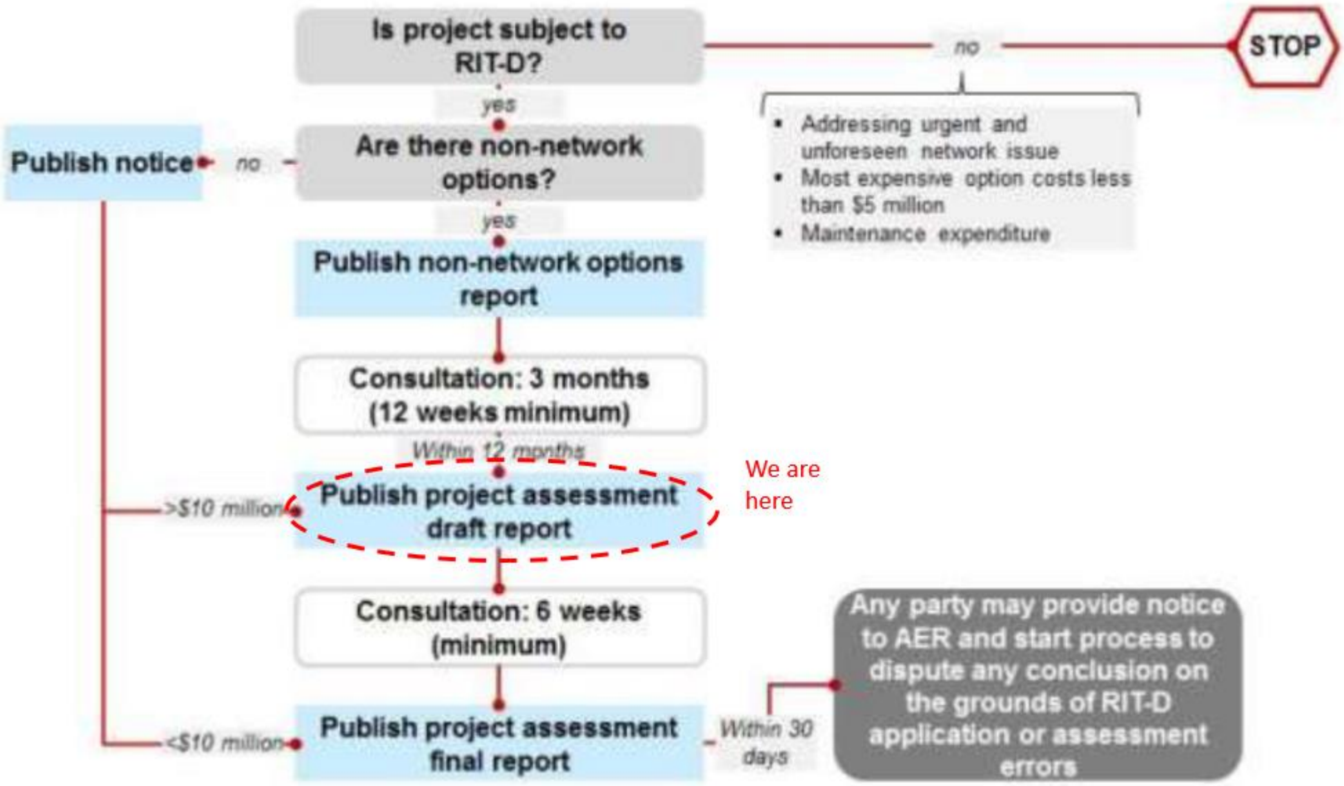
In accordance with clause 5.17.4(j)(11)(iv) of the Rules, we certify that the proposed option satisfies the regulatory investment test for distribution. The table below shows how each of these requirements have been met by the relevant section of this report.

Table 6: Compliance with regulatory requirements

Requirement		Section
Clause 5.17.4(j) of the NER - The draft project assessment report must include the following:		Noted. See details below.
(1)	a description of the identified need for the investment;	Section 4.
(2)	the assumptions used in identifying the identified need (including, in the case of proposed reliability corrective action, reasons that the RITD proponent considers reliability corrective action is necessary);	Section 4.2.
(3)	if applicable, a summary of, and commentary on, the submissions on the options screening report;	Section 4.3.
(4)	a description of each credible option assessed;	Section 5.
(5)	where a Distribution Network Service Provider has quantified market benefits in accordance with clause 5.17.1(d), a quantification of each applicable market benefit for each credible option;	Section 6.5.
(6)	a quantification of each applicable cost for each credible option, including a breakdown of operating and capital expenditure;	Section 5 and 6.8.
(7)	a detailed description of the methodologies used in quantifying each class of cost and market benefit;	Sections 6.2 and 6.3.
(8)	where relevant, the reasons why the RIT-D proponent has determined that a class or classes of market benefits or costs do not apply to a credible option;	Section 6.2
(9)	the results of a net present value analysis of each credible option and accompanying explanatory statements regarding the results;	Section 6.5
(10)	the identification of the proposed preferred option;	Section 6.7
(11)	For the proposed preferred option, the RIT-D proponent must provide:	
	(i) details of the technical characteristics;	Section 5.3 and 6.7
	(ii) the estimated construction timetable and commissioning date;	Section 5.3 and 6.7.
	(iii) the indicative capital and operating cost (where relevant);	Section 6.8
	(iv) a statement and accompanying detailed analysis that the proposed preferred option satisfies the regulatory investment test for distribution; and	Section 6.5

Requirement	Section
(V) if the proposed preferred option is for reliability corrective action and that option has a proponent, the name of the proponent;	Not applicable as the preferred option is not for reliability corrective action
(12) contact details for a suitably qualified staff member of the RIT-D proponent to whom queries on the draft report may be directed; and	Section 7.1
(13) if the estimated capital cost of the proposed preferred option is greater than $100 million (as varied in accordance with a cost threshold determination), include the RIT reopening triggers applying to the RIT-D project	As required if the inputs change significantly such that the preferred option outcome would change.

Appendix – RIT-D assessment and consultation process[15]



Note: The report names of the above diagram are different to the names used in the NER (Section 5.17) but the process is the same. This report used NER report names.

[15] Section 4 - Australian Energy Regulator, *"Application guidelines Regulatory investment test for distribution"* October 2023

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