

Service constraints at Thomastown (TT) Zone Substation

RIT-D Stage 1: Non-network options report



ISSUE/AMENDMENT STATUS

Issue	Date	Description	Author	Approved
1	16/04/2021	First Issue	F. Dinh	T. Langstaff

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1 Executive Summary

1.1 Background

AusNet Services is a regulated Victorian Distribution Network Service Provider (DNSP) that supplies electrical distribution services to more than 745,000 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 that we operate under, AusNet Services aims to maintain service levels at the lowest possible cost to our customers. To achieve this, we develop forward looking 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).

Our planning approach includes the application of a probabilistic planning methodology, under which conditions often exist where some of the load cannot be supplied under rare but possible conditions, such as during extreme demand conditions or with a network element out of service. Where relevant, we also prepare, publish, and consult on a regulatory investment test for distribution (RIT-D), which further helps ensure all credible options are identified and considered, and the best option is selected.

This non-network options report is stage one of the RIT-D consultation process to address the existing and emerging service level constraints in the Thomastown (TT) Zone Substation supply area. The report has been prepared by AusNet Services in accordance with the requirements of clause 5.17 of the National Electricity Rules (NER).

1.2 Identified need

TT commenced operation as a 66/22kV transformation station in the early 1950s. Two 20/27MVA transformers were installed in the early 1960s and a third 20/30MVA transformer was installed in the late 1960s. Two 66kV and eighteen 22kV bulk oil circuit breakers were installed at this station in the 1950s and 1960s. The physical condition of some assets has deteriorated and they are now presenting an increased risk of failure.

The key service constraints at TT are:

- Security of supply risks presented by the increasing likelihood of asset failure due to the condition of the assets;
- Health and safety risks to workers presented by a possible explosive failure of bushings on a number of the assets;
- Plant collateral damage risks presented by a possible explosive failure of bushings on a number of assets;
- Environmental risks associated with insulating oil spill or fire; and
- Reactive asset replacement risks presented by the increasing likelihood of asset failure due to the deteriorating condition of the assets.

1.3 Potential credible options

The potentially credible options that AusNet Services considers capable of meeting the identified need include:

1. Do Nothing (counterfactual)
2. Retire one transformer
3. Retire one transformer and reduce residual risk through network support
4. Use network support to defer retirement and replacement

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5. Replace 66kV and 22kV switchgear
6. Replace one transformer and 66kV and 22kV switchgear
7. Replace three transformers and 66kV and 22kV switchgear

1.4 Submissions

AusNet Services invites written submissions on the matters set out in this non-network options 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:

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AusNet Services
Email: ritdconsultations@ausnetservices.com.au

Submissions are due on or before 21 July 2021.

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

1.5 Next steps

Following conclusion of the non-network options report consultation period, AusNet Services will, having regard to any submissions received on this non-network options report, prepare and publish a draft project assessment report (DPAR). AusNet Services intends to publish the DPAR by Q3 2021.

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).

This non-network options report is the first stage of the RIT-D consultation process in relation to the existing and emerging service level constraints in the TT supply area. This report has been prepared by AusNet Services in accordance with the requirements of clause 5.17 of the NER.

This report:

- Describes the identified need that AusNet Services is seeking to address, in relation to the service level constraints in the TT Zone Substation supply area.
- Outlines the assumptions made in identifying the need.
- Describes the options that AusNet Services considers could potentially address the identified need.
- Outlines the technical characteristics that a non-network option would be required to deliver to meet the identified need.
- Invites registered participants, AEMO, interested parties, non-network providers and persons on AusNet Services' demand side engagement register to make a submission on this non-network options report.

3 Background

3.1 Existing network

TT Zone Substation is located in the northern suburbs of metropolitan Melbourne on the same site as the Thomastown Terminal Station (TTS), approximately 15km north of Melbourne (Melway map reference 8 H11). It is the main source of electricity for the suburbs of Thomastown, Lalor, Reservoir, Kingsbury and Bundoora.

TT supplies approximately 28,600 customers, split fairly evenly with AusNet Services supplying approximately 14,100 customers and Jemena supplying approximately 14,500 customers. The load at TT is urban in nature and includes mostly residential and industrial load with some commercial loads.

The northern suburbs of Melbourne are at an elevation of 74m above sea level. TT has typical Melbourne climate with summer average maximum temperature of 26°C, winter average minimum temperature of 6°C and with extreme temperatures reaching 46°C in summer and -3°C in winter. The average rainfall is 590mm for Essendon, the nearest weather station.

TT is supplied at 66kV via two short 66kV circuits that originate from the TTS.

The location of TT within the AusNet Services distribution network is as shown below in Figure 1.

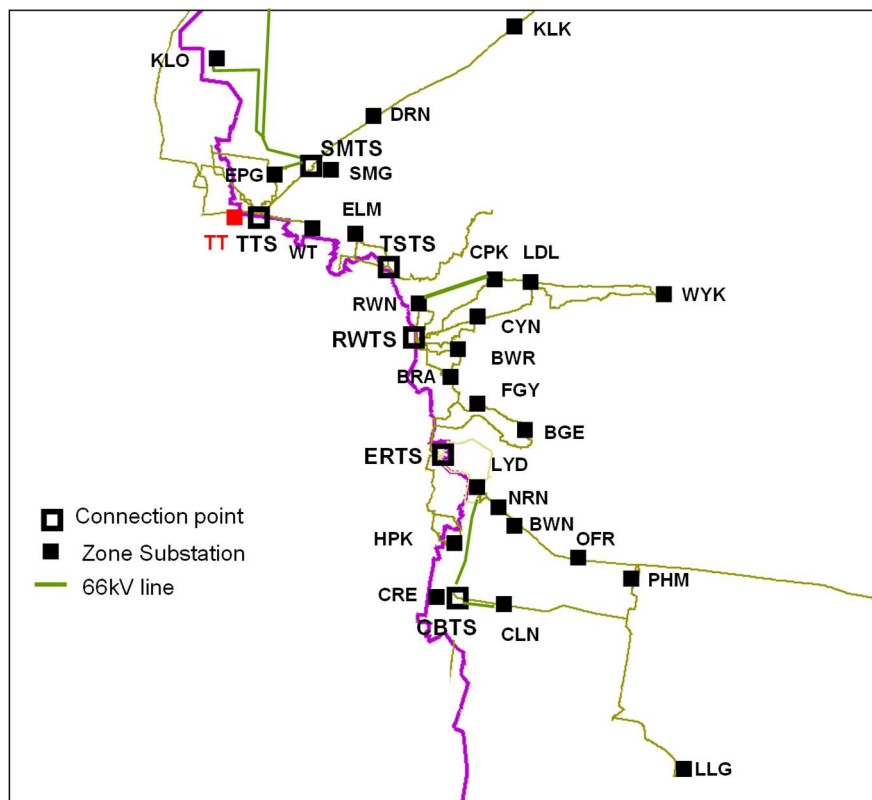


Figure 1: TT location within AusNet Services distribution network

The configuration of primary electrical circuits within TT is as shown in the following single line diagram in Figure 2 below.

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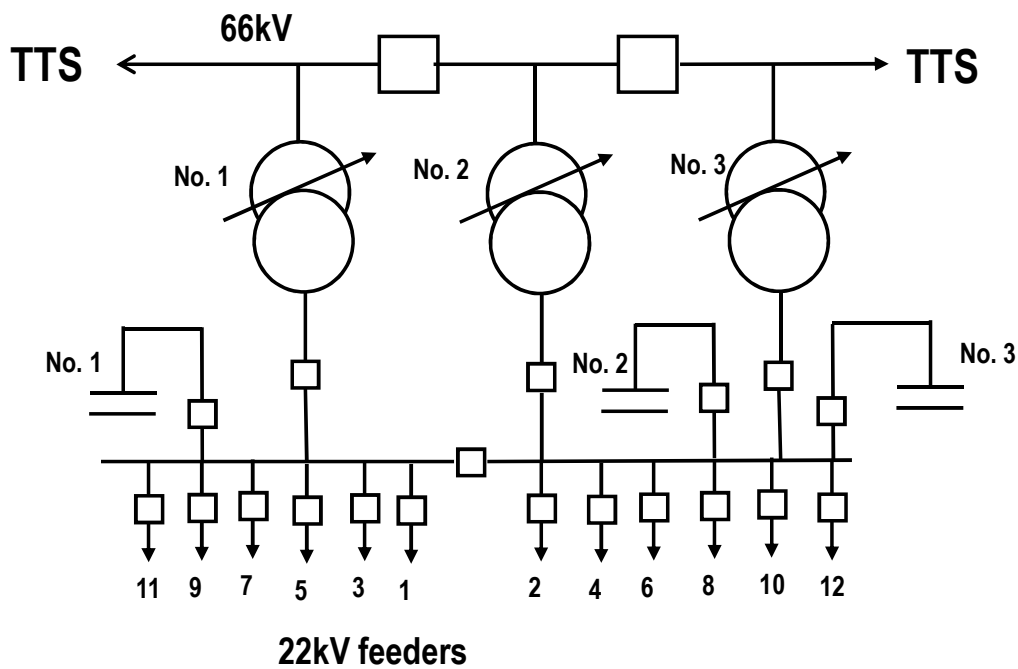


Figure 2: Single Line Diagram of TT

3.2 Customer Composition

TT has twelve 22kV feeders of which eight supply into the AusNet Services supply area and four (TT3, TT8, TT10 and TT11) supply into the Jemena electricity network area.

Table 1 provides details of the 22kV supply feeders.

Table 1: TT feeder information

Feeder	Feeder Length (km)	Feeder description	Number of Customers	Type of Customer
TT1	5.3	Summer peaking, urban feeder	200	0.5% residential 60% commercial 39% industrial 0.5% farming
TT2	7.0	Summer peaking, urban feeder	471	1.5% residential 78% commercial 20.5% industrial
TT3	-	Jemena feeder	2,893	-
TT4	9.9	Summer peaking, urban feeder	2,637	93.5% residential 5.9% commercial 0.6% industrial
TT5	10.6	Summer peaking, urban feeder	1,765	87.6% residential 11.9% commercial 1.5% industrial
TT6	23.2	Summer peaking, urban feeder	4,710	97.3% residential 2.4% commercial 0.3% industrial

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TT7	9.1	Summer peaking, urban feeder	453	2.6% residential 70.2% commercial 27.2% industrial
TT8	-	Jemena feeder	3,099	-
TT9	14.5	Summer peaking, urban feeder	3,531	94.2% residential 5.6% commercial 0.2% industrial
TT10	-	Jemema feeder	4,029	-
TT11	-	Jemena feeder	4,469	-
TT12	8.8	Summer peaking, urban feeder	342	2.0% residential 73.9% commercial 24.1% industrial

The TT 22kV feeders have open point interconnections with feeders from both Epping and Watsonia zone substations in the AusNet Services distribution network, providing a load transfer capability of 11.2MVA.

Some of the 22kV feeders have open point interconnections with feeders from both North Heidelberg (NH) and Coburg North (CN) zone substations in the Jemena distribution network, providing an additional load transfer capability of 12.5 MVA.

3.3 Zone Substation Equipment

3.3.1 Primary Equipment

TT comprises an air insulated 66kV switchyard with three 66kV buses separated by bus-tie circuit breakers. These 66kV buses are supplied by two incoming 66kV lines from TTS.

There are three 66/22kV transformers supplying two 22kV air insulated busbars, which are connected to one another with a bus tie circuit breaker. Across the two 22kV buses, there are twelve 22kV feeders and three 2X6MVA capacitor banks.

The two 66kV bus tie circuit breakers are bulk oil units which were installed in the late 1960s.

The 22kV switchyard currently has nineteen 22kV circuit breakers including eighteen bulk-oil circuit breakers installed in the late 1950s, when the station was established, and one vacuum circuit breaker that was installed in 1999 to protect the No.2 capacitor bank.

Of the three 66/22kV transformers, the No.1 and No.2 units are rated 20/27MVA and were installed in the early 1960s, while the No.3 unit is rated 20/30MVA and was installed in the late 1960s.

3.3.2 Secondary Equipment

The two incoming 66kV lines are protected by duplicated current differential protection schemes using modern numerical relays.

The 66kV bus protection is covered by duplicated High Impedance Bus protection using old electromechanical relays.

The 66/22kV transformers are protected by overcurrent protection using old electromechanical relays and transformer differential schemes employing old digital relays.

The 22kV bus protection has duplicate schemes using modern numerical relays for bus differential protection and bus distance overcurrent protection.

The 22kV feeder circuit breakers have overcurrent, earth fault, directional sensitive earth fault and auto reclose schemes provided by modern numerical relays.

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The 22kV capacitor bank protection has overcurrent, earth fault, unbalance and overvoltage schemes using modern numerical relays.

The station has two 300kVA station service transformers, and duplicated 240V AC systems and battery chargers that supply a 250V DC system for the protection relays and trip coils.

4 Identified need

TT commenced operation as a 66/22kV transformation station in the early 1950s. Two 20/27MVA transformers were installed in the early 1960s and a third 20/30MVA transformer was installed in the late 1960s. Two 66kV and eighteen 22kV bulk oil circuit breakers were installed at this station in the 1950s and 1960s. The physical condition of these assets has deteriorated and they are now presenting an increased risk of failure.

The key service constraints at TT are:

- Security of supply risks presented by the increasing likelihood of asset failure due to the condition of the assets;
- Health and safety risks to workers presented by a possible explosive failure of bushings on a number of the assets;
- Plant collateral damage risks presented by a possible explosive failure of bushings on a number of assets
- Environmental risks associated with insulating oil spill or fire; and
- Reactive asset replacement risks presented by the increasing likelihood of asset failure due to the deteriorating condition of the assets.

5 Assumptions underpinning the identified need

The purpose of this chapter is to summarise the key input assumptions that underpin the identified need described in the previous chapter.

5.1 Regulatory Obligations

In addressing the identified need, we must satisfy our regulatory obligations, which we summarise below.

Clause 6.5.7 of the National Electricity Rules requires AusNet Services to only propose capital expenditure required in order to achieve each of the following:

- (1) *meet or manage the expected demand for standard control services over that period;*
- (2) *comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;*
- (3) *to the extent that there is no applicable regulatory obligation or requirement in relation to:*
 - (i) *quality, reliability or security of supply of standard control services; or*
 - (ii) *the reliability or security of the distribution system through the supply of standard control services*

to the relevant extent:

 - (iii) *maintain the quality, reliability and security of supply of standard control services, and*
 - (iv) *maintain the reliability and security of the distribution system through the supply of standard control services; and*
- (4) *maintain the safety of the distribution system through the supply of standard control services.*

Section 98(a) of the Electricity Safety Act requires AusNet Services to:

design, construct, operate, maintain and decommission its supply network to minimise as far as practicable –

- (a) *the hazards and risks to the safety of any person arising from the supply network; and*
- (b) *the hazards and risks of damage to the property of any person arising from the supply network; and*
- (c) *the bushfire danger arising from the supply network.*

The Electricity Safety act defines ‘practicable’ to mean having regard to –

- (a) *severity of the hazard or risk in question; and*
- (b) *state of knowledge about the hazard or risk and any ways of removing or mitigating the hazard or risk; and*
- (c) *availability and suitability of ways to remove or mitigate the hazard or risk; and*
- (d) *cost of removing or mitigating the hazard or risk.*

Clause 3.1 of the Electricity Distribution Code requires AusNet Services to:

- (b) *develop and implement plans for the acquisition, creation, maintenance, operation, refurbishment, repair and disposal of its distribution system assets and plans for the establishment and augmentation of transmission connections:*

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- (i) to comply with the laws and other performance obligations which apply to the provision of distribution services including those contained in this Code;
- (ii) to minimise the risks associated with the failure or reduced performance of assets; and
- (iii) in a way which minimises costs to customers taking into account distribution losses.

Under clause 5.2 of the Electricity Distribution Code, AusNet Services:

must use best endeavours to meet targets required by the Price Determination and targets published under clause 5.1 and otherwise meet reasonable customer expectations of reliability of supply.

5.2 Asset Condition

AMS 10-13 Condition Monitoring describes AusNet Services' strategy and approach to monitoring the condition of assets.

Asset condition is measured with reference to an asset health index on a scale of C1 to C5. Table 2 provides a description of the asset condition scores.

Table 2: Asset condition Score and Remaining Service Potential

Condition Score	Condition	Condition Description
C1	Very Good	Initial service condition
C2	Good	Deterioration has minimal impact on asset performance. Minimal short term asset failure risk.
C3	Average	Functionally sound showing some wear with minor failures, but asset still functions safely at adequate level of service.
C4	Poor	Advanced deterioration – plant and components function but require a high level of maintenance to remain operational.
C5	Very Poor	Extreme deterioration approaching end of life with failure imminent.

The condition of the key assets at TT is discussed in detail in the Asset Health Reports for the key asset classes such as power transformers, instrument transformers and switchgear with information on asset condition rankings, recommended risk mitigation options and replacement timeframes.

A summary of the asset condition at TT is provided in Table 3 and discussed in the following sections.

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Table 3: TT Asset Condition Summary

Asset Type	Number of assets by condition score				
	C1	C2	C3	C4	C5
66kV Circuit Breakers				2	
66/22kV Power Transformers			2	1	
22kV Circuit Breakers	2	2		3	15
22kV Current Transformers		6		3	6
22kV Voltage Transformers				2	

These condition scores are then used to calculate the asset failure rates using the Weibull parameters determined for each asset class.

5.3 Zone Substation Supply Capacity

TT zone substation is a summer peaking station and the peak electrical demand reached 80.2MVA in the summer of 2019/20.

The peak demand at TT is currently forecast to increase slowly at approximately 0.2% per annum.

Figure 3: shows the forecast maximum demand and supply capacities (cyclic ratings) for TT.

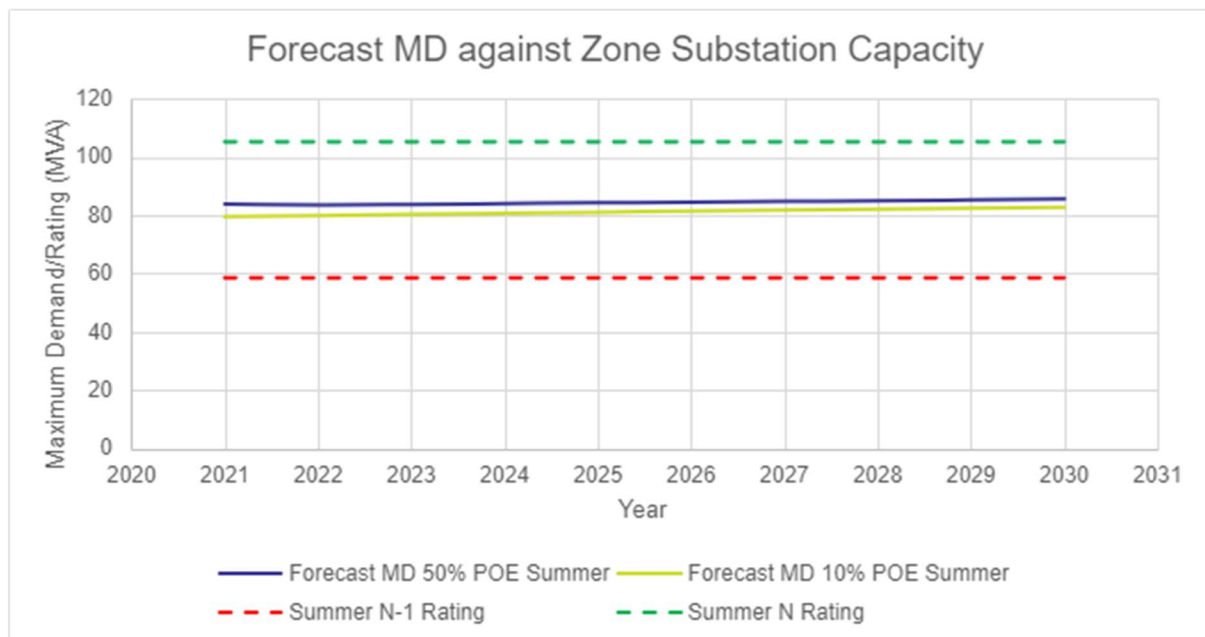


Figure 3: TT Forecast Maximum Demand against Zone Substation Capacity

5.4 Load Duration Curves

The zone substation load duration curves that feed into the risk-cost assessment model are derived from historical actual demands between:

- 1 October 2019 and 31 March 2020 for the summer 50% probability of exceedance (POE) curves;
- 1 April 2020 and 30 September 2020 for the winter 50% POE curves;
- 1 October 2019 and 31 March 2020 for the summer 10% POE curves; and

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- 1 April 2020 and 30 September 2020 for the winter 10% POE curves.

The historical hourly demands are separated by season and unitised based on the recorded maximum demand within that season (summer and winter) and time period, which allows the load duration curve to be scaled according to the seasonal forecast maximum demand for each year of the assessment period.

The 50% POE unitised load duration for TT zone substation is presented in Figure 4, and the 10% POE unitised load duration for TT zone substation is presented in Figure 5.

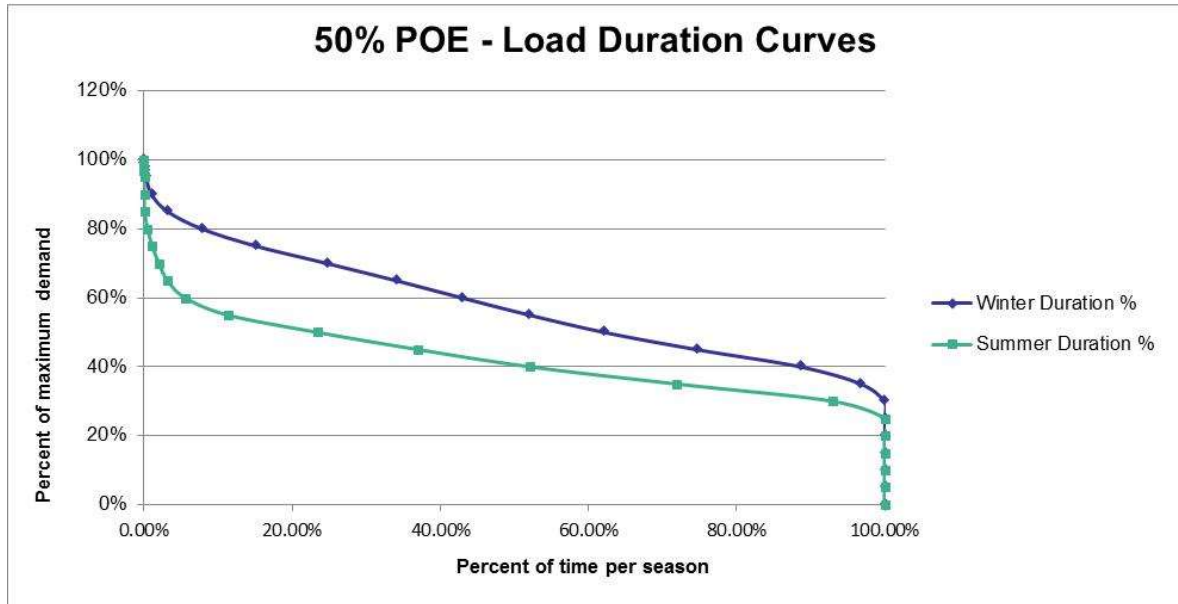


Figure 4: TT 50% POE Load Duration Curve

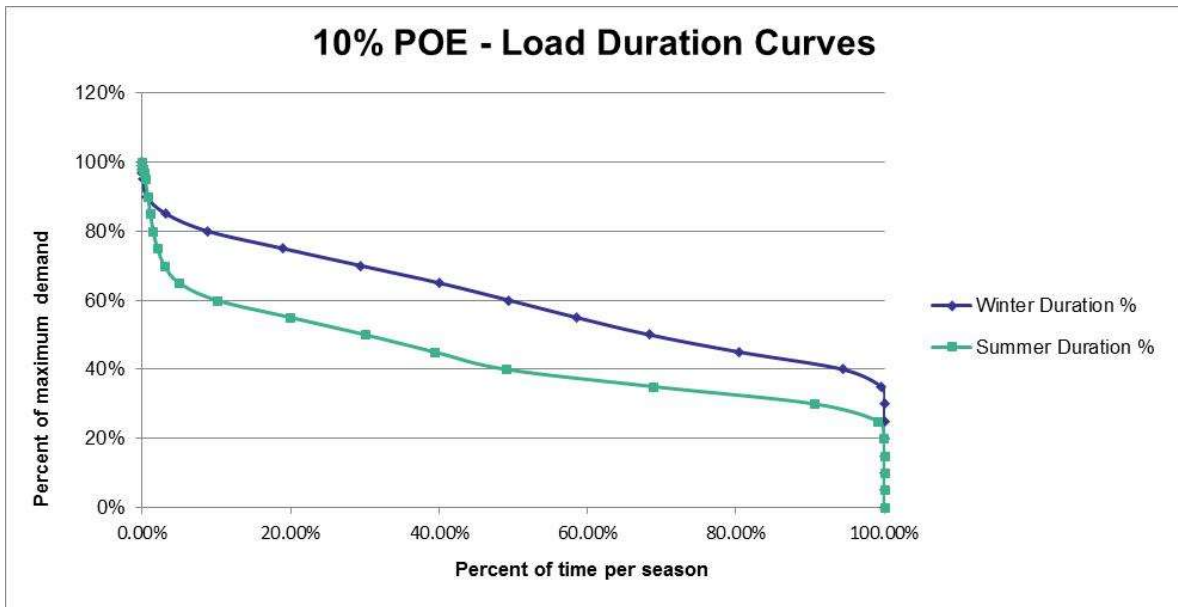


Figure 5: TT 10% POE Load Duration Curve

5.5 Feeder Circuit Supply Capacity

There is currently no requirement for additional feeders at TT due to the modest load growth expected in the area.

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5.6 Load Transfer Capability

The Distribution Annual Planning Report (DAPR) provides the load transfer capability (in MW) of the feeder interconnections between TT and its neighbouring zone substations. Our forecast load transfer capability for TT is presented in Table 4.

Table 4: TT Load Transfer Capability

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Load Transfer Capability (MW)	11.2	11.2	11.2	11.1	11.1	11.1	11.1	11.0	11.0	11.0

5.7 Station Configuration Supply Risk

The configuration of TT means that a failure of some 22kV equipment will result in supply outages to customers as backup circuit breakers operate to isolate the failed equipment. The resultant supply outage would be for an estimated duration of two hours, which reflects the time required for operators to travel to site and manually re-configure circuits to isolate the failed equipment and sequentially restore supply to customers.

Table 5 lists the estimated bus outage consequence factors for failure of each major type of equipment based on the substation layout.

Table 5: TT Bus Outage Consequence Factors

Failed Equipment	Estimated Bus Outage Consequence
22kV circuit breaker	53%
22kV current transformer	53%

6 Potential Credible Options

This section outlines the potential credible options that have been considered to address the identified invest, and summarises the key works and costs associated with implementing these options. It presents both the credible and non-credible options considered. The draft project assessment report, which is the next stage of the RIT-D process, will consider the credibility of each option in further detail. At this stage, it should be noted that an option may not be credible if it fails to address the health and safety issues associated with the risk of asset failure.

The following potential credible options have been identified at TT:

1. Do Nothing
2. Retire one transformer
3. Retire one transformer and reduce residual risk through network support
4. Use network support to defer retirement and replacement
5. Replace 66kV and 22kV switchgear
6. Replace one transformer and 66kV and 22kV switchgear
7. Replace three transformers and 66kV and 22kV switchgear

Each of the network options to address the identified need would need to be delivered during the 2021-25 EDPR period.

The purpose of this non-network options report is to provide an opportunity for non-network proponents to propose solutions. The options described in this section, therefore, should not be regarded as limiting the scope of potential non-network options.

6.1 Option 1: Do Nothing

The Do Nothing (counterfactual) option assumes that AusNet Services would not undertake any investment, outside of the normal operational and maintenance processes. Under this option, increasing supply risk would be managed by increased levels of involuntary load reduction. Increased non-supply risks, such as those associated with safety, collateral damage, reactive replacement and environmental impacts, would be accepted as unmanaged rising risk costs.

The Do Nothing (counterfactual) option establishes the base level of risk, and provides a basis for comparing potential options. Whilst the direct capital and operating costs of this option are zero, the residual costs arising from this option will be significant.

6.2 Option 2: Retire one transformer

This option tests whether the current installed capacity of the substation is still required to meet customer demand and whether equipment could be retired rather than replaced.

The estimated capital cost for this option is \$100k, for associated decommissioning works.

6.3 Option 3: Retire one transformer and reduce residual risk through network support

This option supplements Option 2 by examining whether the addition of network support would provide a cost effective means of eliminating residual risk and therefore produce a higher net market benefit. The cost of obtaining network support will be the principal direct cost associated with this option, with capital expenditure of approximately \$130k for the associated decommissioning works and setting up a network support agreement.

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The purpose of this non-network options report is to test with non-network proponents whether this option is feasible and to better understand the likely costs of procuring network support. The details of the technical requirements for network support and the maximum available funding is discussed in the next section.

6.4 Option 4: Use network support to defer retirement and replacement

This option extends Option 3 to consider whether sufficient network support could be provided to avoid entirely the proposed retirement and replacement of the network assets, i.e. a network support only solution.

As noted in relation to Option 3, this option will involve relatively modest direct costs to decommission assets and set up a network support agreement. The principal costs of this option, which is to be explored with non-network proponents, is the cost of procuring network support. Further information to assist non-network proponents is provided in the next section.

6.5 Option 5: Replace 66kV and 22kV switchgear

This option replaces the two existing 66kV circuit breakers and the existing two outdoor 22kV bus and circuit breakers with three indoor switchboards and associated secondary equipment in Stage 1. The transformers are then replaced in Stage 2 of this asset renewal proposal, scheduled for completion around 5 to 10 years after Stage 1.

This option does not address the risks associated with the transformers.

The estimated capital cost of this option is \$16.20 million

6.6 Option 6: Replace one transformer and 66kV and 22kV switchgear

This option replaces one of the existing transformers with a new 20/33MVA unit, replaces the two existing 66kV circuit breakers and replaces the existing outdoor 22kV bus and circuit breakers with three new indoor switchboards. It also includes replacing all associated secondary equipment.

Under this option those assets with high failure risks, including one transformer, current transformers and circuit breakers and the 22kV busses, are replaced as an integrated project.

The estimated capital cost of this option is \$19.5 million.

6.7 Option 7: Replace three transformers and 66kV and 22kV switchgear

This option replaces the existing transformers with three new 20/33MVA units, replaces the two existing 66kV circuit breakers and replaces the two existing outdoor 22kV buses and circuit breakers with three new indoor switchboards. It also includes replacing associated secondary equipment.

Under this option those assets with high failure risks, including transformers, current transformers and circuit breakers and the 22kV busses, are replaced as an integrated project.

The estimated capital cost of this option is \$25.4 million. The economic analysis in the next stage of the RIT-D will consider whether this increased capital cost is sufficiently offset by the lower residual risk associated with this option.

7 Requirements for non-network option

This section outlines:

- The technical characteristics that a non-network (network support generation, energy storage and/or demand management) option would be required to deliver; and
- The information that a non-network proponent should provide to AusNet Services to explore the potential provision of a non-network service.

The amount that AusNet Services would be willing to pay for a non-network service depends on the extent to which it will mitigate the risks described in the identified need. Key factors that influence the network support amount payable to proponents include availability, capacity, dispatch duration and firmness of response provided by the non-network solution.

7.1 Load reduction and location

As detailed in section 4, the identified need comprises a number of different elements, which can be grouped together in the following broad categories:

- Security of supply risk;
- Health and safety risks;
- Plant collateral damage risks;
- Environmental risks; and
- Reactive asset replacement risks.

In broad terms, these risks are asset-related and will only be mitigated by a non-network option if it is able to reduce the existing dependency on the relevant assets. For asbestos related risks associated with TT, for example, it is highly unlikely that these risks can be mitigated by a non-network option (as the risk relates to the fabric of the building).

However, if the need for one or more transformers or other assets can be eliminated through a non-network option, then savings may result by reducing the risks associated with asset failure. The ability for a non-network solution to support an N-1 contingency on a summer peak demand day is one such scenario.

The table below sets out the load reductions that a non-network option would be required to deliver on a maximum demand day, in order to mitigate the identified risks at TT to some extent, e.g. loss of one transformer.

Year	Load at Risk (MVA)	Hours at Risk, POE50	Expected non-network support required during MD event	
			MW @ PF = 1	MWh
2021/22	14	18	14	124
2022/23	14	19	14	126
2023/24	14	20	14	129
2024/25	15	21	15	132
2025/26	15	22	15	134
2026/27	15	24	15	136
2027/28	15	25	15	138
2028/29	16	27	16	141
2029/30	16	29	16	144

Table 6: Load at risk and non-network support requirements

If non-network options are able to reduce the load by more than this minimum amount under an N-1 scenario, then the level of risk mitigation is likely to be higher.

7.2 Power system security, reliability and fault levels

A non-network option must be capable of reliably meeting electricity demand 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 a rotating or inverter-based generator operating in parallel with AusNet Services’ 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](#).

7.3 Timing and operating profile

A non-network option would need to be agreed by 30 November 2021 in order to defer the adoption of a network solution. AusNet Services’ expectation is that a non-network solution would be required for a minimum of five (5) years, although the duration of the service would be subject to negotiation.

A non-network option must, as a minimum, be capable of reducing network loading or increasing network capacity in the TT supply area during the months of December to March (summer period). For each day during this period, the network load reduction or increase in network capacity would be required over the evening period, typically 5 pm to 8 pm (AEST), as shown in Figure 6.

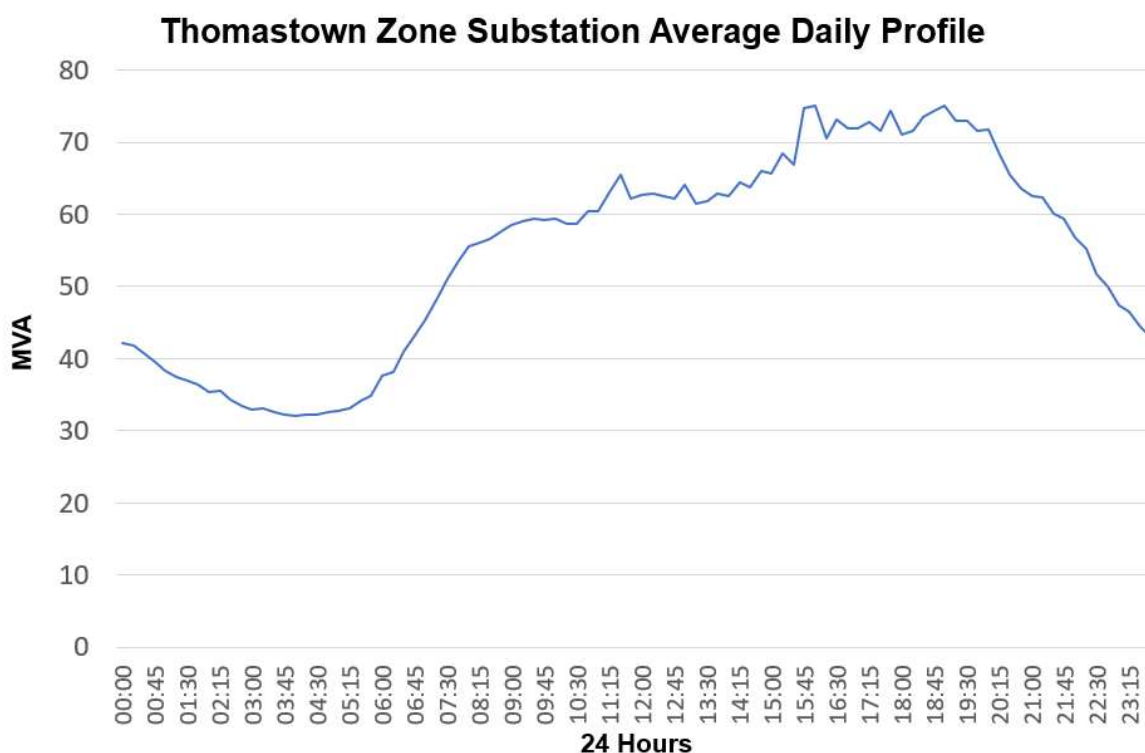


Figure 6: Average 24-hour Demand Profile, Showing Timing of Peak Demand

The maximum duration of non-network support required over a day can be up to four consecutive hours per day. The non-network solution will need to be capable of operating

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continuously during these periods on consecutive days, to cater to peak demands until the faulted asset is repaired or replaced, and full N-rated capacity is restored at the zone substation.

7.4 Guidance on potentially feasible options

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

- New embedded generation;
- Existing customer generation and load curtailment (firm demand management); and
- Embedded energy storage systems.

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.

7.5 Data requirements from non-network service providers

Non-network service providers interested in alleviating the network constraints outlined above are advised to begin engagement with AusNet Services 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.

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- 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.
- 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 Services' 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>

7.6 Potential payments to non-network proponents

As already noted, the maximum amount that AusNet Services would be willing to pay for a non-network solution would depend on the value that it provides in terms of risk reduction. The actual payment to a non-network proponent will be subject to negotiation.

Provisional analysis indicates that Option 5 is the preferred network option. If this option could be deferred *entirely* by engaging a non-network solution, the total capital expenditure of approximately \$16.20 million could be deferred. The approximate maximum annual payment that would be available to a non-network proponent to defer this expenditure would be in the region of \$1.1 million per annum. This calculation assumes a 45 year asset life, an operating expenditure allowance of 1% of the avoided network capital expenditure, and a cost of capital of 5.9% (real).

It should be emphasised, however, that the actual payment for a non-network solution may be lower than this maximum available amount, due to the aforementioned factors of availability, capacity, dispatch duration and firmness of response provided by the non-network solution.

8 Next steps

The assessment outlined in this report shows that the service level risk to customers supplied from TT Zone Substation is forecast to grow to unacceptable levels within the 2021-25 EDPR period.

The forecast increase in service level risk is driven by increasing supply and non-supply (safety, environmental, collateral damage and reactive replacement) risk due to deterioration in the condition of zone substation assets, resulting in an increasing likelihood of asset failure. AusNet Services considers that one of the credible options outlined in this report, or an alternative non-network option will be required to address the identified need.

8.1 Request for submissions

AusNet Services invites written submissions, on the matters set out in this non-network options 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:

Fuji Dinh
Senior Engineer – Strategic Network Planning
AusNet Services
Email: ritdconsultations@ausnetservices.com.au

Submissions are due on or before 21 July 2021.

Submissions will be published on AusNet Services' website. 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 conclusion of the non-network options report consultation period, AusNet Services will, having regard to any submissions received on this non-network options report, prepare and publish a draft project assessment report (DPAR) including:

- A summary of, and commentary on, any submissions on the non-network options report.
- 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 Services expects to publish the DPAR by Q3 2021.