Regulatory Investment Test for Distribution (RIT-D)

Reliability Corrective Action
The Jimboomba – North Maclean Network Area

Final Project Assessment Report

12 December 2025

energex
Part of Energy Queensland

INTRODUCTION

Purpose

The National Electricity Rules (NER) require that, subject to certain exclusions, distribution network service providers who are looking to address an identified need, by investing in the network, must apply the regulatory investment test for distribution (RIT-D). This Final Project Assessment Report (FPAR) has been prepared by Energex Limited (Energex) in accordance with the requirements of clause 5.17.4(r) of the NER and is published in accordance with 5.17.4(o) of the NER.

In preparing this FPAR, Energex is required to consider reasonable future scenarios. With respect to major customer loads and generation, Energex has included as much detail as possible while maintaining necessary customer confidentiality. Potential large future connections that Energex is aware of are in different stages of progress and are subject to change (including outcomes where none or all proceed). These and other customer activity can occur over the consultation period and may change the timing and/or scope of any proposed solutions.

About Energex

Energex Limited (Energex) is a subsidiary of Energy Queensland Limited and manages the electricity distribution network in the growing region of South East Queensland which includes the major urban areas of Brisbane, Gold Coast, Sunshine Coast, Logan, Ipswich, Redlands and Moreton Bay. Our electricity distribution area runs from the NSW border north to Gympie and west to the base of the Great Dividing Range.

Our electricity network consists of approximately 57,000 kilometres of powerlines and 450,000 power poles, along with associated infrastructure such as major substations and power transformers.

Today, we provide distribution services to more than 1.5 million domestic and business connections, delivering electricity to a population base of around 4 million people.

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1.1 Existing supply arrangement

1.1.1 Geographic Region

Jimboomba 110/33kV Bulk Supply substation (SSJBB BS) is located approximately 38km south of Brisbane CBD, it supplies three zone substations via 33kV feeders: North Maclean (SSNMC), Jimboomba (SSJBB) and Logan Village (SSLGV). Jimboomba bulk supply substation provides electricity supply to approximately 26,000 predominantly residential customers in the Jimboomba, South Maclean, Tamborine, Cedar Grove, Kagaru, North Maclean, Greenbank, New Beith, Logan Village, Yarrabilba and Flagstone areas.

Browns Plains 110/33kV bulk supply substation (SSBPN BS) is located approximately 21km south of Brisbane CBD, it supplies four zone substations via 33kV feeders: Heathwood (SSHWD), Crestmead (SSCRM), Browns Plains (SSBPN) and North Maclean (SSNMC). Browns Plains bulk supply substation provides electricity supply to approximately 38,000 predominantly residential customers in the Crestmead, Heritage Park, Browns Plain, Boronia Heights, Forestdale, Hilcrest, Regent Park and Heathwood areas.

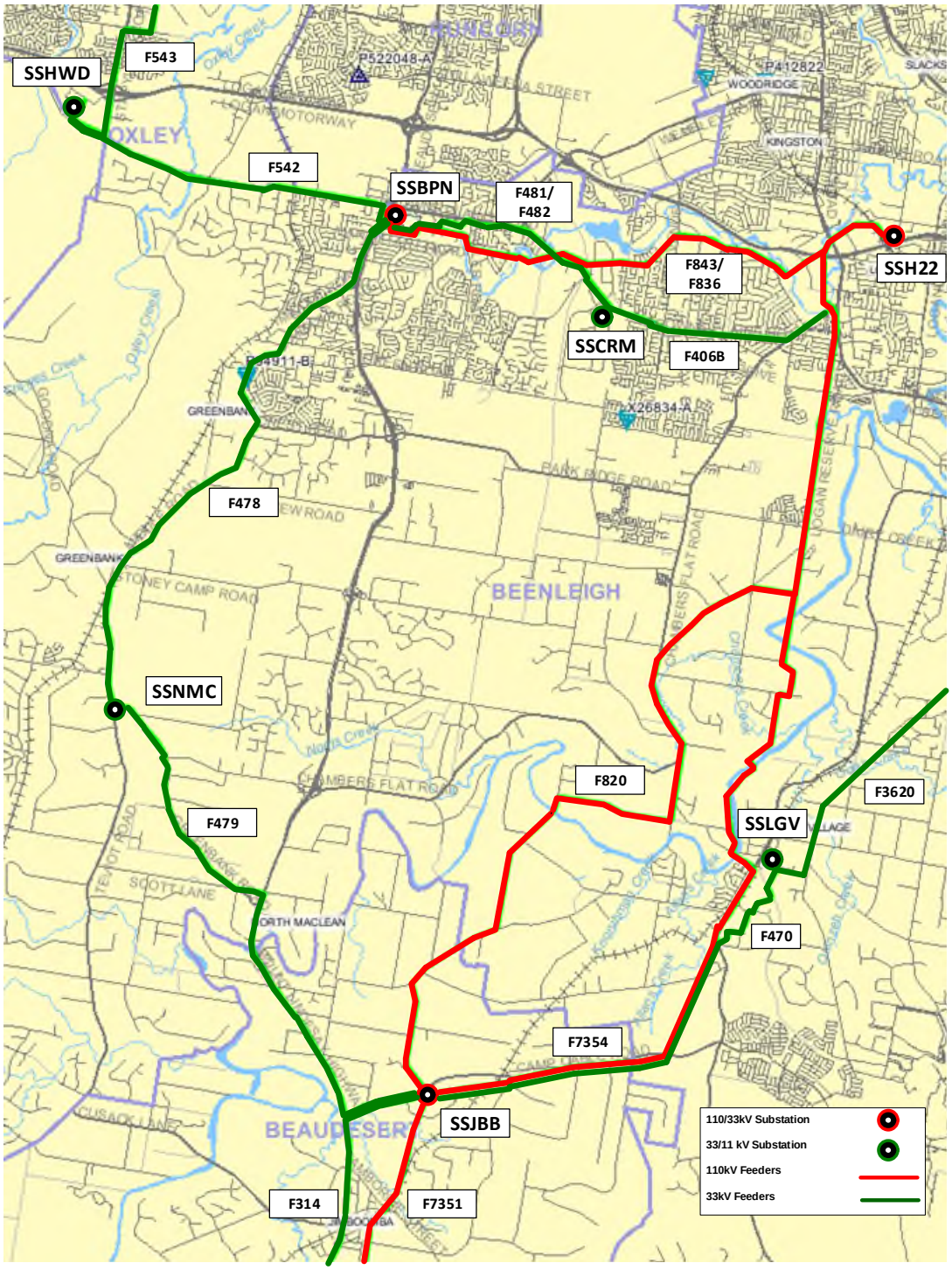


Figure 1: Existing network arrangement (geographic view)

1.1.2 Overview of Existing System

Jimboomba Bulk Supply substation (SSJBB BS) is equipped with one 80 MVA, 110/33 kV transformer (TR7), two 33 kV buses comprising seven circuit breakers and one 110 kV bus comprising four 110 kV circuit breakers. It supplies North Maclean (SSNMC), Jimboomba (SSJBB) and Logan Village (SSLGV) zone substations via 33 kV feeders. The peak load at Jimboomba bulk supply has exceeded the transformer capacity in recent years and has been managed by transferring part of SSNMC to Browns Plain (SSBPN BS) bulk supply via 33 kV feeder F478. The peak load was 85.1 MVA in 2024/25 with the transfers effected.

Jimboomba zone substation has two indoor 33 kV and 11 kV bus arrangement and one 15 MVA, 33/11 kV transformer and one 25 MVA, 33/11kV transformer. The 2 x 11 kV bus has seven (7) active feeders which supply a total of approximately 10,000 residential, industrial and commercial customers, with a peak of 37.8 MVA in 2024/25.

North Maclean has two indoor 33kV and 11kV bus arrangement and two 25 MVA, 33/11kV transformers. The 2 x 11kV bus has eight (8) active feeders which supply a total of approximately 13,500 residential, industrial and commercial customers, with a peak of 44.9 MVA in 2024/25.

Browns Plain bulk supply substation (SSBPN BS) is equipped with one 120 MVA, 110/33 kV transformer (TR6), one 80 MVA, 110/33kV transformer (TR5), four 33 kV buses comprising 19 circuit breakers and two 110kV circuit breakers. It supplies Heathwood (SSHWD), Crestmead (SSCRM), Browns Plains (SSBPN) and part of North Maclean (SSNMC) zone substations via 33 kV feeders. The peak load at SSBPN was 183.4 MVA in 2024/25 including part of SSNMC substation load.

A schematic view of the existing sub-transmission network arrangement is shown in Figure 2.

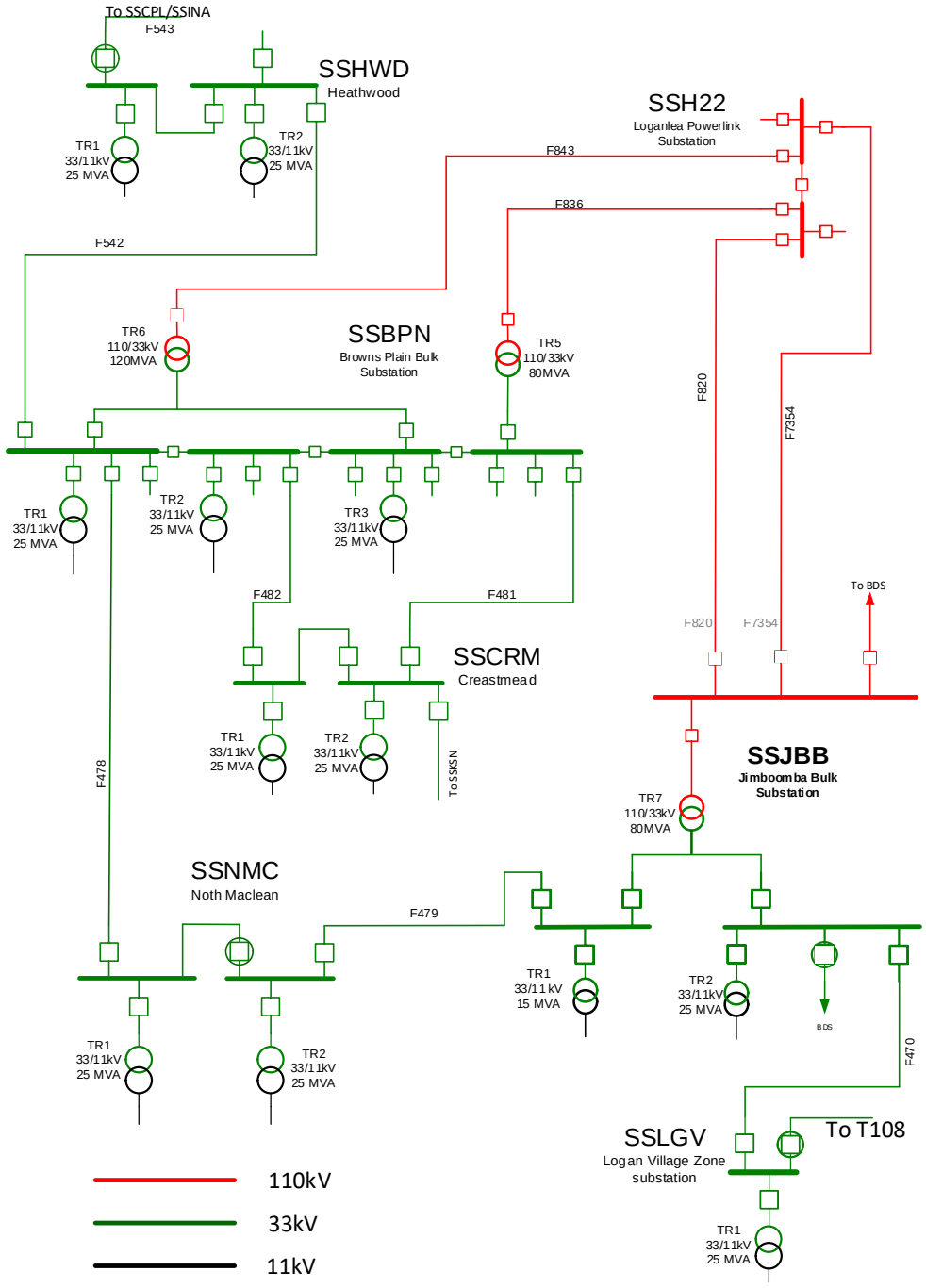


Figure 2: Existing network arrangement (schematic view)

1.2 Size of load reduction or additional supply

To meet Energex's ongoing operational needs, it is expected that any solution must provide capacity or demand reduction to the distribution network up to the values listed in the table below.

As measured at Jimboomba zone substation 11kV bus:

Year	Dispatch within 30 minutes any time of the year following a contingency (N 1)		
	Forecast required capacity (MVA)	Estimated number of days where capacity may be requested following a contingency	Estimated number of hours where capacity may be required per 24 hour period
2029	6.7	3	6
2030	6.8	3	6
2031	7.0	3	6
2032	7.3	3	6
2033	7.6	3	6
2034	8.1	3	6
2035	8.8	3	6

As measured at North Maclean zone substation 11kV bus:

Year	Dispatch within 30 minutes during peak load seasons (between 1st December and 30th May)		
	Forecast required capacity (MVA)	Estimated number of days where capacity may be requested	Estimated number of hours where capacity may be required per 24 hour period
2029	11.4	12	6
2030	24.1	37	6
2031	30.2	60	6
2032	34.8	78	7
2033	36.2	85	7
2034	38.2	95	8
2035	40.6	105	8

Year	Dispatch within 30 minutes any time of the year following a contingency (N 1)		
	Forecast required capacity (MVA)	Estimated number of days where capacity may be requested following a contingency	Estimated number of hours where capacity may be required per 24 hour period
2029	16.7	3	6
2030	27.6	3	6
2031	32.8	3	6
2032	36.7	3	7
2033	38.0	3	7
2034	39.7	3	8
2035	41.7	3	8

As measured at Jimboomba bulk supply substation 33kV bus:

Year	Dispatch within 30 minutes during peak load seasons (between 1st December and 30th May)		
	Forecast required capacity (MVA)	Estimated number of days where capacity may be requested	Estimated number of hours where capacity may be required per 24 hour period
2029	17.0	6	6
2030	29.4	19	7
2031	35.8	30	7
2032	39.8	39	8
2033	40.9	41	8
2034	42.5	43	8
2035	44.5	46	8

Year	Dispatch within 30 minutes any time of the year following a contingency (N 1)		
	Forecast required capacity (MVA)	Estimated number of days where capacity may be requested following a contingency	Estimated number of hours where capacity may be required per 24 hour period
2029	30.1	3	24
2030	41.7	3	24
2031	48.3	3	24
2032	53.0	3	24
2033	55.0	3	24
2034	57.9	3	24
2035	62.8	3	24

As measured at Browns Plains bulk supply substation 33kV bus:

Year	Dispatch within 30 minutes any time of the year following a contingency (N 1)		
	Forecast required capacity (MVA)	Estimated number of days where capacity may be requested following a contingency	Estimated number of hours where capacity may be required per 24 hour period
2029	20.7	3	6
2030	20.8	3	6
2031	21.3	3	6
2032	22.4	3	6
2033	23.4	3	6
2034	26.0	3	6
2035	29.5	3	6

1.3 Location

As detailed above, the location where network support and load restoration capability will be measured / referenced is on the 11kV bus at Jimboomba and North Maclean Zone Substations and 33kV bus at Jimboomba and Browns Plains Bulk Supply Substation; however alternative options may be located downstream of the reference buses.

1.4 Contribution to power system security or reliability

The solution needs to assist Energex in complying with the safety net targets as required under its Distribution Authority to provide the level of security and reliability required. The solution must be available for the full duration required when called upon.

1.5 Contribution to power system fault levels

The solution must consider the fault level contribution to the network and include any mitigation works that are required due to a change in fault level. The maximum fault level on 11kV and 33kV network should not exceed 13.1kA and 25kA, respectively.

1.6 Operating profile

Refer to Section 1.2 and Appendix C for further information.

1.7 Forecast

The 10 PoE and 50 PoE load forecasts for the base case load growth scenario for Jimboomba zone substation, North Maclean zone substation, Jimboomba bulk supply substation and Browns Plains bulk supply substation are illustrated in Figure 3, Figure 4, Figure 5 and Figure 6. The historical peak load for the past six years has also been included in the graph.

It should be noted that 4 MVA load is proposed to be transferred from SSJBB to SSLGV in 2028. Significant load growth is expected at SSNMC and SSJBB BS mainly due to proposed new customer connections in the Flagstone PDA starting from 2025 to 2030.

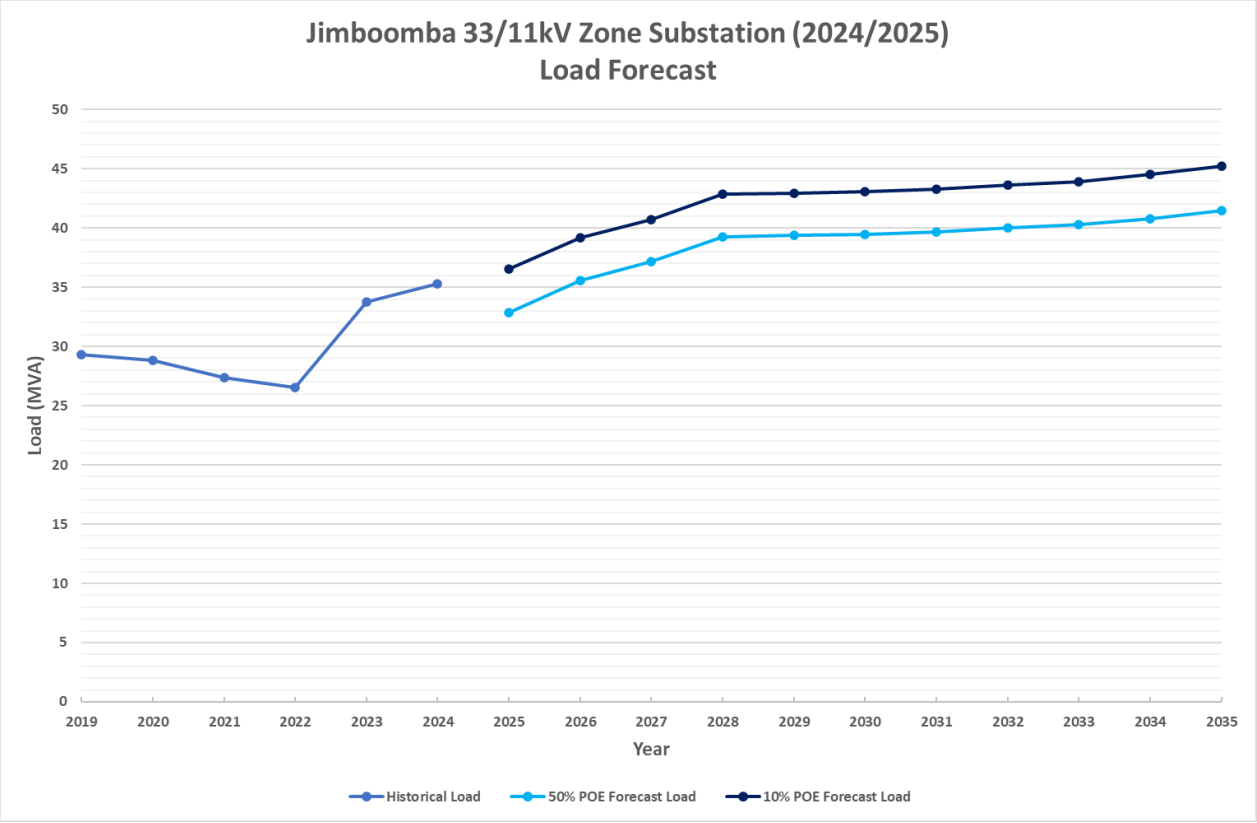


Figure 3: Jimboomba Zone Substation load forecast

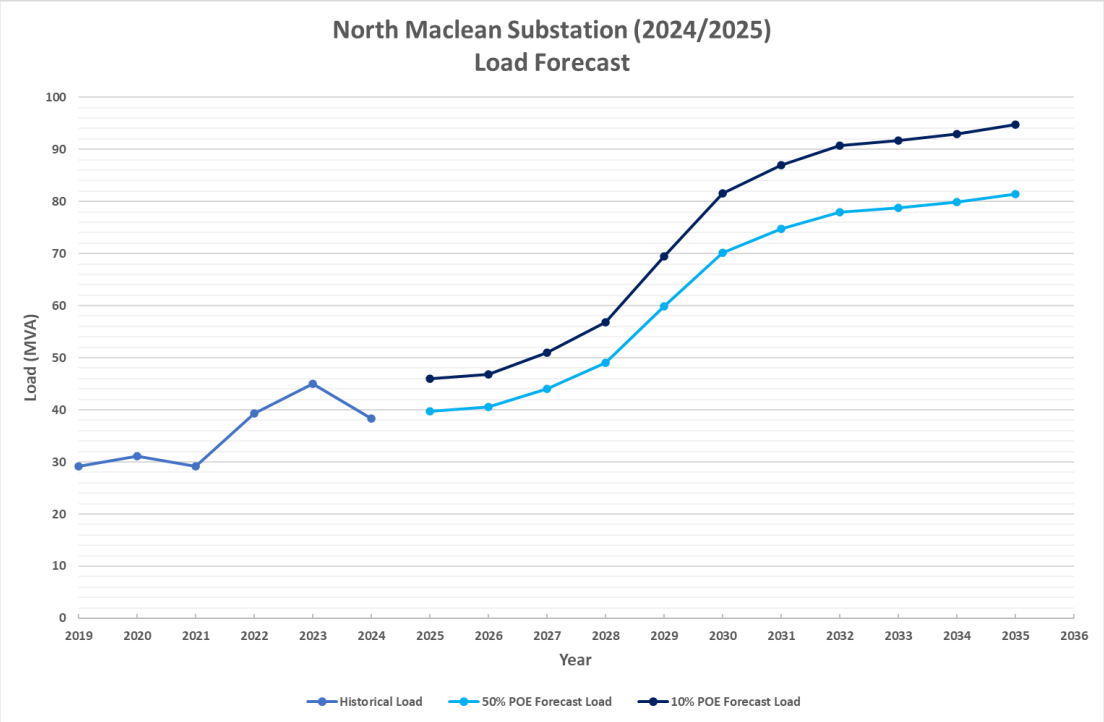


Figure 4: North Maclean Substation load forecast

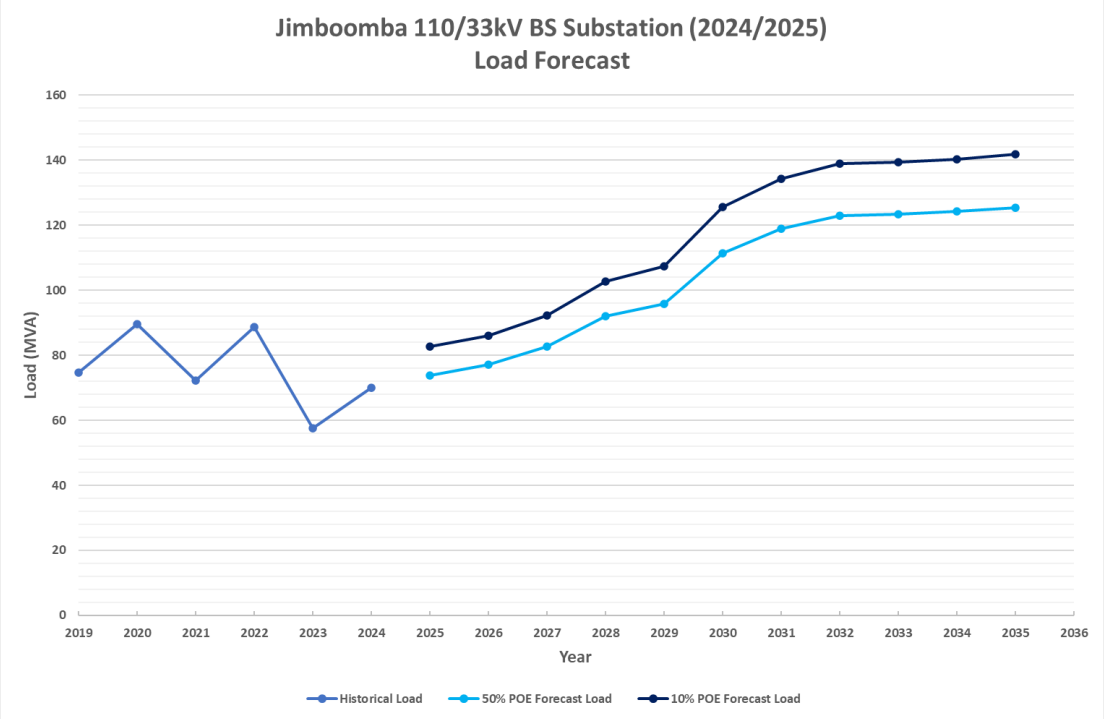


Figure 5: Jimboomba Bulk Supply Substation load forecast

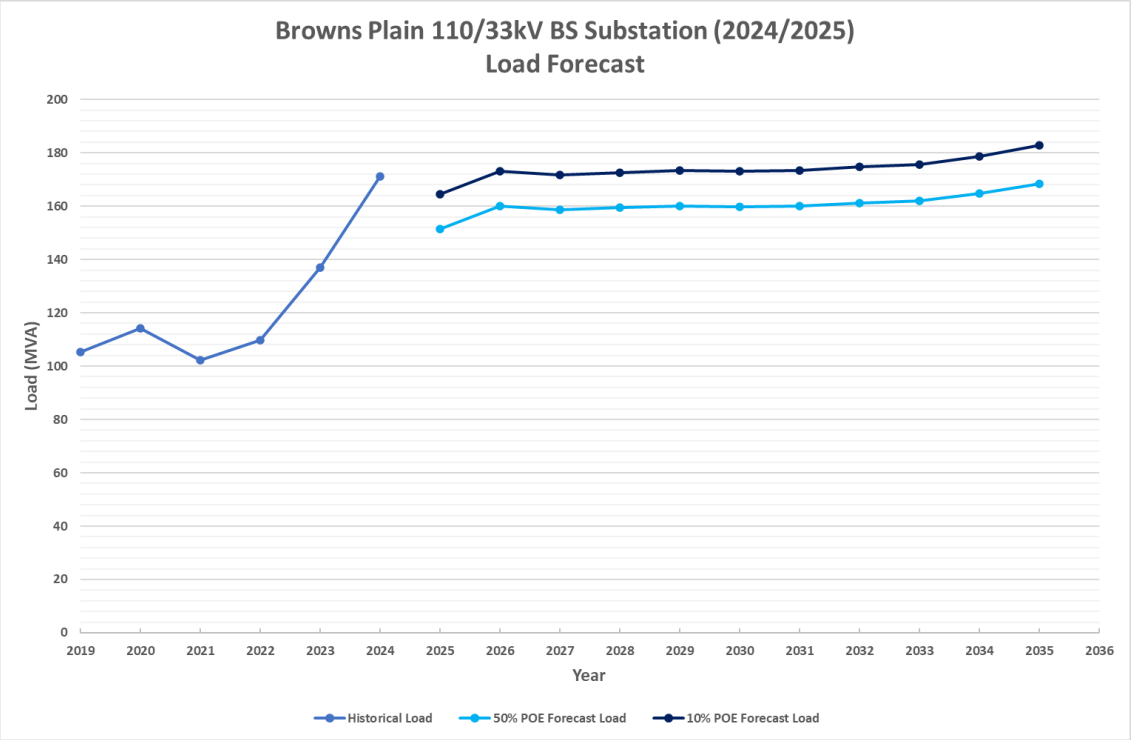


Figure 6: Browns Plains Supply Substation load forecast

2 IDENTIFIED NEED

Energex's has identified that the load at North Maclean zone substation and Jimboomba Bulk Supply substation will exceed their capacities in the coming years.

Jimboomba zone substation and North Maclean zone substation currently supplies the Greater Flagstone Priority Development Area (PDA), located west of Jimboomba and Mount Lindsay Highway. The Greater Flagstone PDA is one of the largest urban growth areas in Australia, covering an area of 7,188 hectares, it will potentially develop to have over 50,000 dwellings to house a population of 138,000 people as stated by the Queensland Government.

The identified need is for reliability corrective action to ensure that reliability of supply and service obligations are maintained to customers in the Jimboomba and North Maclean network area. Under applicable regulatory instruments, Energex is required to connect new customers and maintain the reliability of supply to these customers. To ensure that Energex can continue to meet these requirements, reliability corrective action is required by 2029. If this does not occur Energex estimates the probability of failure to comply with regulatory requirements is deemed to have reached unacceptably high levels.

Investment in Energex's network is required to continue to meet the following service standards and regulatory requirements.

- National Energy Retail Law (Queensland) – Under Part 3, Division 2, Energex has an obligation to provide customers connection service for the premises of a customer who requests those services to be connected to the distribution system.
- Energex's Distribution Authority issued under the *Electricity Act 1994* – Under Clause 10, Energex is required to design, plan and operate its network to meet the service safety net, which aims to mitigate the risk of low probability-high consequence network outages to avoid unexpected customer hardship and/or significant community or economic disruption. The safety net has specific outage restoration timeframe targets that Energex is required to achieve. Details of the safety net targets are shown in Appendix B.

If Energex did not invest to address this identified need, it may result in a breach of these regulatory obligations, due to:

- Insufficient capacities at Jimboomba bulk supply substation (SSJBB BS) and North Maclean zone substation (SSNMC), which limits Energex's ability to connect new customers to the distribution system. This will place Energex in breach of the National Energy Retail Law (Queensland) Part 3, Division 2.
- The failure of a transformer at SSJBB BS can result in approximately 23,000 customers without power and supply cannot be restored within the timeframes stipulated under the safety net targets in the Distribution Authority.
- The failure of a transformer at SSNMC can result in approximately 6,000 customers without power and supply cannot be restored within the timeframes stipulated under the safety net targets in the Distribution Authority.

Therefore, Energex considers that reliability corrective actions in the Jimboomba and North Maclean area are necessary.

2.1 Associated Relevant Annual Deferred Augmentation Charge

A present value analysis of the costs associated with the preferred option show that there is a saving of approximately $1.5 million for each year the proposed augmentation cost is deferred.

3 SUBMISSIONS ON THE DRAFT PROJECT ASSESSMENT REPORT

The Draft Project Assessment Report was published on 24th October 2025 and the consultation period concluded on 5th December 2025. No submissions were received.

4 CREDIBLE OPTIONS

4.1 Credible Options Identified

Energex has considered all options that could reasonably be classified as a credible option without bias to energy source, technology, ownership and whether it is a network option, a non-network option or a SAPS option.

Energex has identified the following potential credible options that are commercially and technically feasible and can be implemented in an appropriate timeframe to address the identified need. All costs and benefits for each credible option have been measured against a 'business as usual' base case.

4.1.1 Option A: Establish Jimboomba West (SSJBW) Zone Substation, Install 2nd 110/33kV Transformer & Replace 33kV bus at SSJBB BS and Establish Jimboomba North Zone Substation

This option involves:

Jimboomba West zone substation (SSJBW) works:

- Establish new Jimboomba West zone substation with two 33/11kV 25MVA transformers, 33kV buses and 11kV buses.
- Utilise existing 33kV feeder energised at 11kV (JBB15B) as 33kV feeder between SSJBW and P552312-B. Construct a new section of 33kV feeder and connect to existing 33kV feeder F314 (Tee connection).
- Utilise existing 33kV feeder energised at 11kV (NMC13A) as 33kV feeder between NMC and P2052491.
- Install cable tails for the 33kV feeders into SSJBW.
- Establish new 11kV feeders from SSJBW.

Jimboomba bulk supply substation (SSJBB BS) works:

- Extend substation yard, electric perimeter fence and earth grid to suit new installations.
- Install 2 new 110kV circuit breakers and reconfigure existing 110kV bus configuration.
- Install 33kV switchgear with 4 x 2000A transformer CBs, 12 x 1250A transformer/feeder CBs, 2 x 2000A feeder CBs and 1 x 2000A bus section CB.
- Install a new 120 MVA, 110/33kV transformer with 33kV NEX.
- Cutover 33kV feeders, 33/11kV transformers and 110/33 transformer to new switchboard.
- Recover existing 33kV switchgear in Modular 1 and Modular 2 for spares.
- Cutover protection panels to new switchboard.

North Maclean zone substation (SSNMC) works:

- Install 33kV cable tail for 33kV feeder NMC – JBW currently energise at 11kV.

Jimboomba North zone substation works: (requirement depending on customer load)

- Establish new Jimboomba North zone substation with two 33/11kV 25MVA transformers, single 33kV bus and 11kV bus.
- Establish two 33kV feeders from Jimboomba bulk supply substation to Jimboomba North zone substation.
- Establish new 11kV feeders from Jimboomba North zone substation.

A schematic diagram of the proposed network arrangement for Option A is shown in Figure 7.

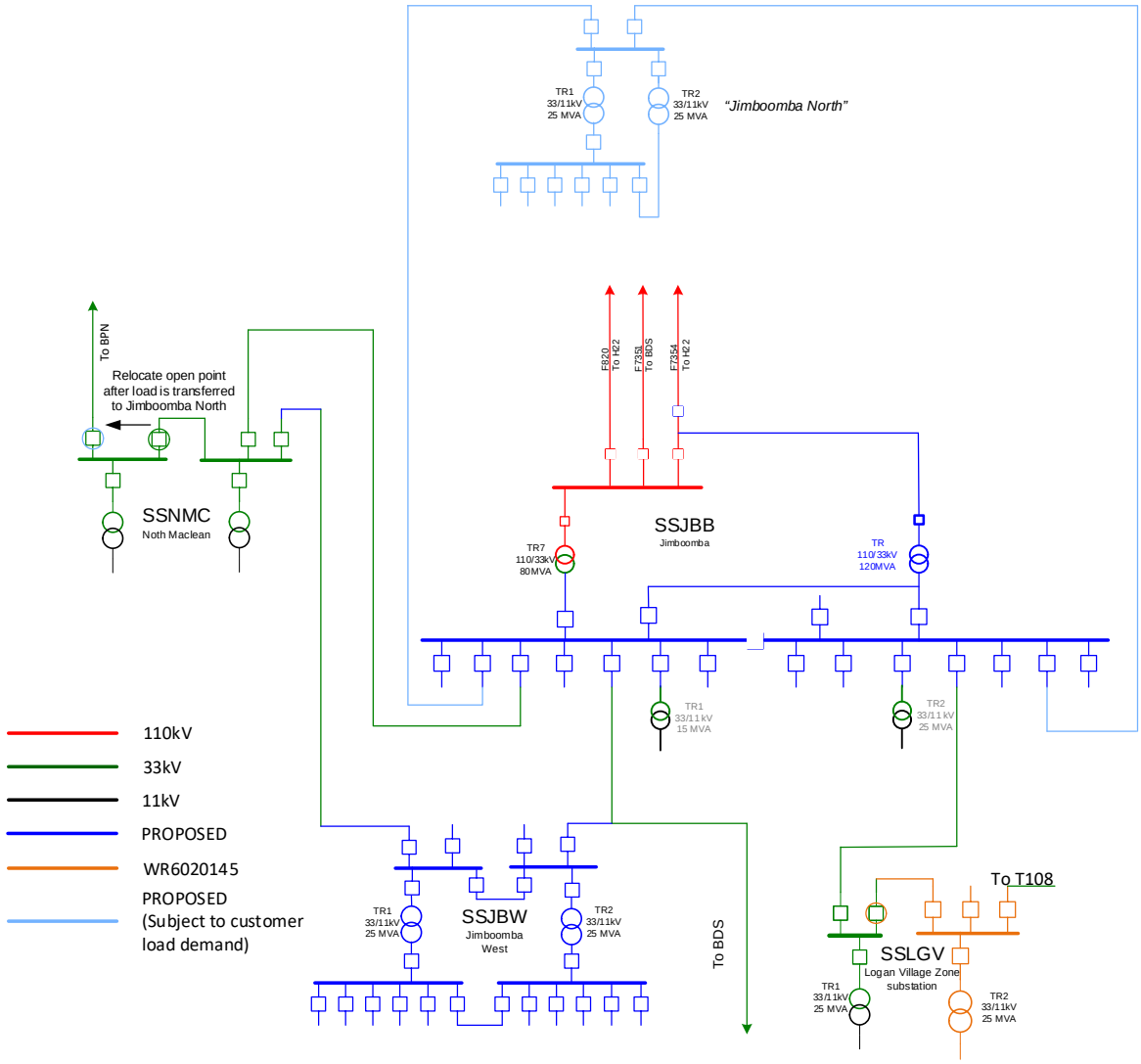


Figure 7: Option A proposed network arrangement (schematic view)

This option is commercially and technically feasible, can be implemented in the timeframe identified and would address the identified need by providing additional capacity to the Jimboomba area, which enables Energex to connect new customers to the distribution network. This will enable Energex to meet the reliability and security requirements as stipulated in the safety net targets of Energex's Distribution Authority.

The estimated capital cost of this option would be $42.7 million, excluding the cost of the Jimboomba North substation (due to it being dependent on load development at a customer facility). The estimated operating costs of this option would be $60,000 a year. The estimated delivery timeline of this option would be staged between 2029-2030.

The estimated construction timetable is:

- Construction start: 2027
- Commissioning: 2029-2030

The estimated costs comprise the following components:

- financial costs incurred in constructing or providing the credible option (including early engagement on the potential connection requirements and costs of each option)
- other operating and maintenance costs during the assessment period; and
- costs of complying with relevant laws, regulations and administrative requirements

Community consultations will be held at the early stage of implementation. Currently, there are not expected to be any social licence issues that would require additional costs to manage or increase the delivery timeline of this option. This is due to the scope of works at SSJBB and SSNMC being contained within the existing sites, and the feeders to the new SSJBW are mostly existing feeders energised at 11kV. New feeders proposed are along road reserve and new substation site for SSJBW has been acquired. The potential Jimboomba North zone substation will be located in an industrial estate in consultation with the developer. In addition, there are also reliability and economic benefits of this option to the local community.

4.1.2 Option B: Install 80 MVA 110/33kV Transformer & 110kV GIS at SSBPN, Upgrade 110kV Feeders F843/F836, Establish Jimboomba West (SSJBW) Zone Substation, Replace 33kV bus at SSJBB BS, Establish new SSJBB-SSBDS 33kV feeder, Establish Jimboomba North Zone Substation

This option involves:

Browns Plains bulk supply substation works:

- Extend substation yard, electric perimeter fence and earth grid to suit new installations.
- Install 6 x 110kV outdoor circuit breakers comprising 2 x 110kV feeder CB, 3 x 110kV transformer CB and 1 x 110kV bus section CB.
- Install standard 80 MVA, 110/33kV transformer with 33kV NEX.
- Upgrade 110kV feeders F843/F836 between SSBPN and SSH22 for summer normal cyclic rating of 240 MVA.

Jimboomba West zone substation works:

- Establish new Jimboomba West zone substation with two 33/11kV 25MVA transformers, 33kV buses and 11kV buses.
- Utilise existing 33kV feeder energised at 11kV (JBB15B) as 33kV feeder between SSJBW and P552312-B. Construct a new section of 33kV feeder and connect to existing 33kV feeder F314 (Tee connection).
- Utilise existing 33kV feeder energised at 11kV (NMC13A) as 33kV feeder between NMC and P2052491.
- Establish new 11kV feeders from SSJBW.

Jimboomba bulk supply substation works:

- Install 33kV switchgear modular building (or equivalent) consist of 4 x 2000A transformer CBs, 12 x 1250A transformer/feeder CBs, 2 x 2000A feeder CBs and 1 x 2000A bus section CB.
- Cutover 33kV feeders, 33/11kV transformers to new switchboard.
- Connect new Jimboomba to Beaudesert 33kV feeder to the new switchboard.
- Recover existing 33kV switchgear in Modular 1 and Modular 2 for spares.

New 33kV Feeder from Jimboomba to Beaudesert (SSJBB - SSBDS)

- Establish a new 33kV feeder from SSJBB to SSBDS.

Beaudesert bulk supply substation works:

- Connect new Jimboomba to Beaudesert 33kV feeder to spare 33kV CB.

33kV Feeder F3620 (SSLGV – SST108) works:

- Upgrade F3620 to supply SSLGV load from SST108 Beenleigh BS.

North Maclean zone substation (SSNMC) works:

- Revise protection for new JBB-NMC-JBW 33kV feeder.

Jimboomba North zone substation works: (requirement depending on customer load)

- Establish new Jimboomba North zone substation with two 33/11kV 25MVA transformers, single 33kV bus and 11kV bus.
- Establish two 33kV feeders from Jimboomba bulk supply substation to Jimboomba North zone substation.
- Establish new 11kV feeders from Jimboomba North zone substation.

A schematic diagram with the proposed network arrangement for Option B is shown in Figure 8.

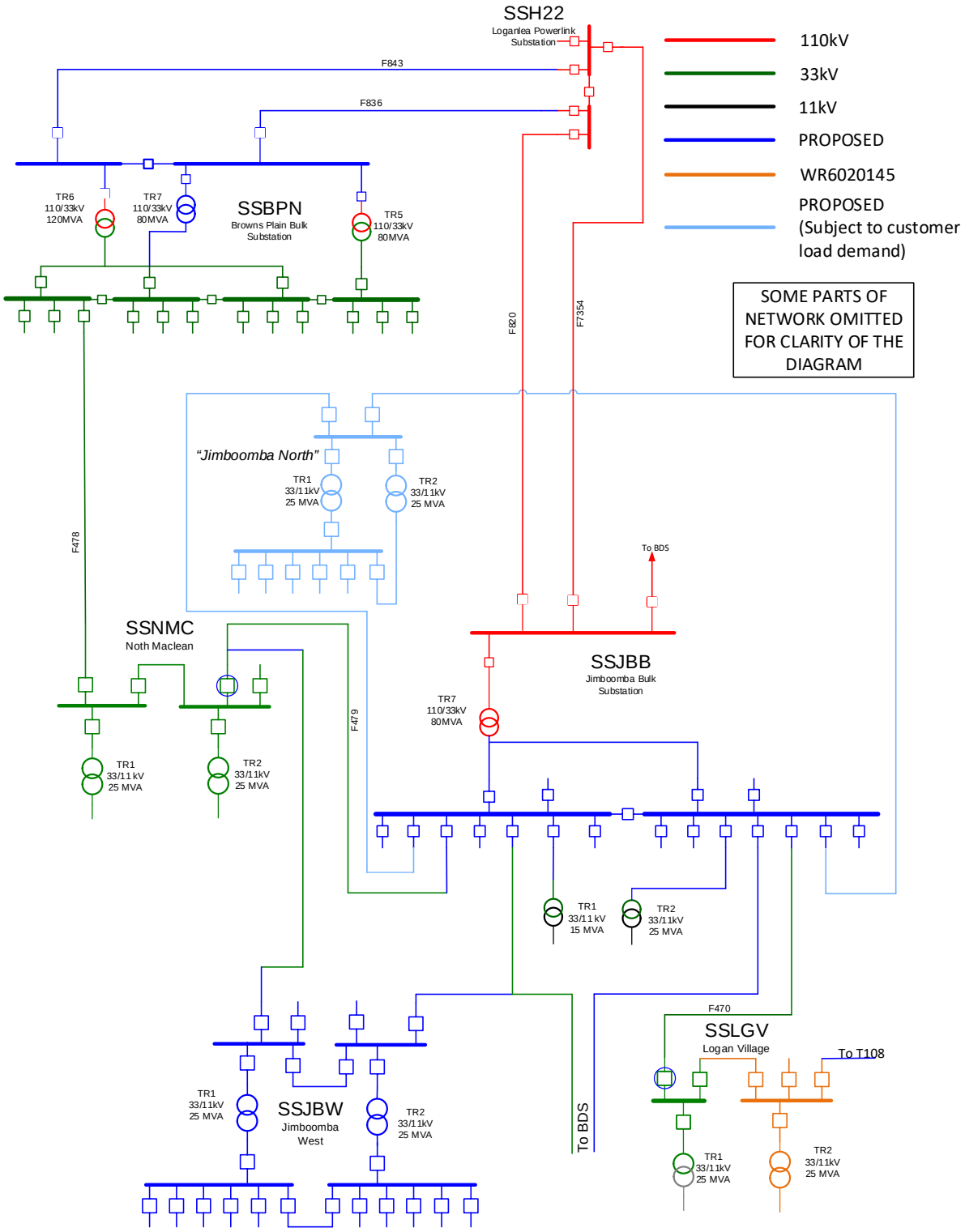


Figure 8: Option B proposed network arrangement (schematic view)

This option is commercially and technically feasible, can be implemented in the timeframe identified and would address the identified need by increasing capacity at the Browns Plains and Jimboomba areas, which enables Energex to connect new customers to the distribution network. This will enable Energex to meet the reliability requirements as stipulated in the safety net targets of Energex's Distribution Authority.

The estimated capital cost of this option would be $67.4 million, excluding the cost of the Jimboomba North substation (due to it being dependent on load development at a customer facility). The estimated operating costs of this option would be $70,000 a year. The estimated delivery timeline of this option is staged between 2029-2030.

The estimated construction timetable is:

- Construction start: 2027
- Commissioning: 2029-2030

The estimated costs comprise the following components:

- financial costs incurred in constructing or providing the credible option (including early engagement on the potential connection requirements and costs of each option)
- other operating and maintenance costs during the assessment period; and
- costs of complying with relevant laws, regulations and administrative requirements

Community consultations will be held at the early stage of implementation. Currently, there are not expected to be any social licence issues that would require additional costs to manage or increase the delivery timeline of this option. This is due to the scope of works at SSBPN, SSJBB and SSNMC being contained within the existing sites, and the feeders to the new SSJBW are mostly existing feeders energised at 11kV. New feeders proposed are along road reserve and new substation site for SSJBW has been acquired. The potential Jimboomba North zone substation will be located in an industrial estate in consultation with the developer. In addition, there are also reliability and economic benefits of this option to the local community.

5 QUANTIFICATION OF MARKET BENEFITS FOR EACH CREDIBLE OPTION

Energex has analysed the following classes of market benefits.

5.1 Changes in Voluntary Load Curtailment

There are no customers on voluntary load curtailment agreements in the study area, therefore, Energex has determined that there will be no material change in this class of market benefit for any of the potential credible options.

5.2 Changes in Involuntary load shedding and Customer Interruptions

Involuntary load shedding is where a customer's load is interrupted from the network without their agreement or prior warning. Energex has forecast load over the assessment period and has quantified the expected unserved energy by comparing forecast load to network capabilities under system normal and network outage conditions. A reduction in involuntary load shedding expected from an option, relative to the base case, results in a positive contribution to the market benefits of the credible option being assessed.

Involuntary load shedding of a credible option is derived by the quantity in kWh of involuntary load shedding required assuming the credible option is completed multiplied by the Value of Customer Reliability (VCR). The VCR is measured in dollars per kWh and is used as a proxy to evaluate the economic impact of unserved energy on customers under the RIT-D.

Customer export Curtailment value (CECV) represents the detriment to all customers from the curtailment of DER export (e.g. rooftop solar PV systems). A reduction in curtailment due to implementing a credible option result in a positive contribution to the market benefits of that option. These benefits have been calculated according to the AER CECV methodology based on the capacity of DER currently installed and forecast to be installed within the study area.

5.3 Changes in Costs for Other Parties

Energex has determined that there will be no material change in costs incurred by other parties due to any of the potential credible options.

5.4 Differences in the Timing of Expenditure

The potential credible options included in this RIT-D assessment are not expected to affect the timing of other distribution investments for unrelated identified needs. Energex has determined that there will be no material change in this class of market benefit for any of the potential credible options.

5.5 Changes in load transfer capacity and the capacity of distribution connected units to take up load

The potential credible options included in this RIT-D assessment will increase the load transfer capacity in the Jimboomba-North Maclean distribution network as well as increasing the hosting

capacity for distribution connected embedded generators. The market benefits gained from increased load transfer capability and/or the ability of embedded generators to take up load is treated in the same way as changes in involuntary load shedding and customer interruptions.

5.6 Additional Option Value

Energex has not identified any additional option value that would result in a material change in market benefit.

5.7 Changes in Electrical Energy Losses

Energex anticipates that the credible options included in the RIT-D assessment will reduce electrical energy losses, however, the reduction is not significant enough to result in a material change in market benefit.

5.8 Changes in Australia's Greenhouse Gas Emissions

Energex has determined that the change in Australia's greenhouse gas emissions for any of the potential credible options do not result in a material change in market benefit.

6 NPV ANALYSIS OF EACH CREDIBLE OPTION

This section outlines the methodology applied in assessing the market benefits and costs associated with each potential credible option.

The RIT-D requires Energex to identify the credible option that maximises the present value of net economic benefit to all who produce, consume and transport electricity in the National Electricity Market. Accordingly, a base case Net Present Value (NPV) comparison of the potential credible options has been undertaken. A sensitivity analysis was then conducted to establish the option that remained the lowest cost option in the scenarios considered.

6.1 Overview of Analysis Framework

All costs and benefits for each credible option have been measured against a 'business as usual' base case. Under this base case, Energex would not be compliant with its requirements under applicable regulatory instruments. The base case is therefore not a realistic state of the world.

The RIT-D analysis has been undertaken over a 15-year period, from 2025 to 2040. Energex considers this period is appropriate as it takes into account the size, complexity and forecast growth of the area to provide a reasonable indication of the market benefits and costs of the options.

Where the capital components of the credible options have asset lives greater than 15 years, Energex has taken a terminal value approach to incorporate capital costs in the assessment, which ensures that the capital cost of long-lived options is appropriately captured in the 15 year assessment period. The terminal value has been calculated as the undepreciated value of capital costs at the end of the analysis period.

Energex has adopted a real, pre-tax discount rate of 3.69% as the central assumption for the NPV analysis, this aligns with the latest AER Final Decision for a Distribution Network Service Provider's (DNSP's) regulated weighted average cost of capital (WACC) at the time of preparing this FPAR. To test the results against variations in the discount rate, an upper value sensitivity of 4.69% and a lower value sensitivity of 2.69% have been adopted for this RIT-D.

6.2 Estimating the Costs of each Potential Credible Option

Energex uses a combination of comparative and standard cost estimating methodologies, underpinned by a bottom-up approach as the basis for the estimation process of individual projects, which provides the platform for the development of forecast capital and operating expenditure.

Standard cost estimation forms the basis of typical larger, lower volume high complexity type network projects. With this approach, the most common network configurations associated with transmission, sub-transmission and distribution project types or components are catered for, incorporating the experience and knowledge of agreed engineered standard ways of construction of network components. These cover a wide range of activities and are adjusted on application to cater for site specific identified requirements through a bottom-up quantification of project scope and application.

Comparative costing is used where a statistically significant historical sample size exists, whereby actual project or program costs are reconciled and assessed. This approached is used in determining the operating costs.

Energex has estimated the capital and operating costs of each potential credible option which is inclusive of the following components:

- All material costs.
- All labour costs incurred in delivery of the project (e.g. planning, design, construction, commissioning, network operations, and project management).
- All contractor costs incurred.
- Ancillary cost such as location allowances, environmental offsets.
- Land value.

6.3 Sensitivity Analysis

A sensitivity analysis was conducted to establish the option that remained the lowest cost option in the scenarios considered.

Table 1 outlines the major sensitivities analysed within the Monte-Carlo analysis which was undertaken to assess the sensitivity to a change in parameters of the NPV model.

Parameter	Mode Value	Lower Bound	Upper Bound
Discount Rate	3.69%	2.69%	4.69%
Project Costs	Standard estimates	-40%	+40%
Opex Costs	Comparative estimates	-10%	+10%

Table 1: Economic parameters and sensitivity analysis factors

6.4 Considered Scenarios

The only scenario that has been considered is the base case load forecast. The low or high growth scenarios have not been considered due to the actual peak load has already exceeded the capacity at Jimboomba bulk supply substation, which is currently managed by using mobile generators and temporary load transfers during peak periods. As a result, alternative scenarios have no impact to the timings of the identified needs.

6.5 Ranking of Credible Options

The table below summarises the costs and benefits relative to the counterfactual, of the potential credible options in present value terms. The counterfactual is the continual operation of the existing network without augmentation and assuming load growth is lower than the forecast.

Option	Option Name	Rank	Initial Capital Cost ($ million)	Net Economic Benefit ($ million)	PV of Capex ($ million)	PV of Opex ($ million)	PV of Benefits ($ million)
A	Establish Jimboomba West (SSJBW) Zone Substation, Install 2nd 110/33kV Transformer & Replace 33kV bus at SSJBB BS and Establish Jimboomba North Zone Substation	1	$42.7	$24.9	-$20.7	-$0.82	$46.4
B	Install 80 MVA 110/33kV Transformer & 110kV GIS at SSBPN, Upgrade 110kV Feeders F843/F836, Establish Jimboomba West (SSJBW) Zone Substation, Replace 33kV bus at SSJBB BS, Establish new SSJBB-SSBDS 33kV feeder, Establish Jimboomba North Zone Substation	2	$68.0	$18.6	-$26.9	-$0.95	$46.4

Table 2: Present value analysis and ranking of credible options

The table below summarises the results of the sensitivity analysis.

Option	Option Name	Rank	Occurrence out of 3000 iterations
A	Establish Jimboomba West (SSJBW) Zone Substation, Install 2nd 110/33kV Transformer & Replace 33kV bus at SSJBB BS and Establish Jimboomba North Zone Substation	1	98.4%
		2	1.6%
B	Install 80 MVA 110/33kV Transformer & 110kV GIS at SSBPN, Upgrade 110kV Feeders F843/F836, Establish Jimboomba West (SSJBW) Zone Substation, Replace 33kV bus at SSJBB BS, Establish new SSJBB-SSBDS 33kV feeder, Establish Jimboomba North Zone Substation	1	1.6%
		2	98.4%

Table 3: Summary of sensitivity analysis results

7 PREFERRED OPTION

Option A has been identified as the preferred option and it satisfies the regulatory investment test for distribution. This option maximises the present value of the net economic benefit.

This statement is made on the basis of the detailed analysis set out in this FPAR. The preferred option is the credible option that has the highest net economic benefit under the most likely reasonable scenario.

8 SOCIAL LICENCE AND COMMUNITY ENGAGEMENT

8.1 Social Licence

Energex has not identified any social licence considerations that have affected the identification and selection of credible options to address the identified need. This is due to the scope of works at SSJBB and SSNMC being contained within the existing sites, and the feeders to the new SSJBW are mostly existing feeders energised at 11kV. New feeders proposed are along road reserve and new substation site for SSJBW has been acquired over ten years ago. The potential Jimboomba North zone substation will be located in an industrial estate in consultation with the developer. Given the reliability and economic benefits to the local community, there are not expected to be social licence issues.

8.2 Community Engagement

Community consultations will be held at the early stage of project implementation. As discussed above, the scope of works for this project is not expected to cause any disruption to the community at large. At this stage we have not identified any community stakeholders who might reasonably be expected to be affected by the development of this project. While Energex does not anticipate any community stakeholder concerns, should any be identified, these would be addressed as part of the Energex Community Engagement Framework which is integrated into the project workflow.

9 QUERIES IN RELATION TO THIS REPORT

For any queries in relation to this FPAR, please contact:

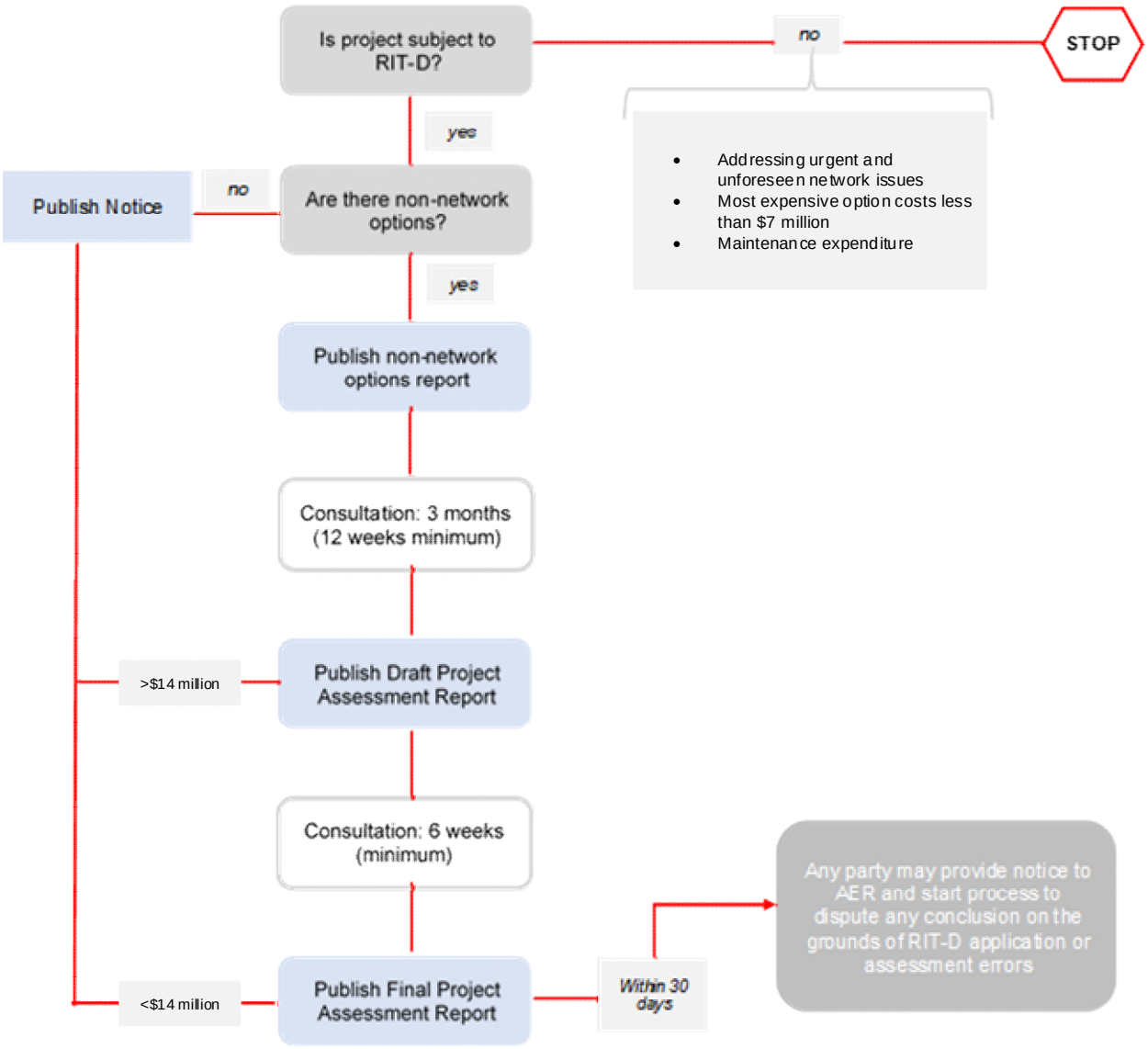
Demand and Energy Management
E: demandmanagement@energex.com.au
P: 13 12 53

10 COMPLIANCE STATEMENT

This FPAR complies with the requirements of clause 5.17.4(r) of the NER as demonstrated below:

Requirement	Report Section
(1) a description of the identified need for investment;	2
(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;	1 and 2
(3) if applicable, a summary of, and commentary on, the submissions received on the Draft Project Assessment Report;	3
(4) a description of each credible option assessed	4
(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 of each credible option	5 and 6
(6) a quantification of each applicable cost for each credible option, including a breakdown of operating and capital expenditure	4
(7) a detailed description of the methodologies used in quantifying each class of costs or market benefit	5
(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	5
(9) the results of a NPV analysis of each credible option and accompanying explanatory statements regarding the results	6
(10) the identification of the proposed preferred option	6 and 7
(11) for the proposed preferred option, the RIT-D proponent must provide:	
(i) details of the technical characteristics;	1
(ii) the estimated construction timetable and commissioning date (where relevant);	4
(iii) the indicative capital and operating costs (where relevant);	4
(iv) a statement and accompanying analysis that the proposed preferred option satisfied the RIT-D; and	7
(v) if the proposed preferred option is for reliability corrective action and that option has a proponent, the name of the proponent	N/A
(12) contact details for a suitably qualified staff member of the RIT-D proponent to whom queries on the FPAR may be directed.	9

11 APPENDIX A – THE RIT-D PROCESS



12 APPENDIX B – SAFETY NET TARGETS

Energex has an obligation to meet the Safety Net Targets under its Distribution Authority. The Safety Net targets are defined by the load impacted and the duration of this impact. The table below shows the specific requirements that Energex needs to achieve.

17
Distribution Authority - No. D07/98
ENERGEX Limited

SCHEDULE 3

Service Safety Net Targets

Feeder Type	Targets
CBD	• Any interruption in customer supply resulting from an N-1 event at the sub-transmission level is restored within 1 minute
Urban	Following an N-1 event, load not supplied must be: • Less than or equal to 40MVA (16,000 customers) for no more than 30 minutes; • Less than or equal to 12MVA (5,000 customers) for no more than 3 hours; • Less than or equal to 4MVA (1,600 customers) for no more than 8 hours; • Fully Restored after 8 hours
Short Rural	Following an N-1 event, load not supplied must be: • Less than or equal to 40MVA (16,000 customers) for no more than 30 minutes; • Less than or equal to15MVA (6,000 customers) for no more than 4 hours; • Less than or equal to 10MVA (4,000 customers) for no more than 12 hours; • Fully Restored after 12 hours

Notes:
- All modelling and analysis will be benchmarked against 50 POE Loads and based on credible contingencies.
- Outages ≤ 3 minutes in duration excluded from Safety Net Targets.

[as inserted on 05 December 2025]

13 APPENDIX C – LOAD CHARACTERISTICS

13.1.1 Existing Load Profiles

The load at Jimboomba, North Maclean and Browns Plain Substations comprises a mix of residential and commercial/industrial customers.

The full annual load profile for Jimboomba zone substation, North Maclean zone substation, Jimboomba bulk supply substation and Browns Plain bulk supply substation over the 2024/25 financial year is shown in Figure 9, Figure 10, Figure 11 and Figure 12. It can be noted that the peak load occurs during summer.

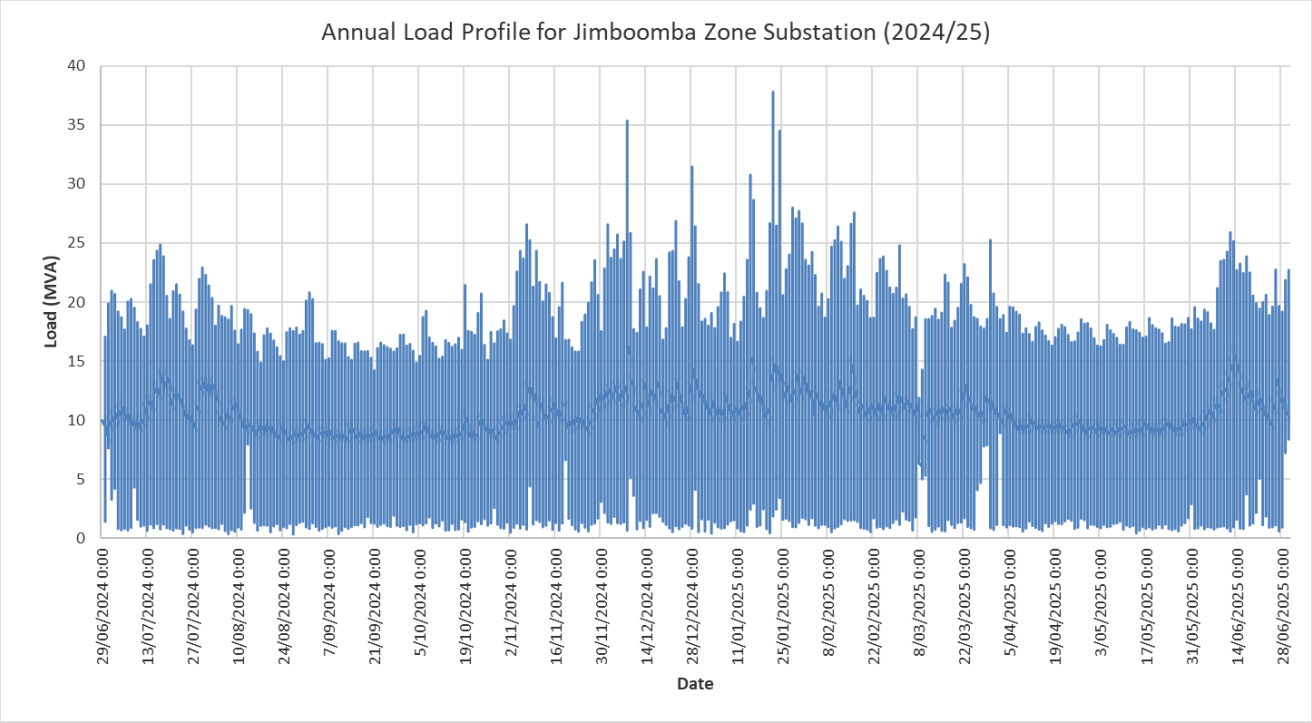


Figure 9: Jimboomba Zone Substation actual annual load profile

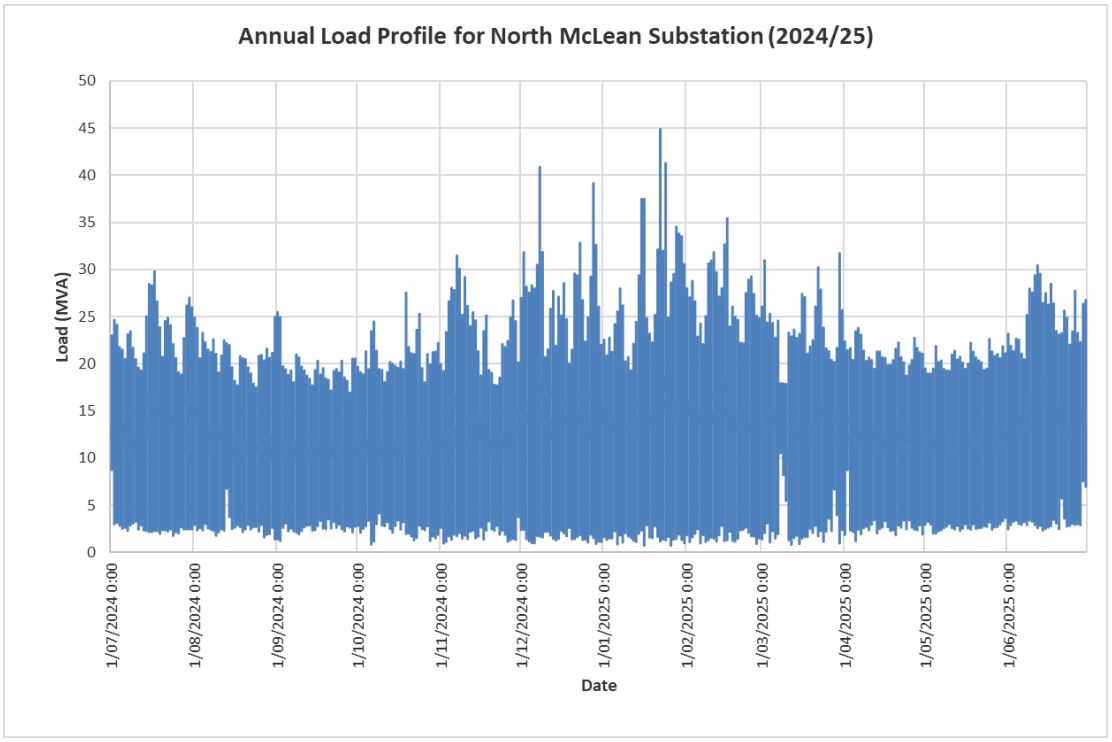


Figure 10: North Maclean Substation actual annual load profile.

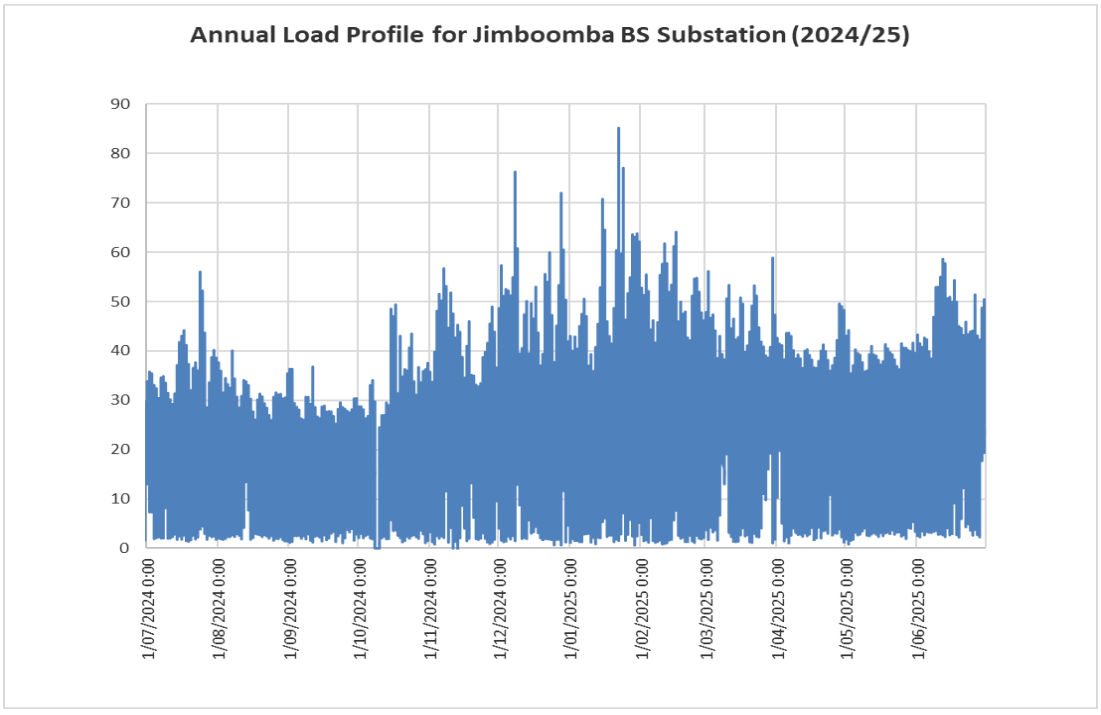


Figure 11: Jimboomba BS Substation actual annual load profile.

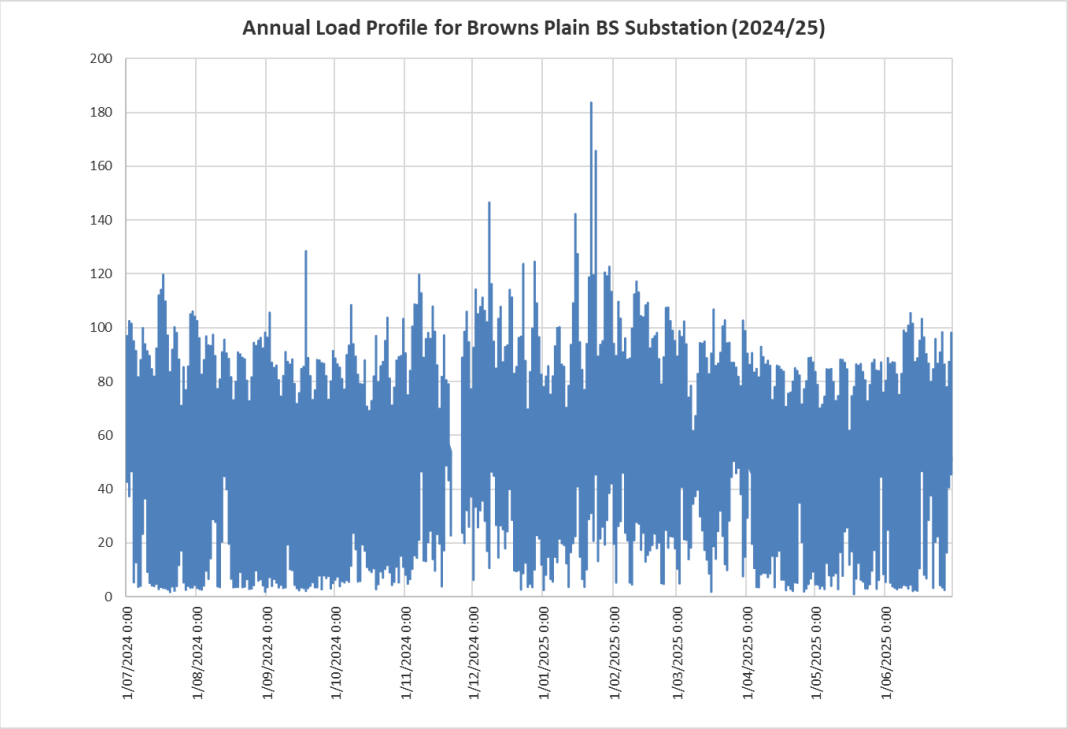


Figure 12: Browns Plain BS Substation actual annual load profile.

13.1.2 Load Duration Curve

The load duration curve for Jimboomba zone substation, North Maclean zone substation, Jimboomba bulk supply substation and Browns Plain bulk supply substation over the 2024/25 financial year is shown in Figure 13, Figure 14, Figure 15 and Figure 16.

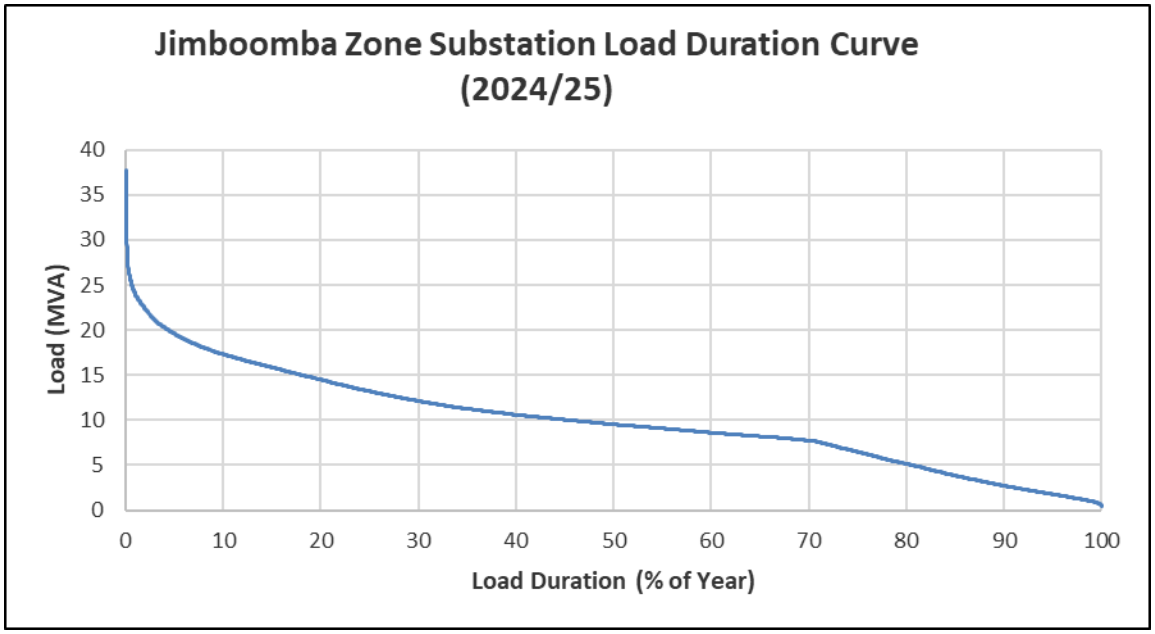


Figure 13: Jimboomba Zone Substation load duration curve

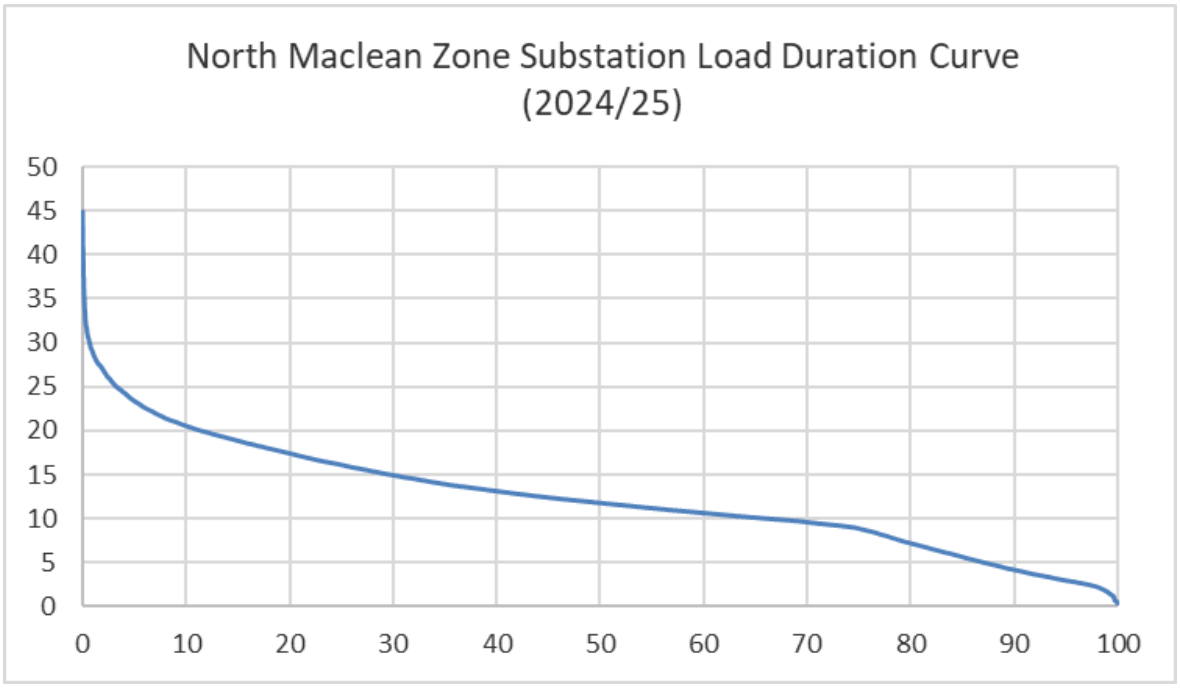


Figure 14: North Maclean Substation load duration curve

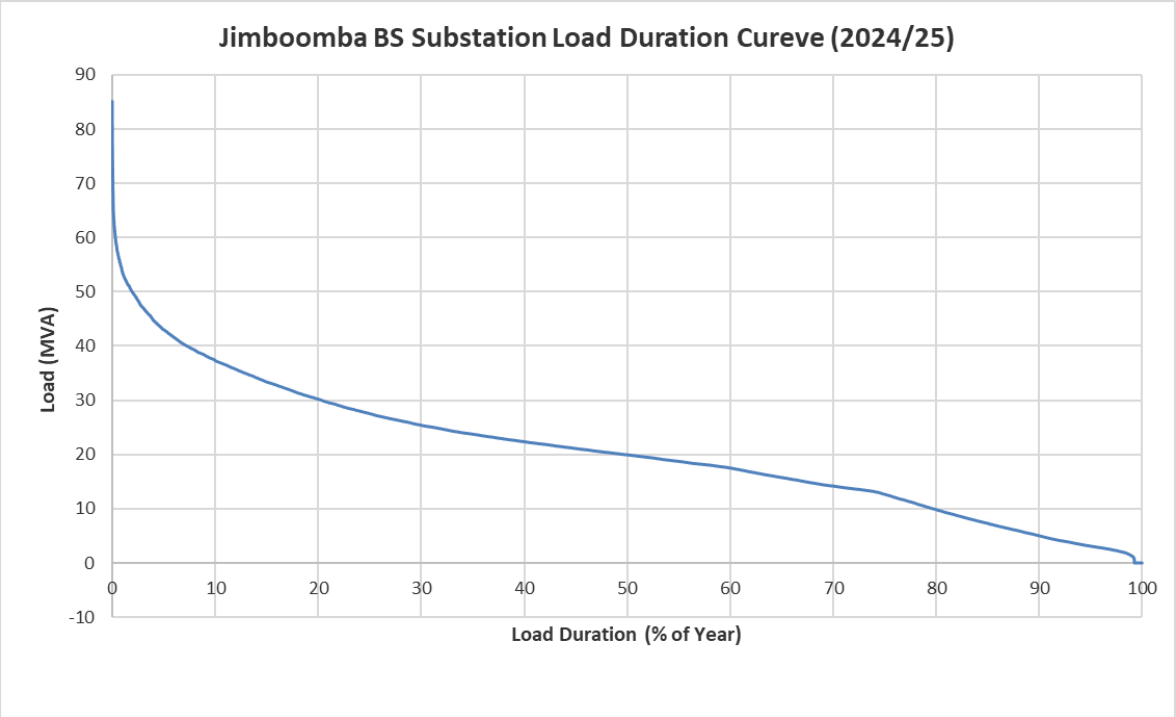


Figure 15: Jimboomba BS Substation load duration curve

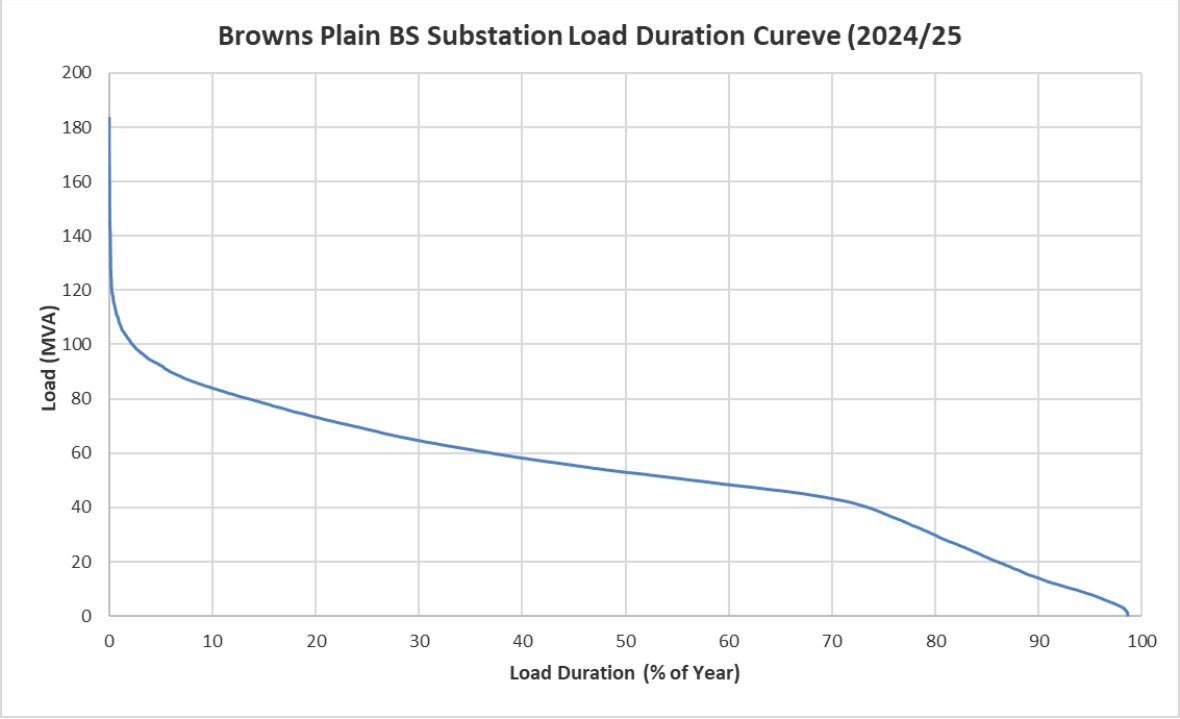


Figure 16: Browns Plain BS Substation load duration curve

13.1.3 Average Peak Weekday Load Profile (Summer)

The daily load profile for an average peak weekday during summer is illustrated below in Figure 17, Figure 18, Figure 19 and Figure 20. It can be noted that the summer peak loads at Jimboomba ZS, North Maclean, Jimboomba BS and Browns Plain BS substations are historically experienced in the late afternoon and evening.

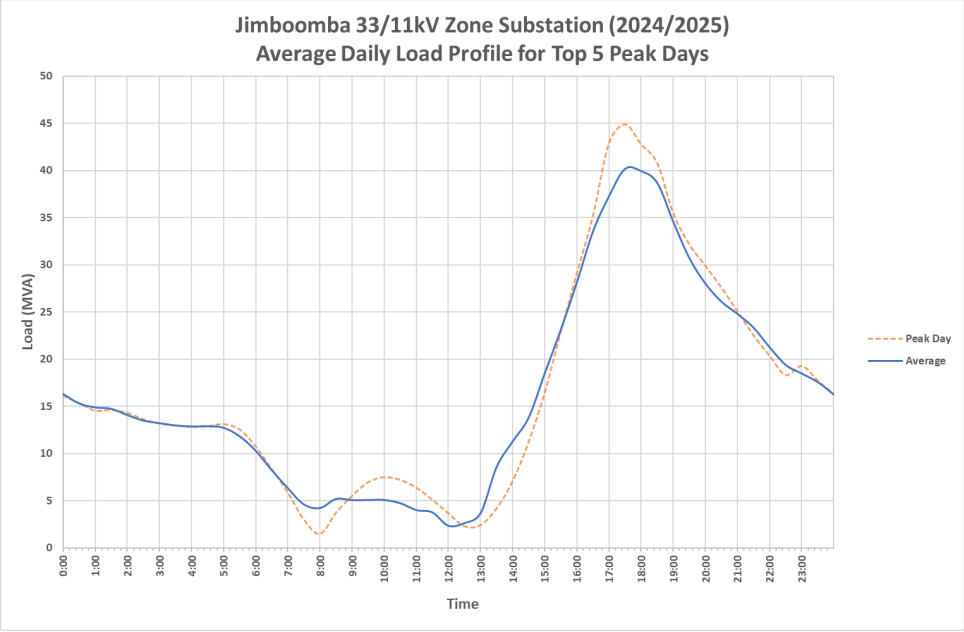


Figure 17: Jimboomba Zone Substation average peak weekday load profile (summer)

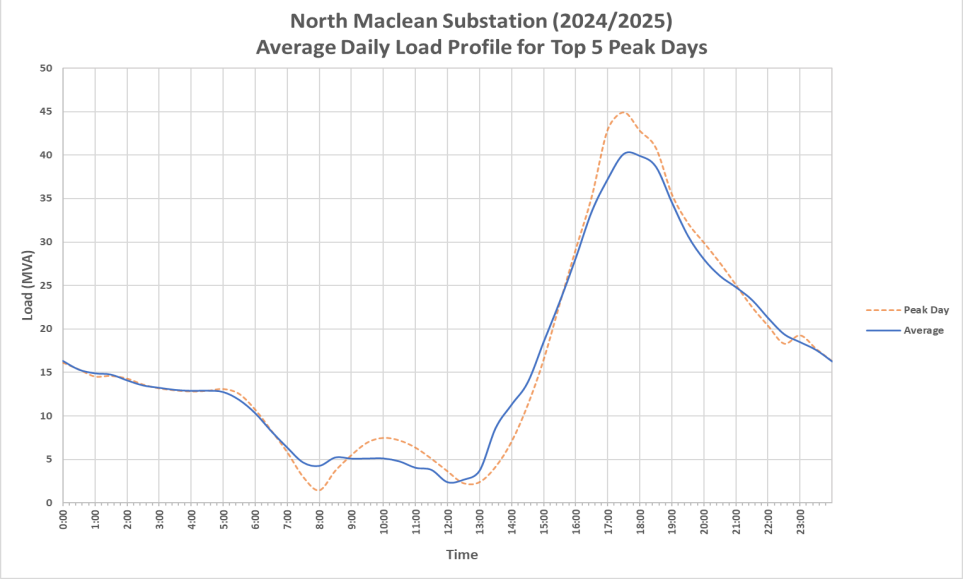


Figure 18: North Maclean Substation average peak weekday load profile (summer)

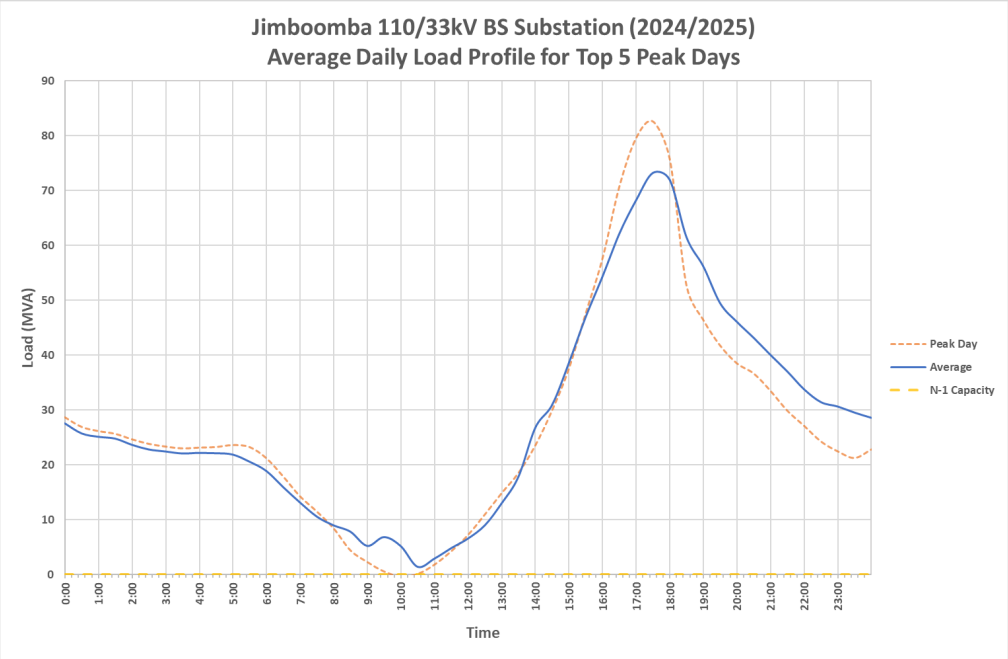


Figure 19: Jimboomba BS Substation average peak weekday load profile (summer)

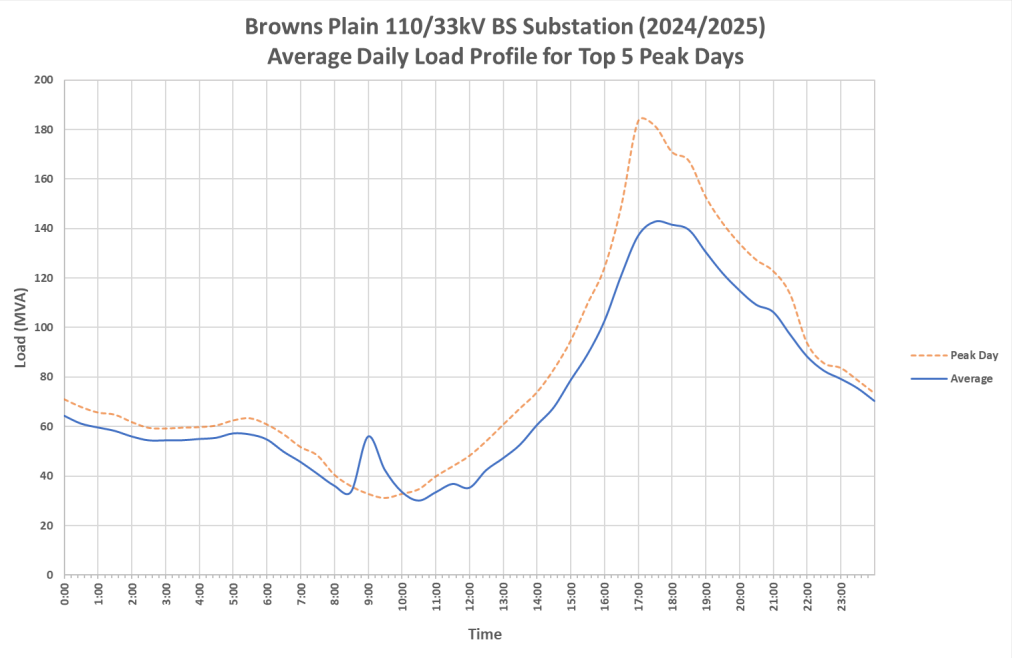


Figure 20: Browns Plain BS Substation average peak weekday load profile (summer)