Regulatory Investment Test for Distribution (RIT-D)

Reliability Corrective Action
The West End Network Area

Draft Project Assessment Report

12 June 2026

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 Draft Project Assessment Report (DPAR) has been prepared by Energex Limited (Energex) in accordance with the requirements of clause 5.17.4(j) of the NER and is published in accordance with 5.17.4(i) of the NER.

In preparing this DPAR, 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 development 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 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.

Energex Limited ABN 40 078 849 055

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1 ASSUMPTIONS AND TECHNICAL CHARACTERISTICS OF THE IDENTIFIED NEED

1.1 Existing supply arrangement

1.1.1 Geographic Region

West End 110/11 kV zone substation (SSWED) is located approximately 1.5 km South-West of Brisbane CBD. It provides electricity supply to approximately 9,400 customers in the inner Brisbane suburbs of West End, South Brisbane and Highgate Hill. There is a mixture of commercial, industrial and residential customers serviced by the substation. SSWED supplies approximately 270 GWh of energy annually, with approximately 11% of the energy consumed by residential customers.

The geographical location of Energex's sub-transmission network and substations in the area is shown in Figure 1.

Figure 1: Existing network arrangement (geographic view)

1.1.2 Overview of Existing System

SSWED is equipped with two 60 MVA, 110/11 kV transformers, 110 kV indoor switchgear with a single 110 kV CB and 11 kV indoor switchgear with four buses. SSWED is supplied via 110 kV feeders F905 (from Powerlink's Rocklea Substation SSH16) and F830 (from the Charlotte Street Zone Substation SSCST).

SSWED has four 11 kV buses with TR3 supplying BB13 and BB16, and TR4 supplying BB14 and BB15. There are automatic change over (ACO) schemes for bus section CBs between BB13 and BB14 and between BB15 and BB16. There is a current project at SSWED to refurbish the switchgear on one 11 kV bus.

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

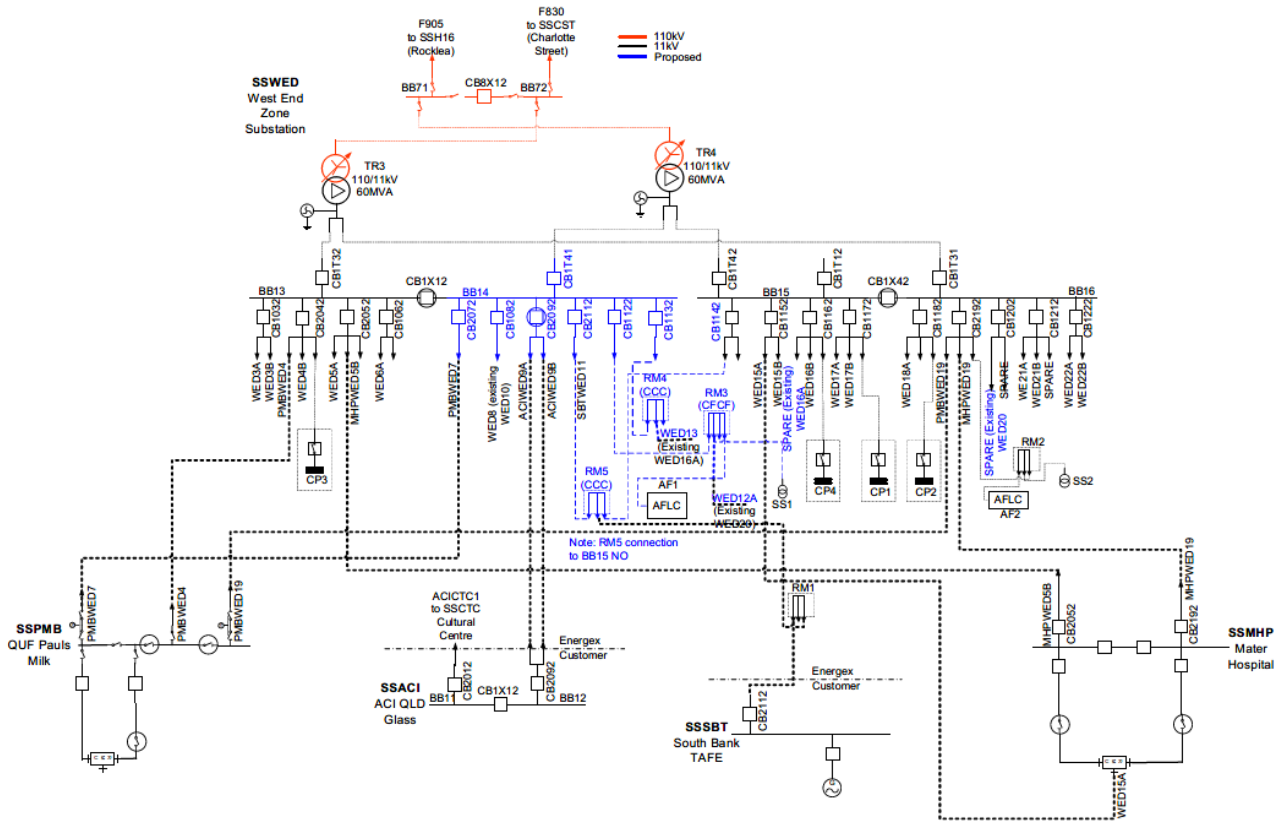

Figure 2: Existing network arrangement with in-progress refurbishment works

1.2 Size of load reduction or additional supply

To meet Energex's ongoing operational needs, any solution must provide capacity or demand reduction to the distribution network of up to 12 MVA in 2032, increasing to 19.1 MVA in 2035. This support must be available at short notice when called upon. The periods where this support may be required is generally from October to April of the following year, except for 2032 where this support must be made available for the full calendar year. Table 1 below summarises the forecast duration of network support required as measured at the SSWED 11 kV bus.

Year	Max Load at risk (MVA)	Yearly		Peak Day	
		Energy at risk (MWh)	Number of hours at risk	Energy at risk (MWh)	Number of hours at risk
2030/31	11.2	151	38.5	49	8
2031/32	12.0	184	48	55	8
2032/33	17.1	575	142.5	100	10.5
2033/34	17.7	654	160	106	11
2034/35	18.2	727	179.5	111	11.5
2035/36	19.1	862	206	119	11.5

Table 1: Forecast size of load reduction or additional supply

1.3 Location

Whilst the location where network support will be measured / referenced is on the 11 kV bus at SSWED, the support may be located downstream of the reference buses.

1.4 Contribution to power system security or reliability

Any solution to address the identified need must enable Energex to maintain a level of security that complies with the service safety net targets required under its Distribution Authority, which has specific outage restoration timeframe targets that Energex is required to achieve. SSWED is classified as “Urban” under the safety net. Details of the safety net targets are shown in Appendix A.

Energex is unable to comply with the safety net targets when load is above 66 MVA. Network support is required to keep the load supplied by SSWED below this level. Any proposed solution must have a high level of reliability to be available for the full duration, when called upon.

1.5 Contribution to power system fault levels

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

1.6 Operating profile

Full Annual Load Profile

The full annual load profile for SSWED over 2025 is shown in Figure 3. It can be noted that the peak load occurs during summer.

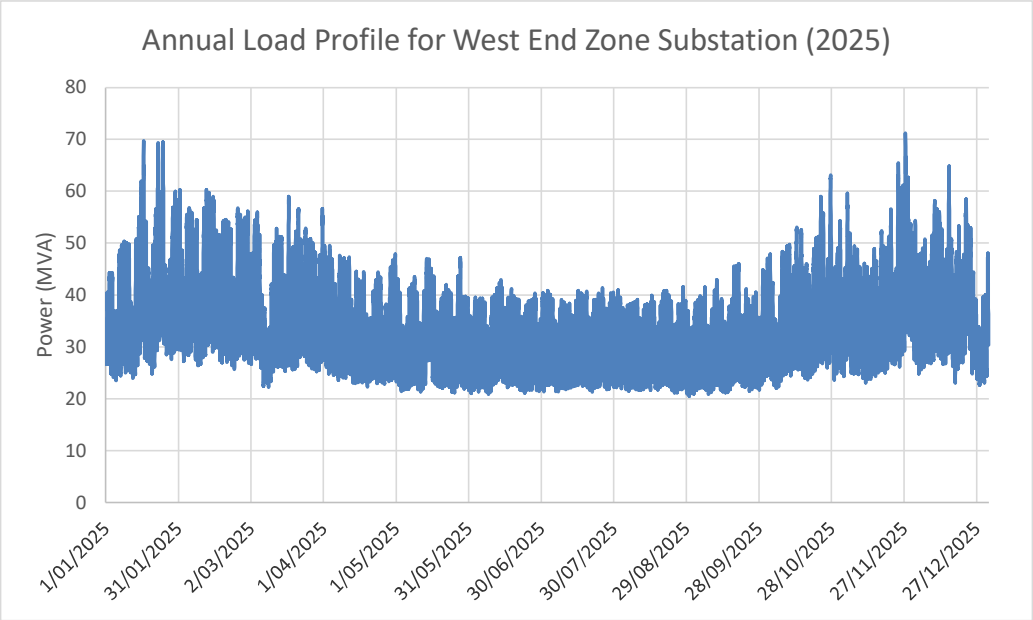

Figure 3: Substation actual annual load profile

Load Duration Curve

The load duration curve for SSWED in 2025 is shown in Figure 4.

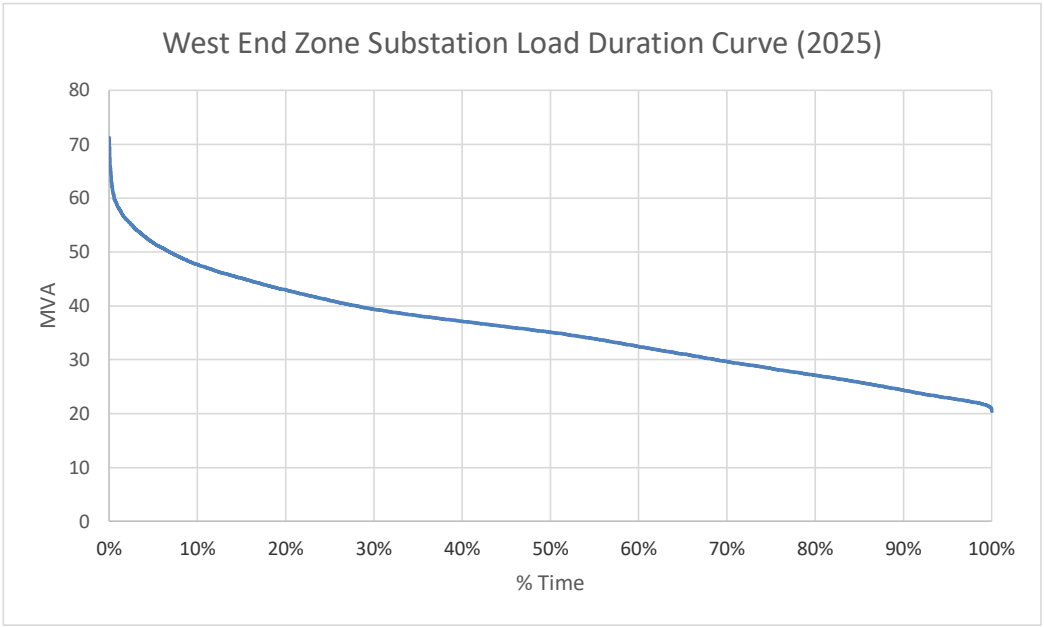

Figure 4: Substation load duration curve

Average Peak Weekday Load Profile (Summer)

The load profile for an average peak weekday during summer is illustrated below in Figure 5. The summer peak loads at SSWED are historically experienced from late morning to late afternoon.

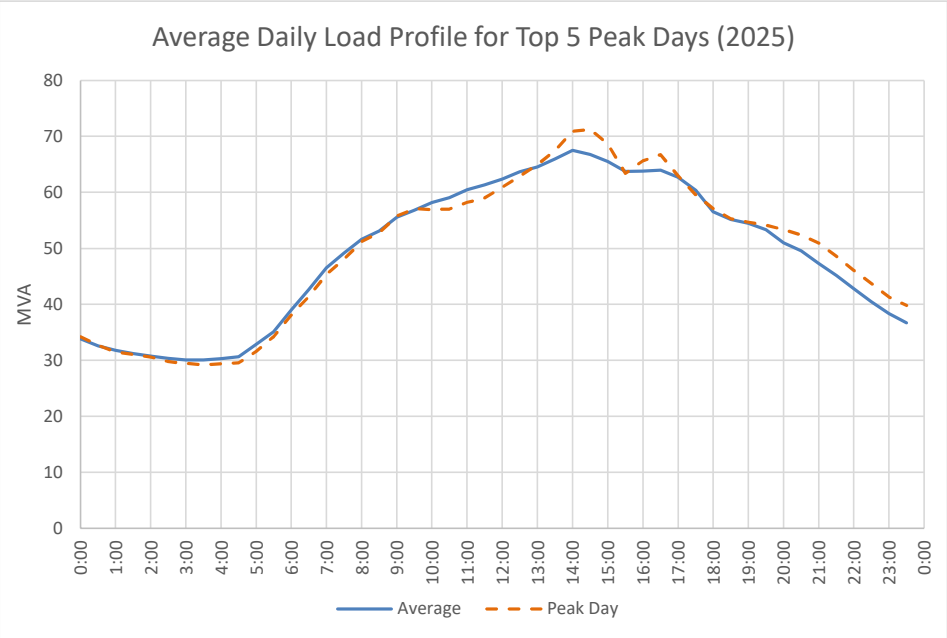

Figure 5: Substation average peak weekday load profile (summer)

1.7 Forecast

The 10% PoE and 50% PoE load forecasts for the base case load growth scenario for SSWED is illustrated in Figure 6. The historical peak load for the past six years has also been included in the graph. This chart demonstrates that a solution is required to address the identified need.

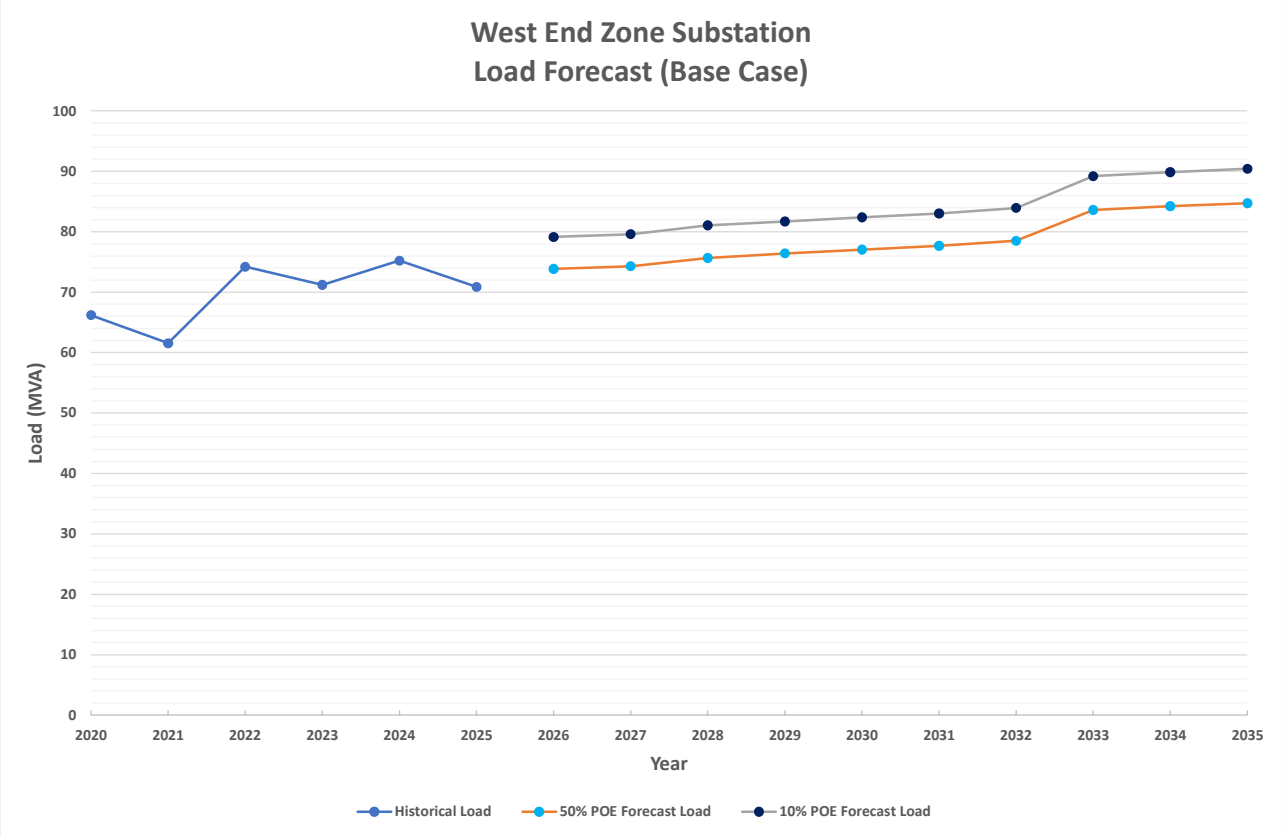

Figure 6: Substation base case load forecast

High Growth Load Forecast

The 10% PoE and 50% PoE load forecasts for the high load growth scenario are illustrated in Figure 7. With the high growth scenario, the peak load is forecast to increase over the next nine years.

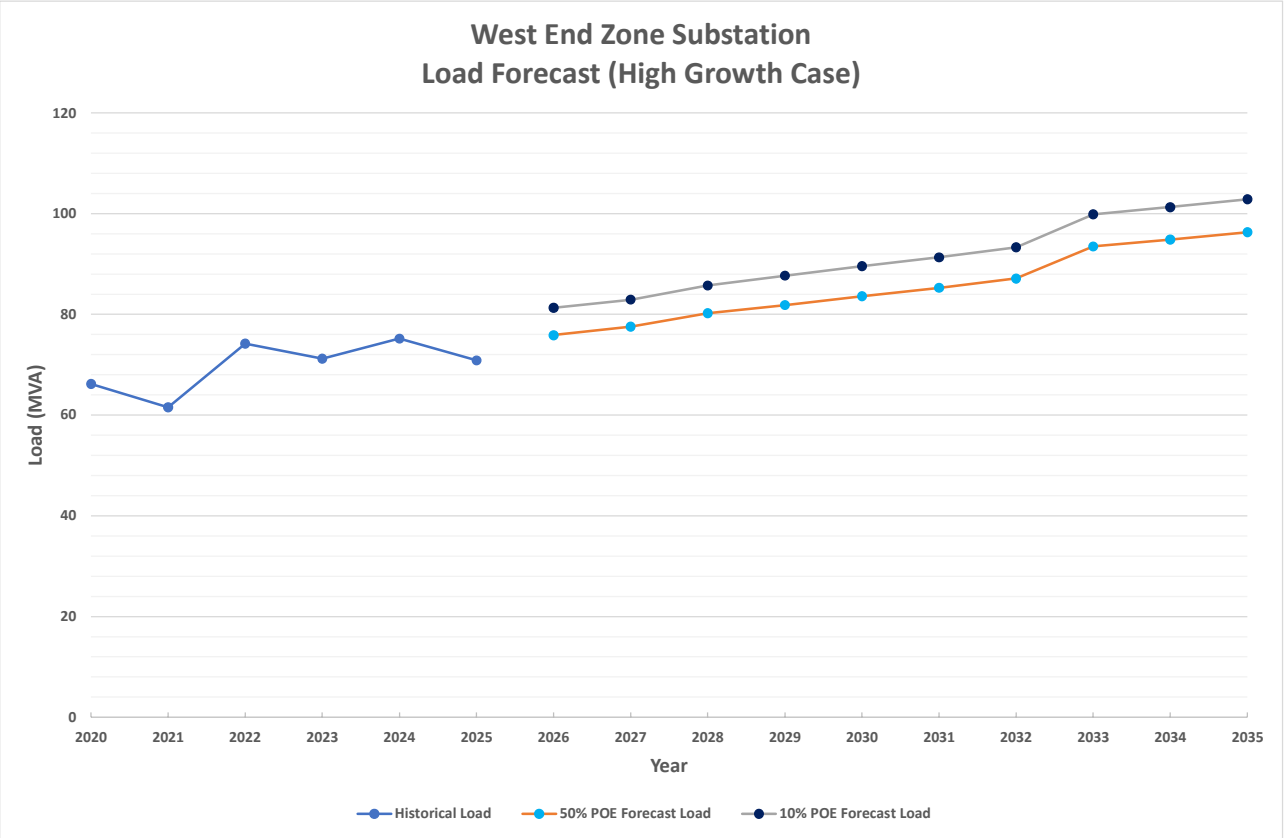

Figure 6: Substation high growth load forecast

Low Growth Load Forecast

The 10% PoE and 50% PoE load forecasts for the low load growth scenario are illustrated in Figure 8. With the low growth scenario, the peak load is forecast to remain relatively steady over the next nine years.

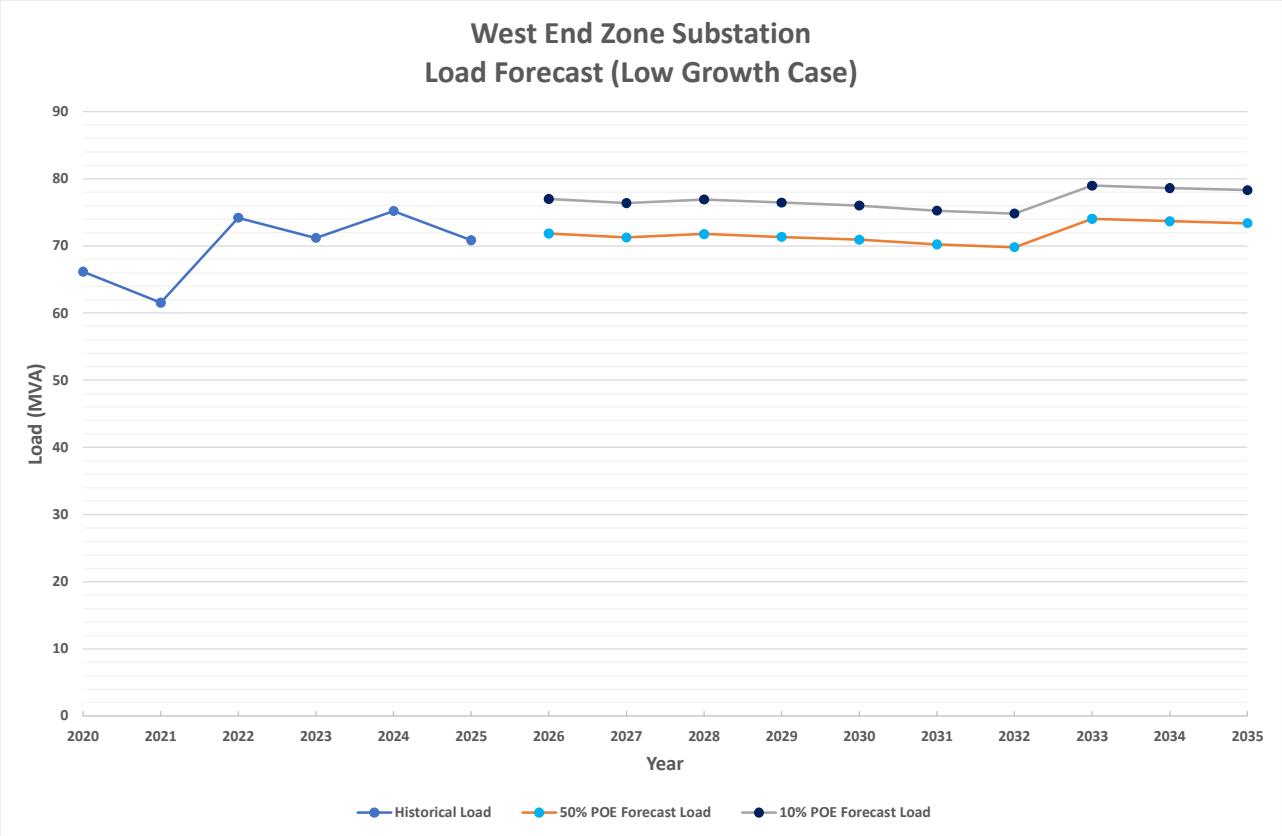

Figure 7: Substation low growth load forecast

2 IDENTIFIED NEED

SSWED is located on the fringe of the Brisbane CBD, in the suburb of West End. The area is undergoing significant transformation due to urban renewal in recent years, which has resulted in a change in development zoning and relaxation of building heights. The load supplied by SSWED has been increasing as a result and is forecast to continue to increase, led by redevelopment of large industrial sites and activities related to the 2032 Olympic games. Furthermore, SSWED will supply major Olympic venues and infrastructure, in which outages are not acceptable during the games' events.

The above forecasts show that the load will exceed the firm capacity of SSWED, resulting in a reduction in security of supply to customers in the area. It is forecast that, for an outage of a 110/11 kV transformer or 110 kV feeder at SSWED during peak periods, the remaining transformer will overload and trigger protection operations that will result in a total loss of supply to all customers supplied by SSWED.

The identified need is for reliability corrective action to ensure that security and reliability of supply are maintained to customers in the West End network area as required under applicable regulatory instruments. To ensure that Energex can continue to meet these requirements, reliability corrective action is required by 2031. If this does not occur, Energex estimates the probability of failure to comply with regulatory requirements will reach unacceptably high levels.

Investment in Energex's network is required to continue to meet the service standards and regulatory requirements in its Distribution Authority issued under the *Electricity Act 1994* (Qld). This includes under Clause 10, where 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 A.

If Energex did not invest to address this identified need, it may result in a breach of these regulatory obligations, as the failure of a 110 kV feeder or a transformer at SSWED can result in approximately 9,400 customers without power, including a major hospital. Supply to these customers cannot be restored within the timeframes stipulated under the safety net targets in its Distribution Authority.

Therefore, Energex considers that reliability corrective actions in the West End 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 $1.2 million for each year the proposed augmentation cost is deferred.

3 POTENTIAL CREDIBLE OPTIONS

3.1 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.

On 22 May 2026, Energex published a Notice of No Non-Network or SAPS after determining that no non-network or SAPS solution would be a potential credible option or form a significant part of a potential credible option.

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

The base case of doing nothing is not a credible option as it will result in Energex being in breach of its regulatory obligations.

3.1.1 Option A: Install a new 60 MVA 110/11 kV Transformer, 110 kV and 11 kV switchboards

This option will provide an additional 60 MVA capacity at SSWED to address the substation limitation to help mitigate Safety Net breaches at SSWED. Furthermore, the installation of a dual secondary winding transformer allows for the future transition to three feeder meshes in the West End 11 kV supply network, as per the standard distribution network configuration in Brisbane CBD area, which is capable of being remotely switched and operated to provide improved reliability.

This option involves:

- Constructing a building for an additional 60 MVA 110/11/11 kV transformer and neutral earthing transformer, 110 kV GIS, 11 kV switchgear, AFLC coupling cells, RMUs and protection panels.
- Installing a 110/11/11 kV transformer with associated neutral earthing transformers.
- Installing three buses of additional 110 kV switchgear in the new building compromising of six feeder circuit breakers, two bus section circuit breakers and three transformer circuit breakers.
- Installing two buses of additional 11 kV switchgear compromising of two transformer circuit breakers, one bus section circuit breaker, nine feeder circuit breakers and two bus-tie circuit breakers.
- Installing three 2.2 MVAr capacitor banks and recovery of existing capacitor banks.
- Installing additional AFLC equipment, secondary systems and LV supplies.
- Cutting over 110 kV feeder F905 to the new 110 kV switchgear.
- Establishing a 110 kV bus-tie between the new and existing 110 kV bus.
- Cutting over one leg of TR4 to the new 11 kV switchboard and connecting one leg of the new transformer to the vacated circuit breaker.

- Connecting the remaining leg of the new transformer to the new 11 kV switchboard.
- Cutting over 6x11 kV feeders from existing 11 kV switchboard to the new 11 kV switchboard at SSWED.

Figure 9 provides the proposed network arrangement for Option 1.

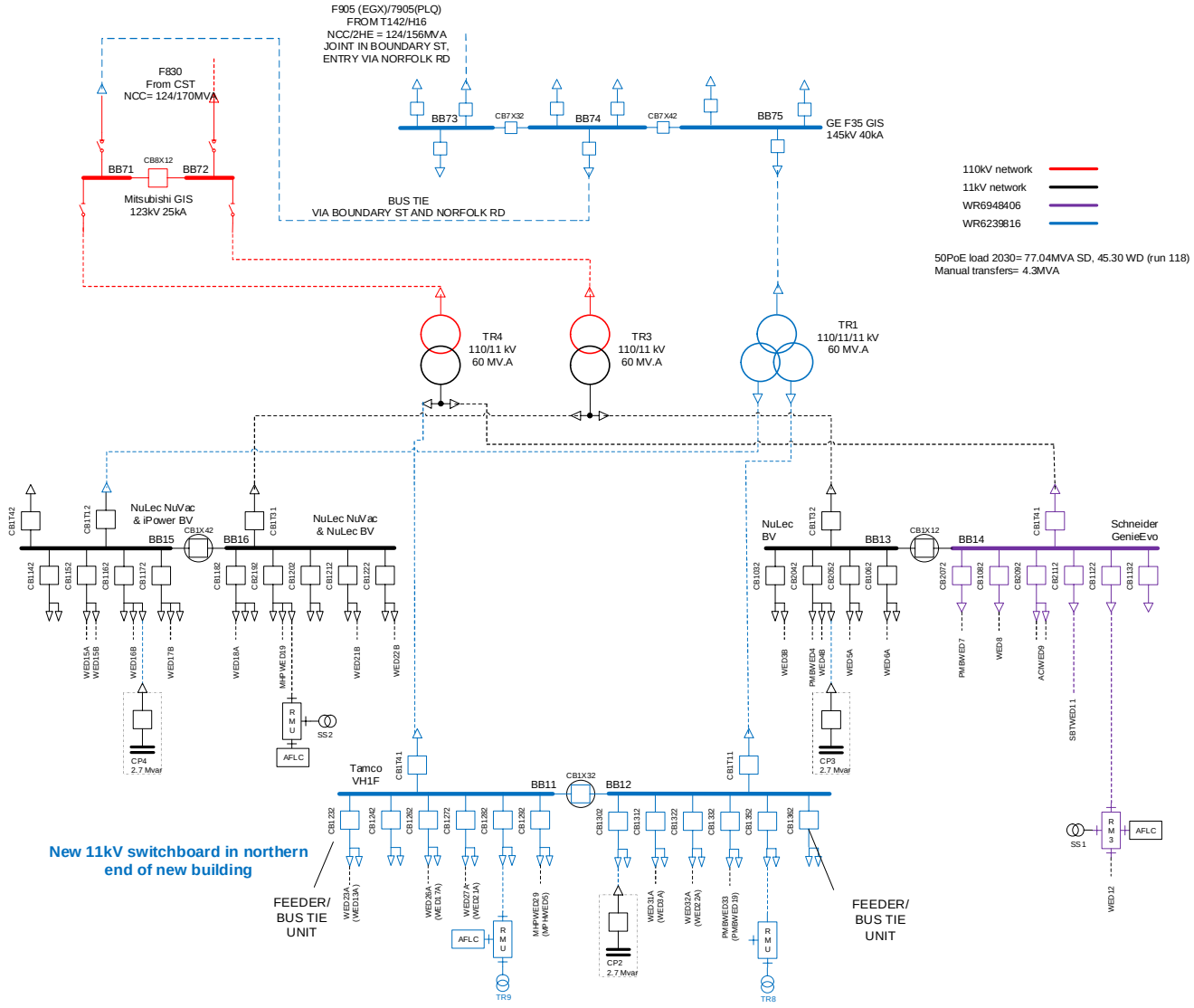

Figure 8: Option A proposed network arrangement (schematic view)

This option is commercially and technically feasible, can be implemented in the timeframe identified and would address the identified need by providing reliable supply and additional capacity to the West End area. The additional capacity will enable Energex to meet the reliability requirements as stipulated in Energex's Distribution Authority.

This option has an estimated capital cost of $43.2 million and operating cost of $9,000 a year. The estimated construction start date would be 2028, with a commissioning date of 2031.

The estimated costs comprise the following components:

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

The scope of works at SSWED are being contained within the existing and adjacent site that is owned by Energex. Given the reliability and economic benefits of this option to the local community, there are not expected to be social licence issues with this option. No additional costs to manage or increase the delivery timeline have been considered in the evaluation of this option.

4 QUANTIFICATION OF MARKET BENEFITS FOR EACH CREDIBLE OPTION

Energex has analysed the following classes of market benefits.

4.1 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.

4.2 Changes in Involuntary Load Shedding and Customer Interruptions

Involuntary load shedding is where electricity supply for a customer's load is interrupted from the network without their agreement or 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 under the credible option 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.

The customer export curtailment value (CECV) represents the detriment to customers and the National Electricity Market (NEM) from the curtailment of distributed energy resource (DER) exports (e.g. rooftop solar PV systems). A reduction in curtailment due to the implementation of a credible option results in a positive contribution to the market benefits of that option. These benefits have been calculated according to the Australian Energy Regulator's (AER) CECV methodology based on the capacity of DER currently installed and forecast to be installed within the study area.

4.3 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.

4.4 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.

4.5 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 West End 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.

4.6 Additional Option Value

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

4.7 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.

4.8 Changes in Australia's Greenhouse Gas Emissions

Energex has determined that the change in Australia's greenhouse gas emissions for the potential credible option does not result in a material change in market benefit.

5 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.

5.1 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 covers the period from 2026 to 2045. Energex considers this period is appropriate for this analysis 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 beyond 2045, 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 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 Energex's regulated weighted average cost of capital (WACC) at the time of preparing this DPAR. 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.

5.2 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, including land value.
- 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 and environmental offsets.

5.3 Sensitivity Analysis

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

Table 2 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	-50%	+50%
Opex Costs	Comparative estimates	-10%	+10%

Table 2: Economic parameters and sensitivity analysis factors

5.4 Considered Scenarios

The only demand / load scenario that was considered was the base case load forecast. A low and high growth scenario were not considered due to the actual load already exceeding the firm capacity of SSWED. Hence, alternative scenarios would have no impact on the proposed timing of the reliability corrective action.

5.5 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.

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	Install a new 60 MVA 110/11 kV Transformer, 110 kV and 11 kV switchboards	1	-$43.2	-$13.3	-$19.3	-$0.09	$6.04

Table 3: Present value analysis and ranking of credible options

The table below summarises the results of the sensitivity analysis.

Option	Option Name	Average NPV ($ million)	Maximum NPV ($ million)	Minimum NPV ($ million)
A	Install a new 60 MVA 110/11 kV Transformer, 110 kV and 11 kV switchboards	-$13.17	-$3.20	-$23.93

Table 4: Summary of sensitivity analysis results

6 PREFERRED OPTION

Option A has been identified as the preferred option, and it satisfies the RIT-D. This option maximises the present value of the net economic benefit.

The proponent for this option is Energex.

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

7 SOCIAL LICENCE AND COMMUNITY ENGAGEMENT

7.1 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. The scope of works at SSWED is being contained within the existing sites. Given the reliability and economic benefits to the local community, there are not expected to be any social licence issues.

7.2 Community Engagement

As the scope of works for the preferred option are largely contained within the existing site and adjacent property owned by Energex, it is not expected to cause any disruption to the community at large. As a result, 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.

8 REQUEST FOR SUBMISSIONS

Energex engages with customers and demand management providers to develop and implement demand side, non-network and SAPS solutions in accordance with our Industry Engagement Document.[1]

Energex invites written submissions on the matters set out in this DPAR, including the proposed preferred option, from registered participants, AEMO, interested parties, non-network providers and persons registered on Energex's industry engagement register.

Energex will not be legally bound in any way or otherwise obligated to any person who may receive this DPAR or to any person who may provide a submission. At no time will Energex be liable for any costs incurred by a proponent in the assessment of this DPAR, any site visits, obtainment of further information from Energex or the preparation by a proponent of a proposal to address the identified need specified in this DPAR.

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

E: demandmanagement@energex.com.au
P: 13 12 53

Submissions in writing are due by 4pm on the 31st July 2026 and should be lodged to demandmanagement@energex.com.au

[1] Available at: https://www.energex.com.au/__data/assets/pdf_file/0020/1005725/Industry-Engagement-Document.pdf

9 COMPLIANCE STATEMENT

This DPAR complies with the requirements of clause 5.17.4(j) 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 Options Screening Report;	N/A
(4) a description of each credible option assessed	3
(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	4 and 5
(6) a quantification of each applicable cost for each credible option, including a breakdown of operating and capital expenditure	3
(7) a detailed description of the methodologies used in quantifying each class of costs or market benefit	4
(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	4
(9) the results of a NPV analysis of each credible option and accompanying explanatory statements regarding the results	5 and 6
(10) the identification of the proposed preferred option	6
(11) for the proposed preferred option, the RIT-D proponent must provide: (i) details of the technical characteristics; (ii) the estimated construction timetable and commissioning date (where relevant); (iii) the indicative capital and operating costs (where relevant); (iv) a statement and accompanying analysis that the proposed preferred option satisfied the RIT-D; and (v) if the proposed preferred option is for reliability corrective action and that option has a proponent, the name of the proponent	 1 3 3 4, 5 and 6 6
(12) contact details for a suitably qualified staff member of the RIT-D proponent to whom queries on the draft report may be directed.	8
5.17.4(k) request for submissions on the matters set out in DPAR	8

10 APPENDIX A – 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]