Regulatory Investment Test for Distribution (RIT-D)

Reliability Corrective Action in
The Raceview Network Area

Notice of No Non-Network or SAPS Options

19 November 2025

energex
Part of Energy Queensland

INTRODUCTION

Purpose

Energex Limited (Energex) has determined on reasonable grounds, in accordance with clause 5.17.4(c) of the National Electricity Rules (NER), that there is no non-network option or a stand-alone power-system (SAPS) option that is a potential credible option, or that forms a significant part of a potential credible option, for this RIT-D project to address the identified need.

This notice sets out the reasons for this determination, including any methodologies and assumptions used. Energex publishes this notice in accordance with clause 5.17.4(d) of the NER.

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 ASSUMPTIONS AND TECHNICAL CHARACTERISTICS OF THE IDENTIFIED NEED

1.1 Existing supply arrangement

1.1.1 Geographic Region

Raceview 110/33kV bulk supply substation (SSRVW) is located approximately 2 km North - East of Ipswich. It provides electricity supply to approximately 35,249 predominantly residential customers in the surrounding suburbs. There is a mixture of commercial, industrial and agricultural customers supplied by the substation. SSRVW supplies 382 GWh of energy annually, with around 49% consumed by residential customers.

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

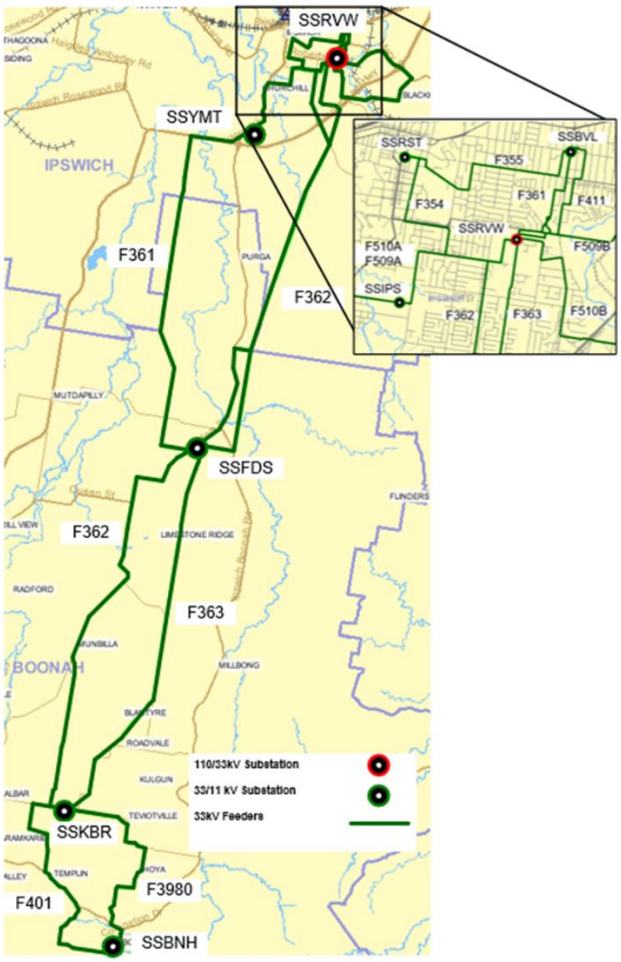

Figure 1: Existing network arrangement (geographic view)

1.1.2 Overview of Existing System

SSRVW is equipped with two 60 MVA, 110/33kV transformers, 33kV outdoor switchgear and a control room. SSRVW is supplied via two 110kV feeders from Powerlink's Blackstone substation (SSH72). SSRVW has seven 33kV feeders suppling seven zone substations, namely, Ipswich South (SSIPS), Yamanto (SSYMT), Flinders (SSFDS), Kalbar (SSKBR), Boonah (SSBNH), Roderick St (SSRST) and Booval (SSBVL). Both 110/33kV transformers are in a deteriorated condition and are due to be retired from service. Furthermore, the substation load is forecast to exceed the transformers' rating from 2029 onwards.

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

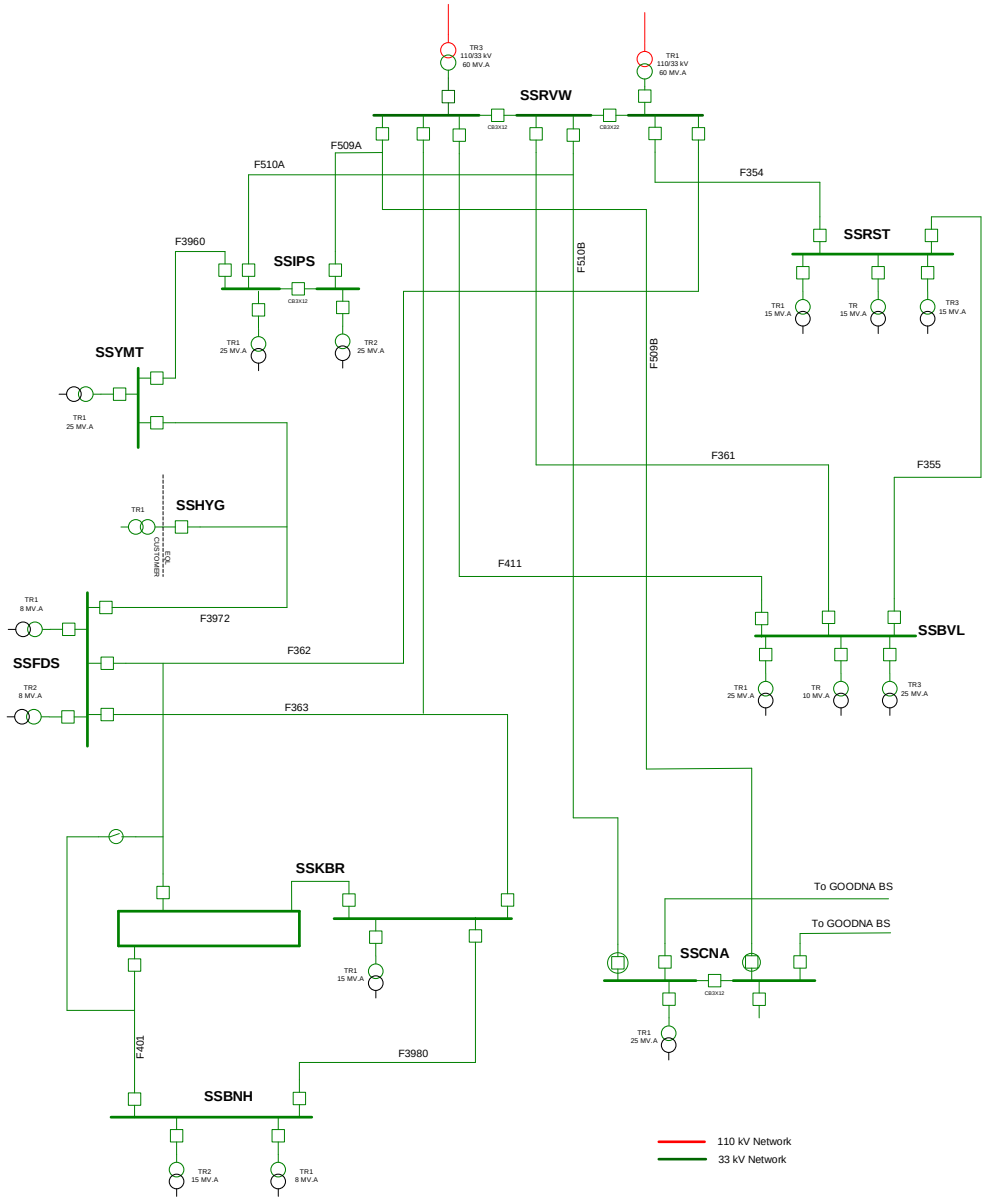

Figure 2: Existing network arrangement (schematic view)

1.2 Size of load reduction or additional supply

To meet Energex's ongoing operational needs, it is expected that any alternate solution must provide capacity or demand reduction to the distribution network up to 146MVA in 2029, increasing to 164MVA in 2035. Supply must be available all year round to provide continuous supply to customers in the area. For reference, the energy supplied by SSRVW in the 12 months between Oct 2024 and Sep 2025 was 382GWh with a peak demand of 112MVA.

1.3 Location

The location where network support and load restoration capability will be measured / referenced is on the 33kV bus at Raceview 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 is to have a level of redundancy that enables Energex in complying with the safety net targets as required under its Distribution Authority, which has specific outage restoration timeframe targets that Energex is required to achieve. SSRVW is classified as "Urban" under the safety net. Details of the safety net targets are shown in Appendix B.

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 33kV and 11kV network should not exceed 25kA and 13.1kA, respectively.

1.6 Operating profile

Full Annual Load Profile

The full annual load profile for Raceview Substation over the 2024/25 financial year is shown in Figure 3. It can be noted that the peak load occurs during summer.

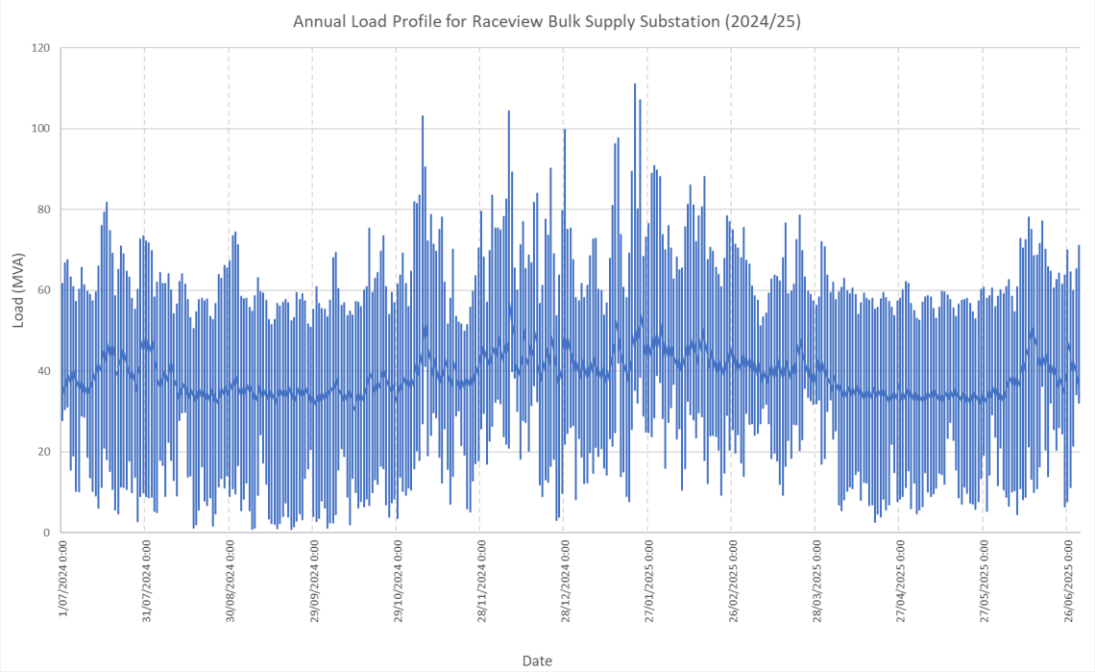

Figure 3: Substation actual annual load profile

Load Duration Curve

The load duration curve for Raceview Substation over the 2024/25 financial year is shown in Figure 4.

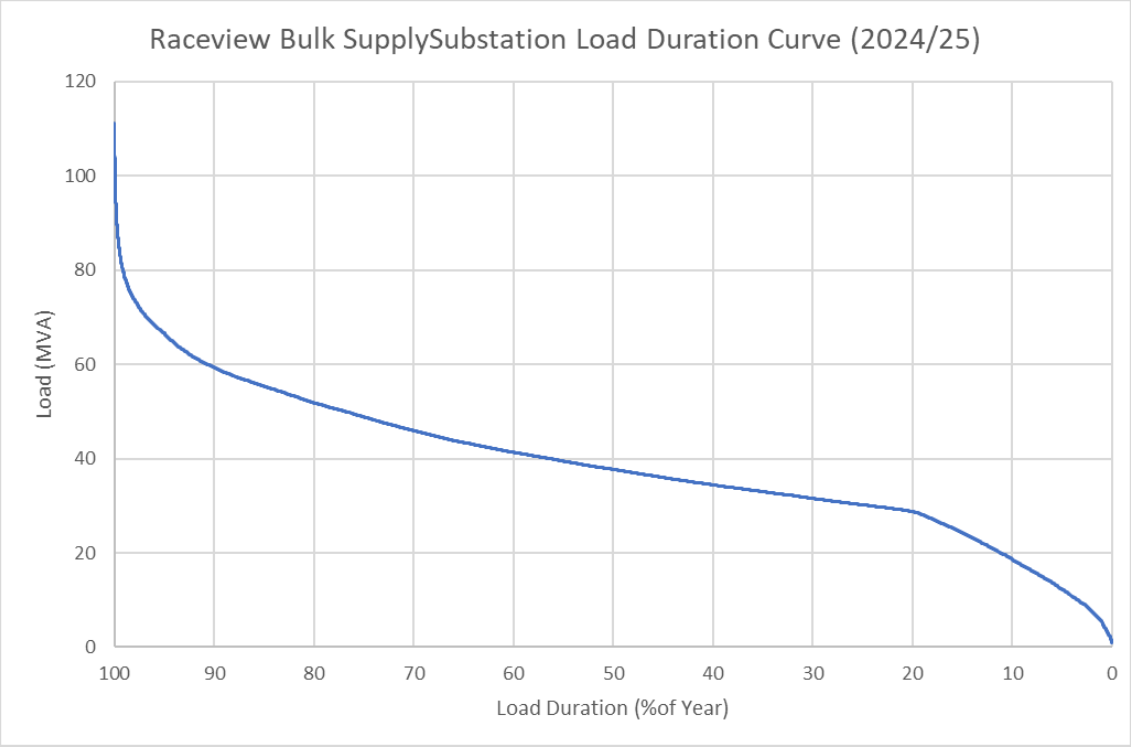

Figure 4: Substation load duration curve

Average Peak Weekday Load Profile (Summer)

The daily load profile for an average peak weekday during summer is illustrated below in Figure 5. It can be noted that the summer peak loads at Raceview Substation are historically experienced in the late afternoon and evening.

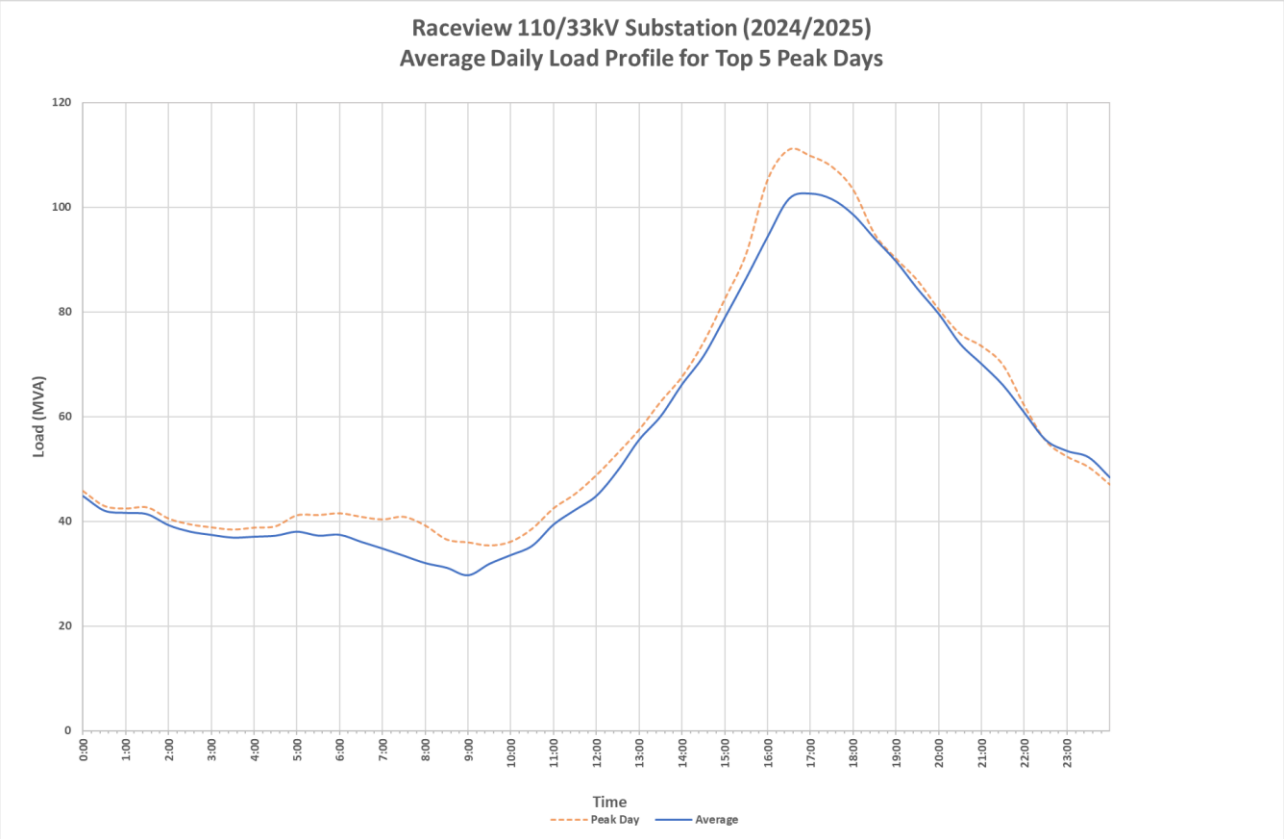

Figure 5: Substation average peak weekday load profile (summer)

1.7 Forecast

Base Case Load Forecast

The 10 PoE and 50 PoE load forecasts for the base case load growth scenario are illustrated in Figure 6. The historical peak load for the past six years has also been included in the graph.

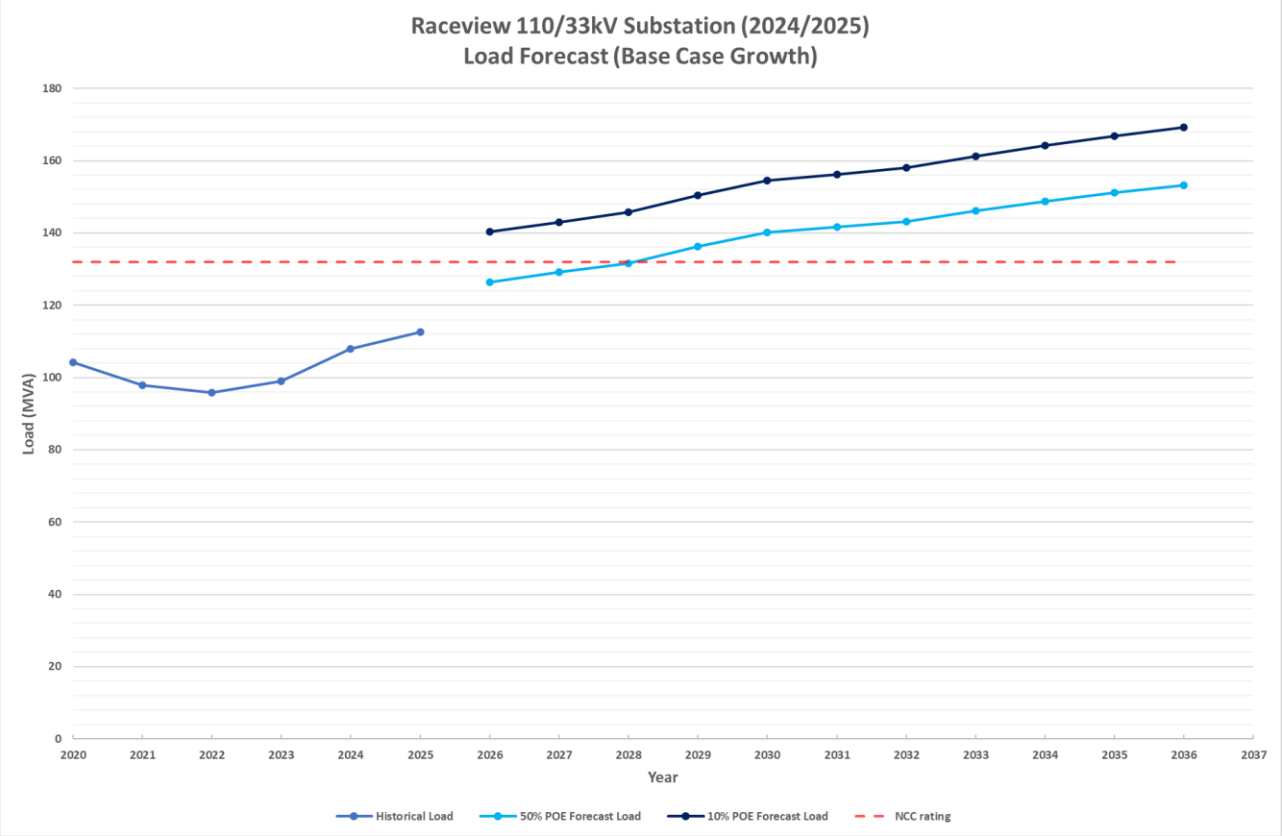

Figure 6: Substation base case load forecast

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 10 years.

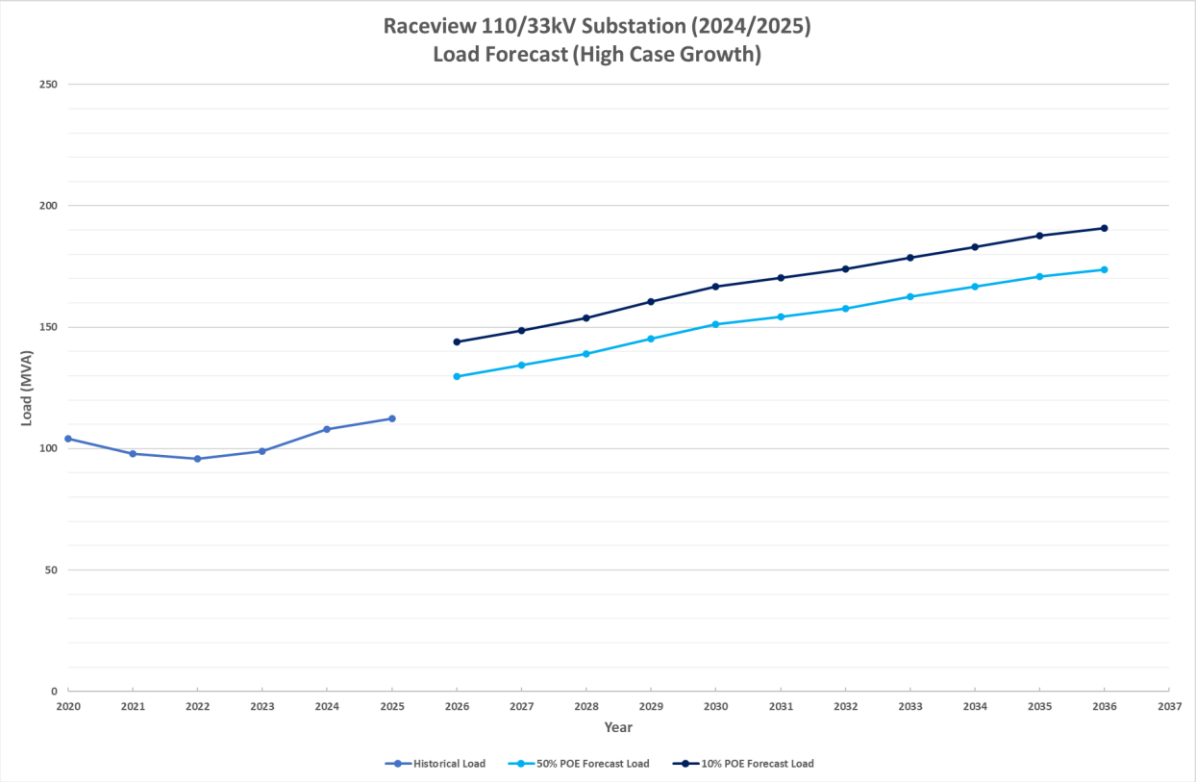

Figure 7: Substation high growth load forecast

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 10 years.

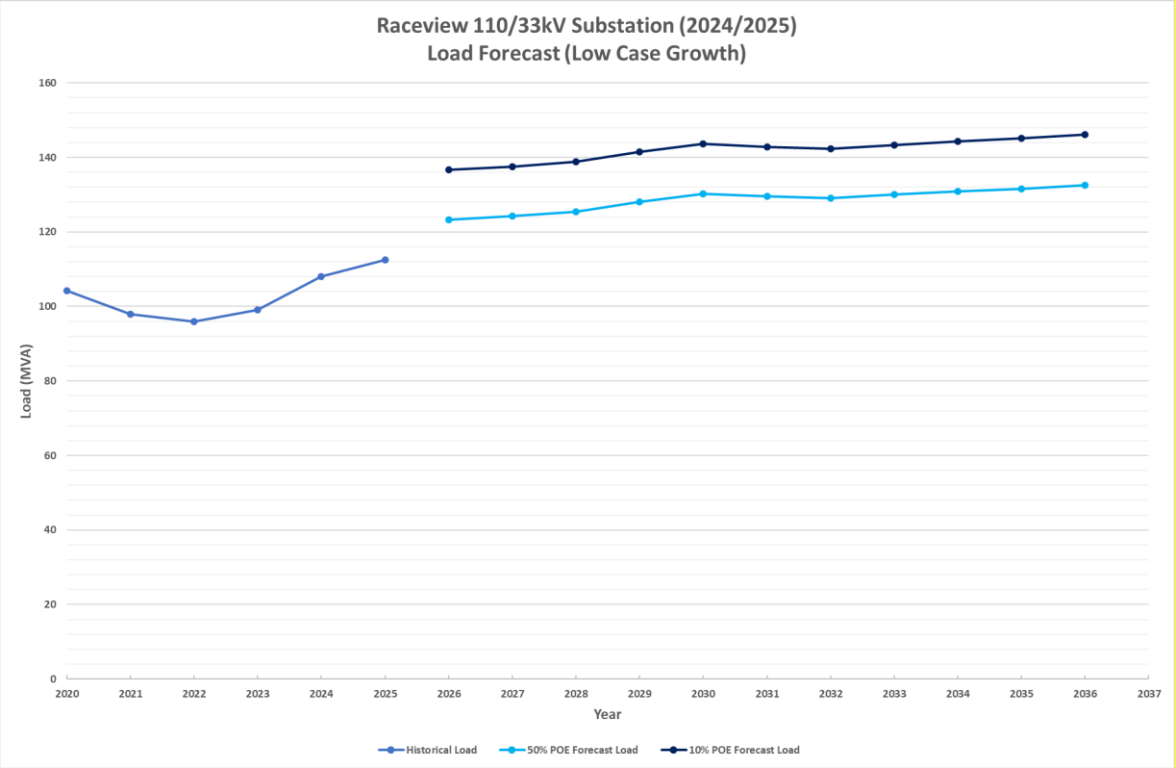

Figure 8: Substation low growth load forecast

2 IDENTIFIED NEED

2.1 Reliability Corrective Action

A recent condition assessment has highlighted that a number of critical assets at SSRVW are at end of life and are in poor condition. The condition of these assets presents a considerable safety, environmental and reliability risk. These assets include:

- Two 110/33kV transformers, TR1 and TR3
- Three 33kV circuit breakers, CB3T12, CB3T32 and CB3X22
- Various protection relays

Deterioration of these primary and secondary system assets poses safety risks to staff working within the switchyard. There is also a considerable risk of environmental harm due to tank rupture and oil spill from the transformers and circuit breakers, which would require clean up and rectification.

The poor condition of these assets significantly increases the likelihood of outages, resulting in a reduction in the level of reliability experienced by the customers supplied from Raceview Substation.

Furthermore, the forecast load at Raceview Bulk Supply substation (SSRVW) will exceed the transformer capacities in the coming years.

The identified need is for reliability corrective action to ensure that reliability of supply and service obligations are maintained to customers in the Raceview 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.

- *Electrical Safety Act 2002* (Qld) – Under Section 29 and 30, Energex has a duty of care to ensure that its works are electrically safe and are operated in a way that is electrically safe. This duty also extends to ensuring the electrical safety of all persons and property likely to be affected by the electrical work.
- *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* (Qld) – 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:

- Continuation to have deteriorated plant in operation heightens the risks of injury to people. This will place Energex in breach of *Electrical Safety Act 2002* (Qld) Section 29 and 30.
- Insufficient capacities from the Year 2028 onwards at Raceview bulk supply substation (SSRVW), 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 SSRVW can result in approximately 15,000 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 Raceview area are necessary.

2.2 Associated Relevant Annual Deferred Augmentation Cost

A present value analysis of the costs associated with the lowest cost potential credible option show that there is a saving of approximately $0.6 million for each year the proposed augmentation cost is deferred.

3 POTENTIAL CREDIBLE OPTIONS

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 Stand-Alone Power System (SAPS) option.

Energex has not identified any viable non-network solutions that will provide a complete or a hybrid (combined network and non-network) solution to address the identified need. Further reasoning as to how Energex came to this determination is provided below

3.1 Credible Options Identified

Energex has identified two credible network options that will address the identified need and are commercially and technically feasible and can be implemented in sufficient time to meet the identified need.

3.1.1 Option A: Replace 110/33kV Transformers TR1/TR3 with 120 MVA Units and Install 2 X 33kV CBs per Transformer

This option involves works at SSRVW:

- Installation of 2 X 120 MVA, 110/33kV transformers with NEXs to replace TR1 and TR3
- Installation of 2 X 33kV CBs and associated isolators for each transformer and replacement of 33kV bus section circuit breaker CB3X22
- Installation of 2 X 33kV VTs for new transformers
- Upgrade/Install protection panels for new transformers
- Replace end of life relays at SSRVW and at associated remote end substations.

A schematic diagram of the proposed network arrangement for Option A is shown in Figure 9.

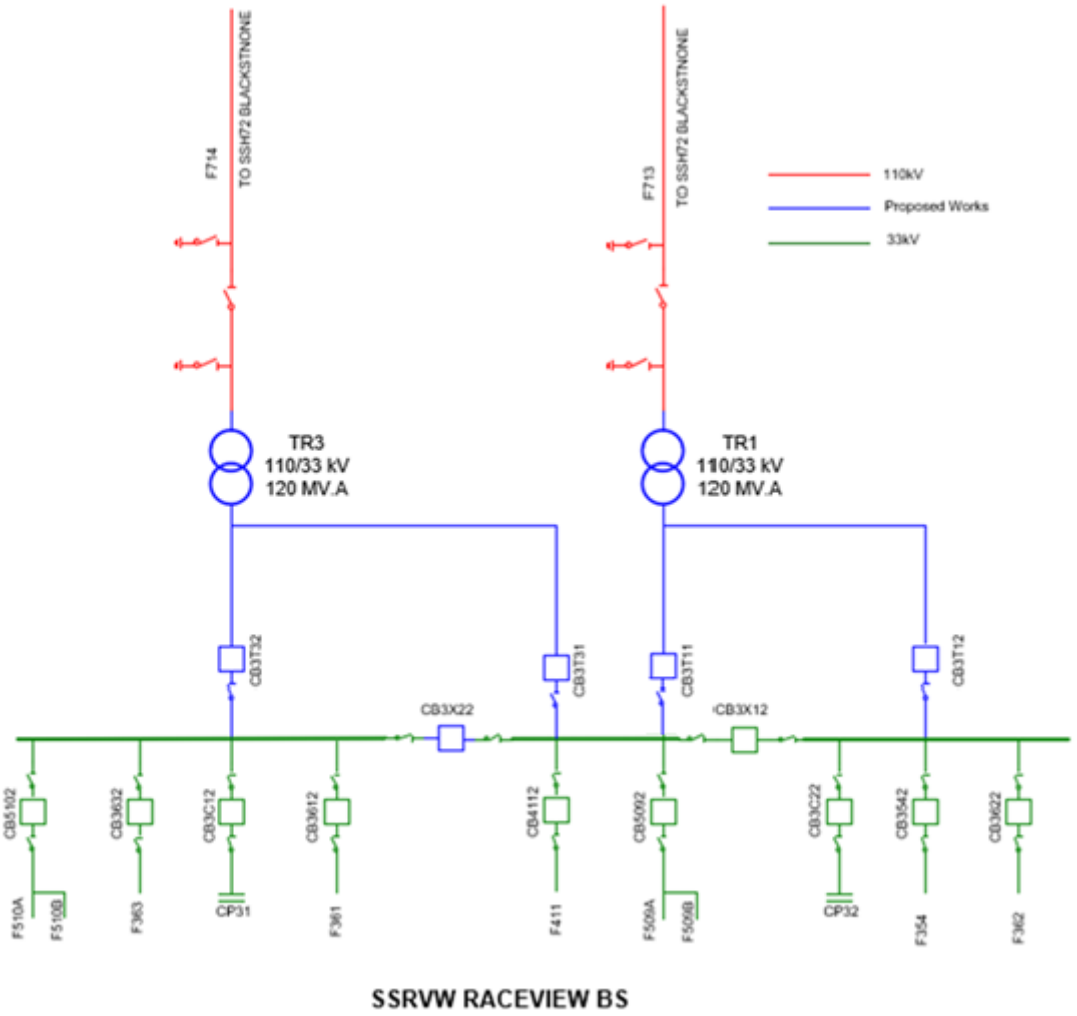

Figure 9: Option A proposed network arrangement (schematic view)

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 Raceview area, which enables Energex to connect new customers to the distribution network. The additional capacity will also enable Energex to meet the reliability requirements as stipulated in Energex's Distribution Authority.

The estimated capital cost of this option would be $19.4 million. The estimated operating costs of this option would be $6,244 a year. The estimated commissioning date of this option would be 2029.

The estimated construction timetable is:

- Construction start: 2027
- Commissioning: 2029

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

The scope of works at SSRVW are being contained within the existing site. 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.

3.1.2 Option B: Replace 110/33kV Transformers TR1/TR3 with 120 MVA Units and Upgrade 33kV Bus to 2000A

This option involves works at SSSRVW:

- Install 120 MVA, 110/33kV transformers with NEXs to replace TR1 and TR3
- Replace 110/33kV transformer 33kV CBs and associated isolators with ratings suitable for 120 MVA transformers.
- Upgrade 33kV bus BB31, BB32 and BB33 to 2000A.
- Replace 33kV bus section circuit breaker CB3X12, CB3X22 and associated isolators
- Install 2 X 33kV VTs for new transformers.
- Upgrade/Install Protection panels for new transformers.
- Replace end of life relays at SSRVW and at associated remote end substations.

A schematic diagram of the proposed network arrangement for Option B is shown in Figure 10.

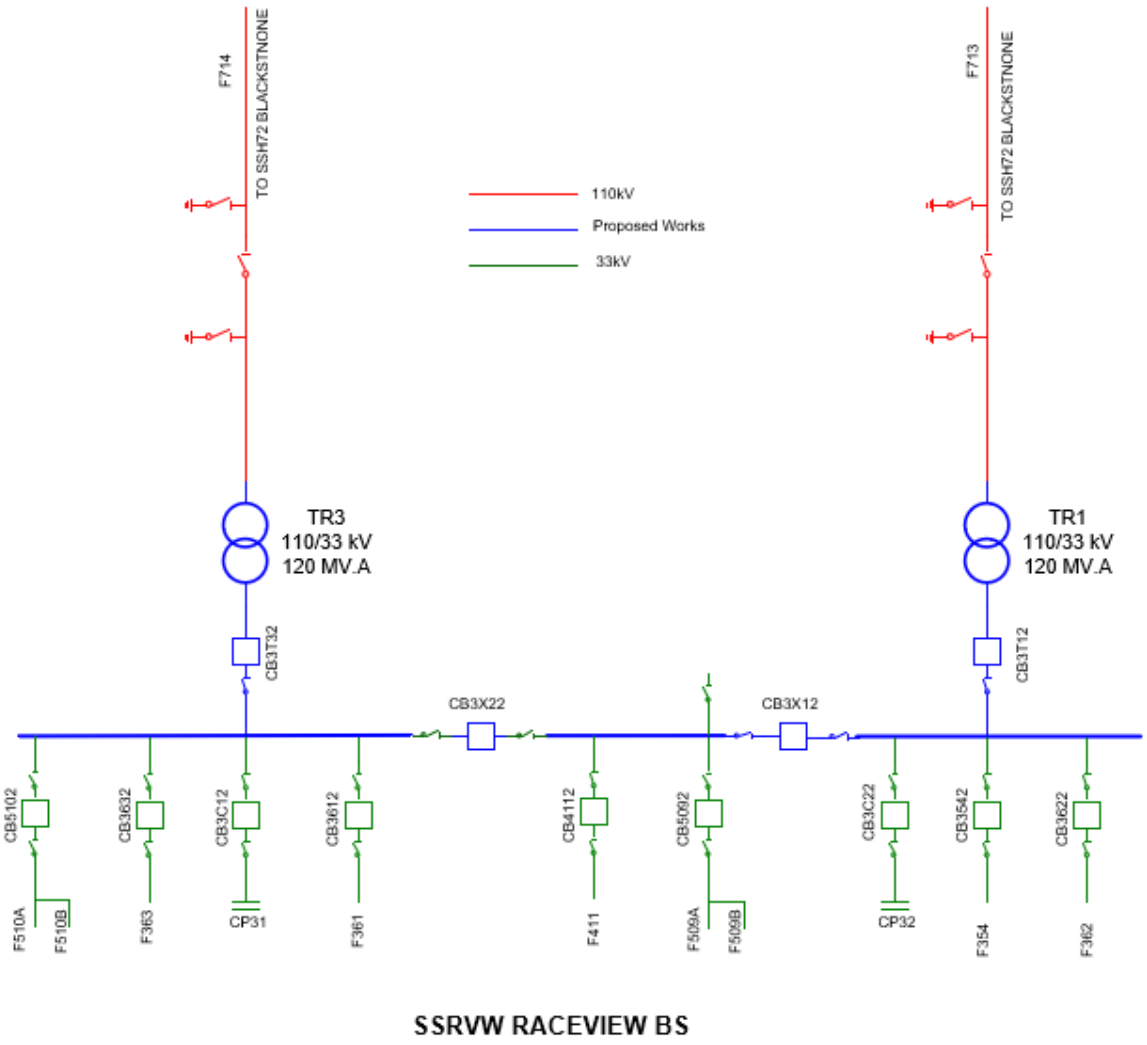

Figure 10: Option B proposed network arrangement (schematic view)

This option is commercially and technically feasible, can be implemented in the timeframe identified and would address the identified need by providing reliable supply and an additional capacity to the Raceview area, which enables Energex to connect new customers to the distribution network. The additional capacity will also enable Energex to meet the reliability requirements as stipulated in Energex's Distribution Authority.

The estimated capital cost of this option would be $21.0 million. The estimated operating costs of this option would be $6,244 a year. The estimated commissioning date of this option would be 2029.

The estimated construction timetable is:

- Construction start: 2027
- Commissioning: 2029

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

The scope of works at SSRVW are being contained within the existing site. 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.

3.2 Ranking of Credible Options

The Table 1 below summarises the costs of the potential credible options relative to the base case in present value terms under the different scenarios. The cost is the estimated capital costs of each option to address the identified need.

Option	Option Name	Rank	Initial Capital Cost	Net Economic Benefit ($ real)	PV of Capex ($ real)	PV of Opex ($ real)
A	Replace 110/33kV Transformers TR1/TR3 with 120 MVA Units and Install 2 X 33kV CBs per Transformer	1	$19,434,163	-$7,099,000	-$17,322,000	-$138,000
B	Replace 110/33kV Transformers TR1/TR3 with 120 MVA Units and Upgrade 33kV Bus to 2000A	2	$20,964,135	-$8,462,000	-$18,686,000	-$138,000

Table 1: Base case NPV ranking table

3.3 Preferred Option

Energex's preferred option is Option A, to replace 110/33kV transformers TR1/TR3 with 120 MVA units and install 2 X 33kV CBs per transformer at Raceview bulk supply substation.

Upon completion of these works, the identified need at Raceview bulk supply Substation will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of

design and construction resources. This option will address the identified need, is commercially and technically feasible and can be implemented in sufficient time to meet the identified need.

The estimated capital direct cost of this option is $19.43 million. Annual operating and maintenance costs are anticipated to be $6,244 as a result of this option. The estimated project delivery timeframe has design commencing in March 2026 and construction completed by March 2029.

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4 SOCIAL LICENCE AND COMMUNITY ENGAGEMENT

4.1 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 SSRVW is being contained within the existing sites. Given the reliability and economic benefits to the local community, there are not expected to be social licence issues.

4.2 Community Engagement

As the scope of works for the preferred option will not extend into new areas of the community and will be entirely contained within the existing site 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.

5 RATIONALE THAT THERE IS NO VIABLE NON-NETWORK OR SAPS OPTIONS

5.1 Consideration of Non-network and SAPS Options

Energex has assessed potential non-network and SAPS options to address the identified need. Potential credible options must be technically and commercially viable and must be able to be implemented in sufficient time to address the identified need. It has been determined, for the following reasons, that no non-network or SAPS options would be suitable to address the identified need or form part of the solution to address the identified need.

5.1.1 Network Load Control

The residential customers and commercial/industrial load appear to drive the daily peak demand which generally occurs between 2:00pm and 6:00pm.

There are 13,988 customers on tariff T31 and T33 hot water load control (LC). An estimated demand reduction value of 8,293kVA[1] is available.

The need at Raceview is to address asset safety and reliability risks, any demand reduction needs to be permanently available. Therefore, this option has been assessed as technically not viable as it will not address the identified network requirement.

5.1.2 Demand Management Programs

The DEM team has completed a review of the Raceview customer base and considered a number of demand management technologies. Reliability corrective actions are the key project drivers (i.e. the need) at Raceview bulk supply substation. It has been determined that most demand management options will not be viable propositions and have been explored in the following sections.

5.1.3 Increased Generation/Supply Options

Generation and storage such as renewable energy generation, solar or wind farms of multiple MW's capacity with BESS constitute an opportunity to support substation investment by reducing demand on, and potentially providing reactive power support for substation assets.

This option could potentially be part of a hybrid network/non-network solution to address the identified need, however, there is no known existing or proposed generation and storage system available in the area. Furthermore, a screening test conducted by Energex shows that the capital and ongoing operating cost of such system is not economical.

[1] Hot water diversified demand saving estimated at 0.6kVA per system

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5.1.4 Demand Response Arrangements With Customers

Four methods utilising demand response technology for deferring network investment are: Call Off Load (COL), Customer Embedded Generation (CEG), Large Scale Customer Generation (LSG) and customer solar power systems.

5.1.5 Customer Call Off Load (COL)

COL is an effective technique for deferring network investment where the need is for a short time period. However, in this instance, the need is required on a long-term permanent basis. There are a small number of large customers in the catchment area but the $/kVA funding available for demand reduction is low therefore customer call off load has been assessed as not a viable proposition as it will not address the identified need, nor benefit the community.

5.1.6 Customer Embedded Generation (CEG)

CEG is an effective technique for deferring network investment where the need is for a short time period. The primary driver for investment in this instance is asset safety and performance. A short-term deferral of network investment by using CEG is not a technically or financially feasible option (due to the number of contracts required to be negotiated and managed).

This option has been assessed as technically not viable as it will not address the identified network requirement.

5.1.7 Large Scale Customer Generation (LSG)

LSG sites such as renewable energy generation, solar or wind farms of multiple MW's capacity constitute an opportunity to support substation investment by reducing demand on, and potentially providing reactive power support for substation assets.

This option could potentially address the identified need, however, has been assessed as technically not viable as there is no known existing or proposed LSG demand response available.

5.1.8 Customer Solar Power Systems

The daily peak demand is driven by residential customer demand and the peak generally occurs between 4:00pm and 8:00pm. As such customer solar generation does not coincide with the peak load period. The impact of the customer solar power systems is already included in the load profile and forecast.

Business customers with large solar arrays are deemed to present a significant opportunity for targeted load control or load curtailment if coupled with a BESS. Contracting such customers is attractive as they represent a larger load across fewer customers and therefore are cheaper and easier to engage and contract.

However, only a small percentage of business customers in this supply area have solar PV systems and possibly none have a BESS. PV systems with BESS present a future portfolio opportunity for potential demand response but currently this supply area has a very limited solar/BESS. Solar customers without a BESS will not meet the technical needs of the demand reduction as their solar contribution may not be available when the network un-met need is required.

5.1.9 Consideration of SAPS Options

Stand-alone Power Systems are off-grid systems that operate independently from the main network. It typically includes solar panels for electricity generation, a battery energy storage system (BESS) to store excess energy, and a backup generator (often a diesel generator).

Energex considers there is no SAPS option that could form a potential credible option on a standalone basis, or that could form a significant part of the credible option. In particular the reliability and load requirements, per the forecast of Raceview bulk supply substation could not be supported by a network that is not part of the interconnected national electricity system. Furthermore, the capital and ongoing operating cost of such system is uneconomical. Therefore, a SAPS option is not technically and economically viable

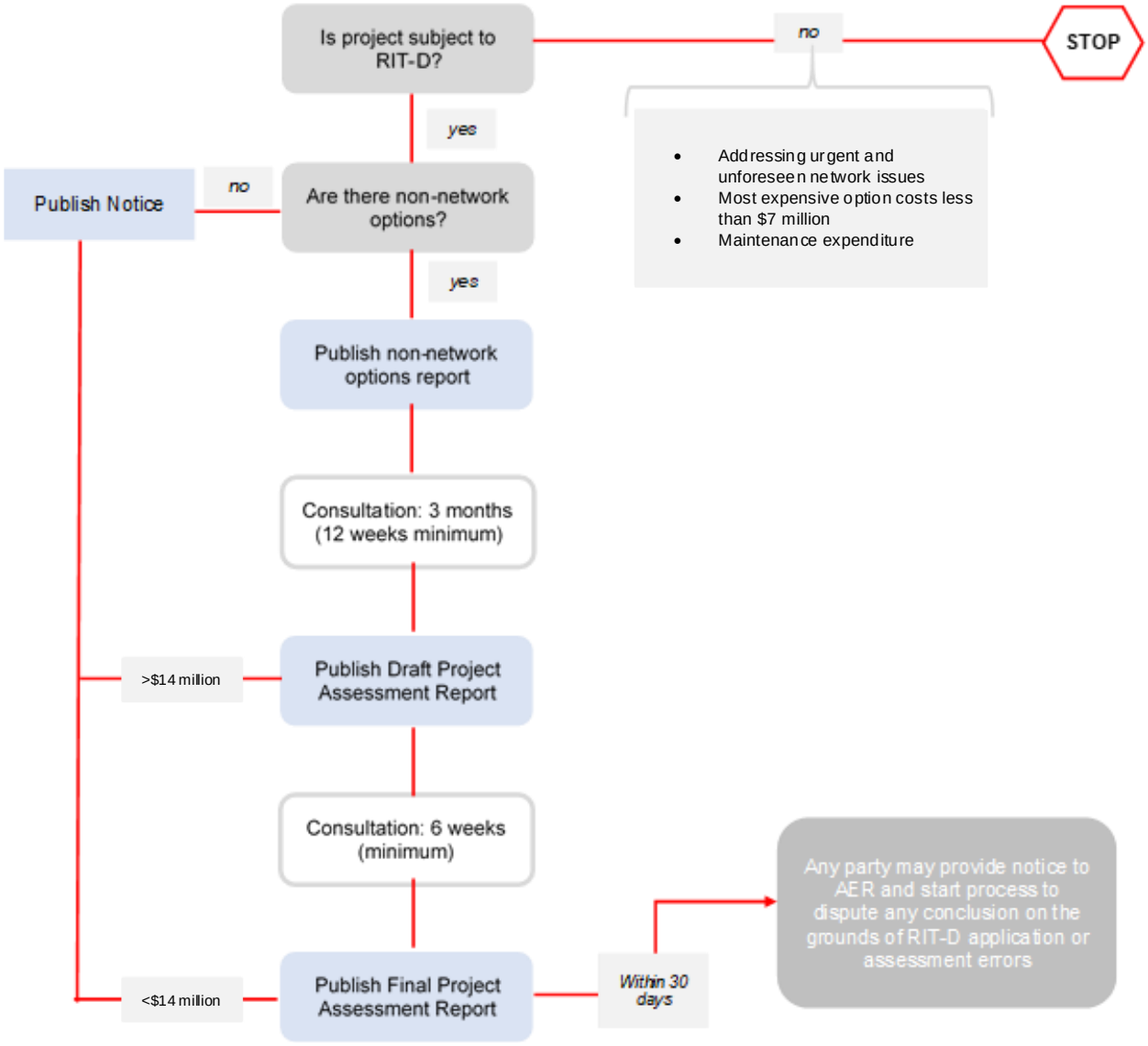
6 CONCLUSION AND NEXT STEPS

Energex has determined that there would not be a non-network or SAPS option that is a potential credible option, or that forms a significant part of a potential credible option, to address the identified need.

As required, Energex publishes this Notice of No Non-network or SAPS as per NER clause 5.17.4 (d).

Energex will be publishing a Draft Project Assessment Report shortly, consultation on that report will be open for a period of at least 6 weeks.

7 APPENDIX A – THE RIT-D PROCESS



8 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.

SCHEDULE 3

Service Safety Net Targets

Feeder Type	Targets *(for restoration of supply following an N-1 event)*
CBD	• Any interruption in customer supply resulting from an N – 1 event at the sub-transmission level is restored with 1 minute
Urban – Following an N – 1 event	• No greater than 40MVA (16,000 customers) is without supply for more than 30 minutes • No greater than 12MVA (5,000 customers) is without supply for more than 3 hours and • No greater than 4MVA (1,600 customers) is without supply for more than 8 hours
Short Rural – Following an N – 1 event	• No greater than 40MVA (16,000 customers) is without supply for more than 30 minutes • No greater than 15MVA (6,000 customers) is without supply for more than 4 hours and • No greater than 10MVA (4,000 customers) is without supply for more than 12 hours

Note: All modelling and analysis will be benchmarked against 50PoE loads and based on credible contingencies