Non-Network Options Report

17 June 2020

Version 1.0

Kilcoy Network Limitation

Consultation Period Starts: 22/06/2020

Consultation Period Closes: 28/09/2020

Part of the Energy Queensland Group

EXECUTIVE SUMMARY

ABOUT ENERGEX

Energex is a subsidiary of Energy Queensland Limited, a Queensland State Government Owned Corporation. Energex distributes electricity to over 1.5 million residential, commercial and industrial customers across a population base of around 3.5 million in South East Queensland.

IDENTIFIED NEED

Kilcoy zone substation (SSKCY) is supplied by Beerwah bulk supply substation via a single 33kV feeder F324 under system normal conditions. There is a back-up supply from Lockrose bulk supply substation via 33kV feeder F447. SSKCY provides electricity supply to approximately 343 predominantly commercial / industrial and 1,902 predominantly domestic customers in Kilcoy, Glenfern, Harlin, Mount Kilcoy, Neurum, Stony Creek, Winya, Woolmar and surrounding areas.

Based on a Condition Based Risk Management (CBRM) analysis of the effect of current condition and ageing on the expected life of 7/.104 overhead conductor,

- Approximately 23km of F447 is deemed to reach its retirement age in August 2023.
- Approximately 26km of F324 is deemed to reach its retirement age in August 2026.

The first objective of the proposed investment is to maintain a safe and sustainable energy supply to customers by reducing the safety and environmental risks associated with 33kV feeders F324 and F447, which have been assessed as having reached their retirement age, to as low as is reasonably practicable (ALARP). Secondly, the proposed investment provides a secure and reliable energy supply to customers by ensuring that the network meets Energex's network security and reliability performance obligations.

In order to reduce the safety and environment risk as well as achieve a reliable network, Energex has identified several network options to address the identified need:

- Option 1: Reconductor F447 and F324
- Option 2: Establish 1 x new SCCT 33kV feeder between SSWFD and SSKCY
- Option 3: Construct 1 x new DCCT 33kV feeder between SSWFD and SSKCY
- Option 4: Reconductor F447 and F324, and run 3MVA of on-site permanent generator

To reduce, defer or avoid network expenditure, a non-network proponent would need to improve reliability at SSKCY to reduce the VCR cost of approximately $6M/annum were the substation to be supplied via a single 33kV feeder.

As a guide, Energex considers the most likely non-network option outcome to be the deferral or elimination of the need to construct a new feeder to replace F447, but still replace F324 with a new 33kV feeder. This could be avoided through either demand reduction such that the VCR implications from a 33kV feeder outage are reduced, or a generation solution that can operate in an islanded mode to supply load while the supply to SSKCY is restored. Another possible likely alternative would be for a supplement to the existing permanent on-site generation to further reduce the unserved energy following a contingency.

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Irrespective of the solution, to defer or eliminate the need for network investment, any assessment of a non-network solution will need to consider the trade-off between the VCR benefits obtained from network support against the cost of operating the non-network solution.

APPROACH

The National Electricity Rules (NER) require that, subject to certain exclusion criteria, network business investments for meeting service standards for a distribution business are subject to a Regulatory Investment Test for Distribution (RIT-D). Energex has determined that network investment is essential in this case for it to continue to provide electricity to the consumers in the Kilcoy area in a reliable, safe and cost-effective manner and meet its obligations under its Distribution Authority. Accordingly, this investment is subject to a RIT-D. This Non-Network Options Report (NNOR) has been prepared by Energex in accordance with the requirements of clause 5.17.4(e) of the NER and seeks information from interested parties about possible alternate solutions to address the need for investment.

Submissions in writing (electronic preferably) are due by 28 September 2020 by 4:00 PM. For further information on this or to enquiry further, please refer to section 1.2 Contact Details.

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1. Introduction

This document is a Non-Network Options Report (NNOR) requesting stakeholders' submissions for credible options to address the identified need in the network. This report is the first stage of the consultation process in the application of the Regulatory Investment Test for Distribution (RIT-D) on credible options to address the identified need for this study area.

The report includes background information about the limitations in this area, highlights the identified need, outlines credible network options, provides the requirements that a non-network proponent would need to meet and specifies the process for interested stakeholder submissions.

1.1. General Terms and Conditions

1. By issuing this NNOR, Energex is under no obligation whatsoever to review, discuss, select or enter into any agreement with any proponent who may submit a proposal.
2. Proponents will be responsible for all costs associated with the preparation and assessment of providing a proposal in response to this NNOR including but not limited to any site visits and responding to further information requests made by Energex in order to assist Energex in its assessment of the proposal.
3. When evaluating a proposal, Energex will be dictated by the NER and RIT-D Guidelines (available on the AER website). Further, Energex will follow the process as described in Energex's Demand Side Engagement Strategy (DSES) a copy of which can be found here.
4. Energex may combine all or parts of separate proposals for the purposes of evaluation where this may lead to a more efficient outcome than the separate proposal or option. Proponents should indicate in their proposal whether they wish to have their proposals or options considered in isolation or in combination with other proponents' proposals.
5. Energex will publicly announce the outcome of the evaluation process. This announcement will be published on Energex's website and unless otherwise agreed in writing at the commencement of the assessment process all details of proposals including cost information will be treated as public information.

1.2. Contact Details

Submissions in writing in response to this report may be submitted to demandmanagement@energex.com.au and are due by 28 September 2020.

2. Background

2.1. Existing Network

Kilcoy zone substation (SSKCY) is supplied by Beerwah bulk supply substation (SSBWH) via a single 33kV feeder F324 under system normal conditions. There is a back-up supply from Lockrose bulk supply substation (SST78) via 33kV feeder F447.

SSKCY provides electricity supply to approximately 343 commercial/industrial and 1,902 domestic customers in Kilcoy, Glenfern, Harlin, Mount Kilcoy, Neurum, Stony Creek, Winya, Woolmar and surrounding areas. Geographic and schematic views of the network area under study are provided in Figure 1 to Figure 5.

Energex are currently undertaking an approved project at SSKCY to increase the substation transformer capacity due to demand growth and the condition of the existing transformers at the site. To meet the growth in demand until this project is completed, Energex have deployed 3MVA of generation at the site to offset the demand at peak times.

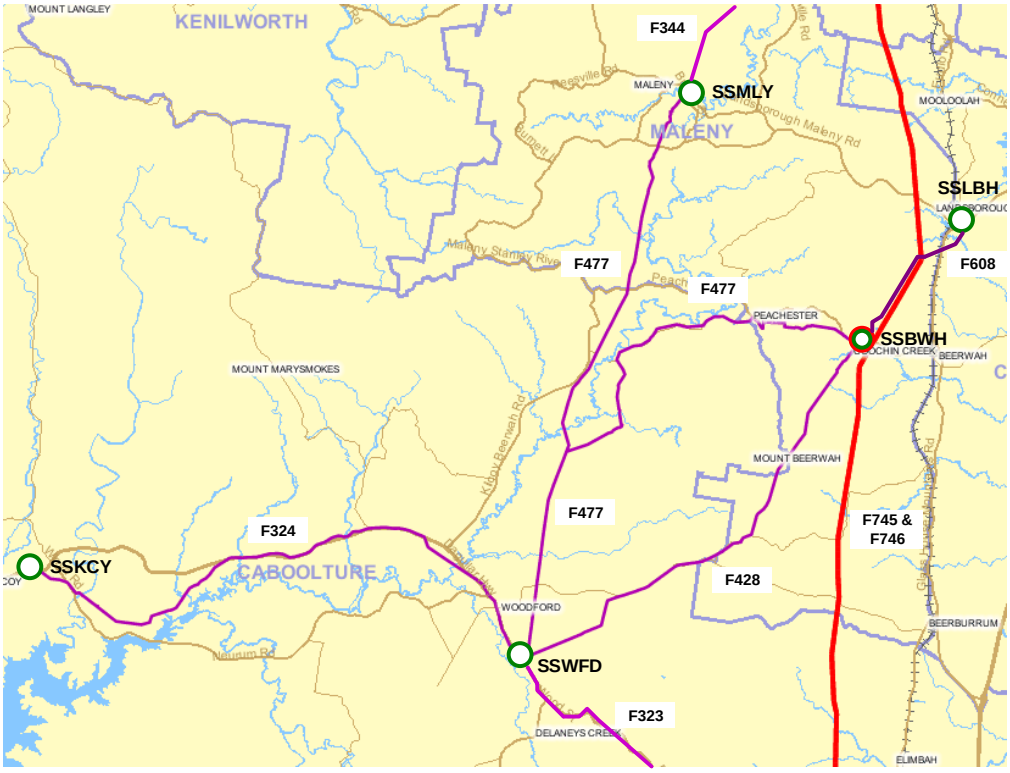


Figure 1: Existing Beerwah sub-transmission network arrangement (Geographic view)

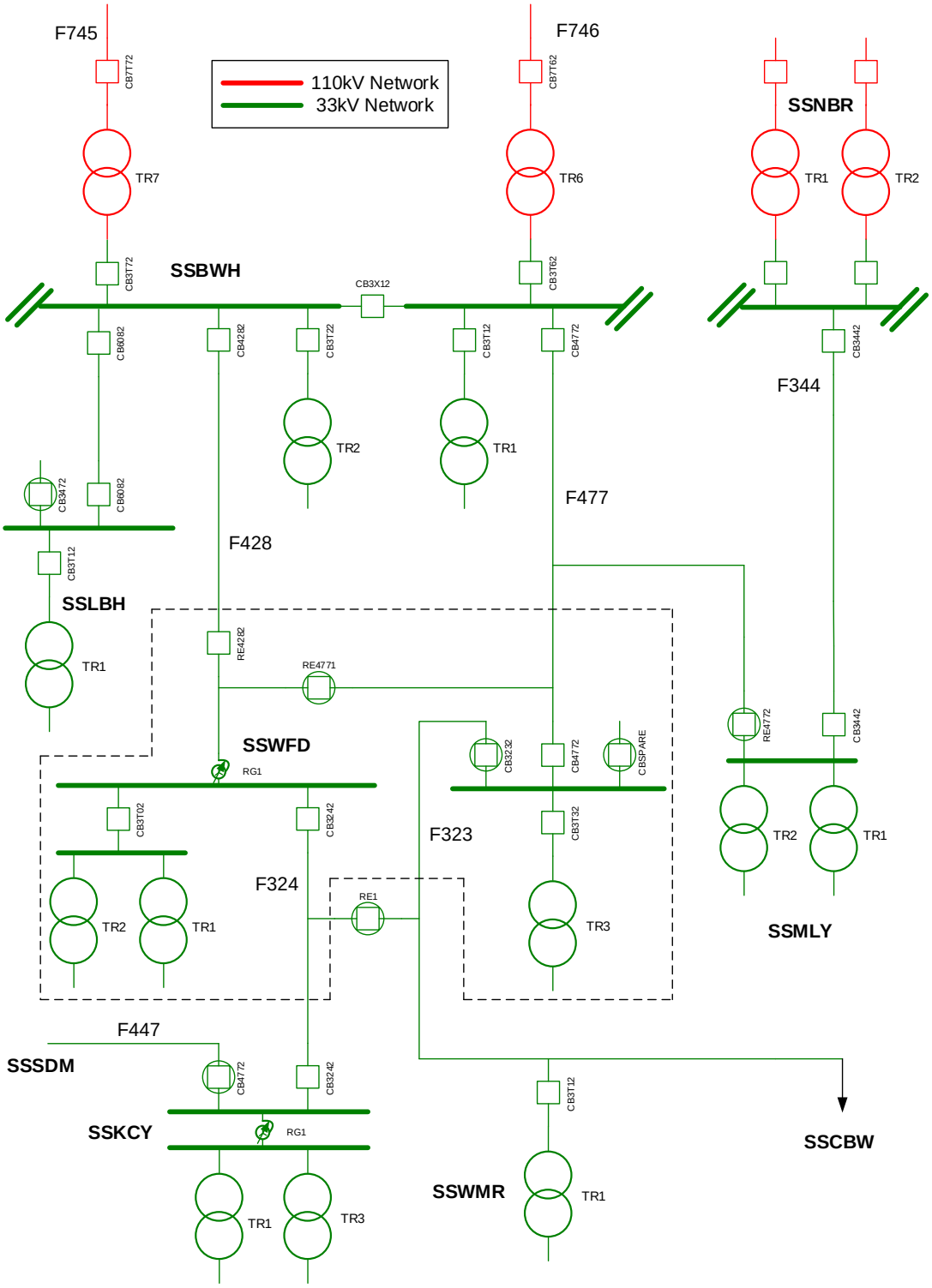


Figure 2: Existing Beerwah Network Arrangement (Schematic View)

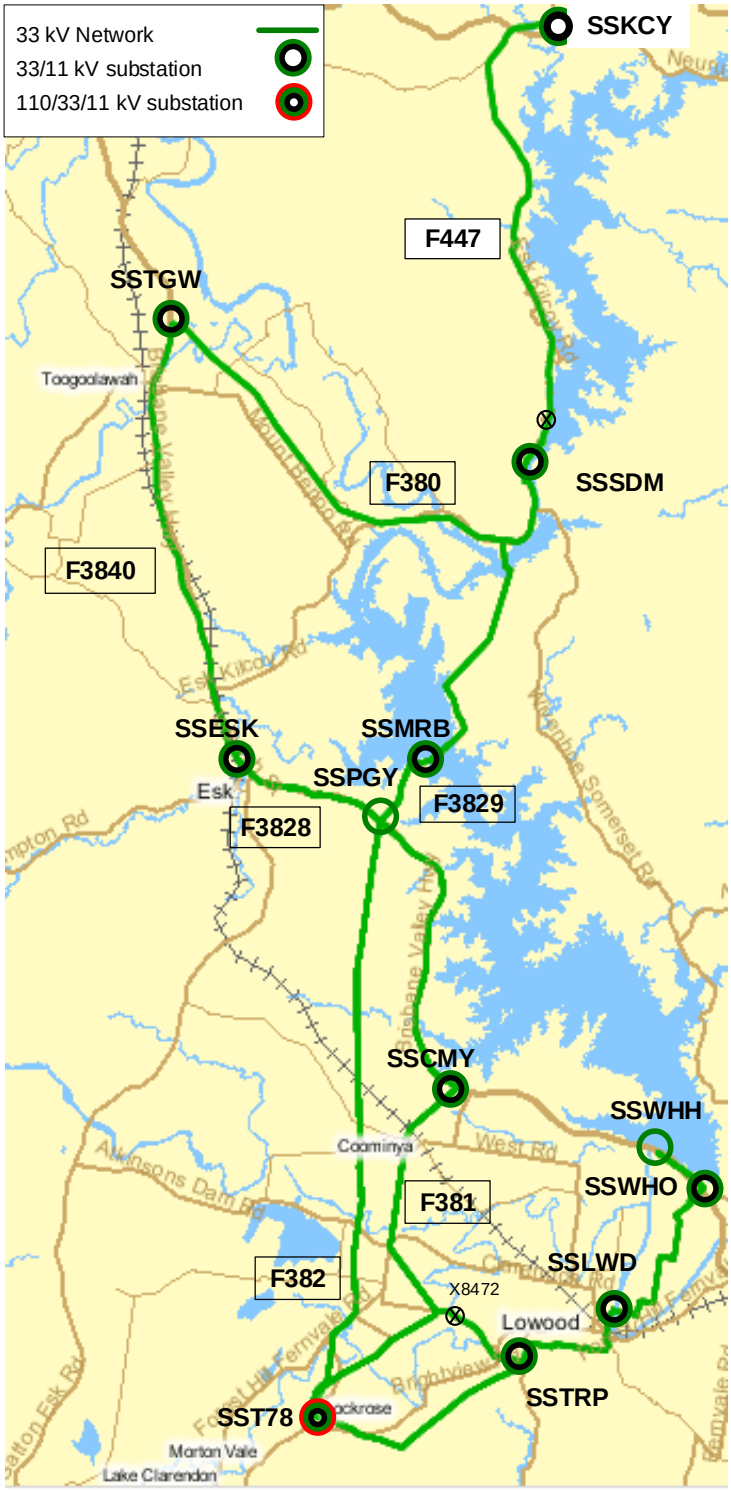


Figure 3: Existing Lockrose Network Arrangement (Geographic View)

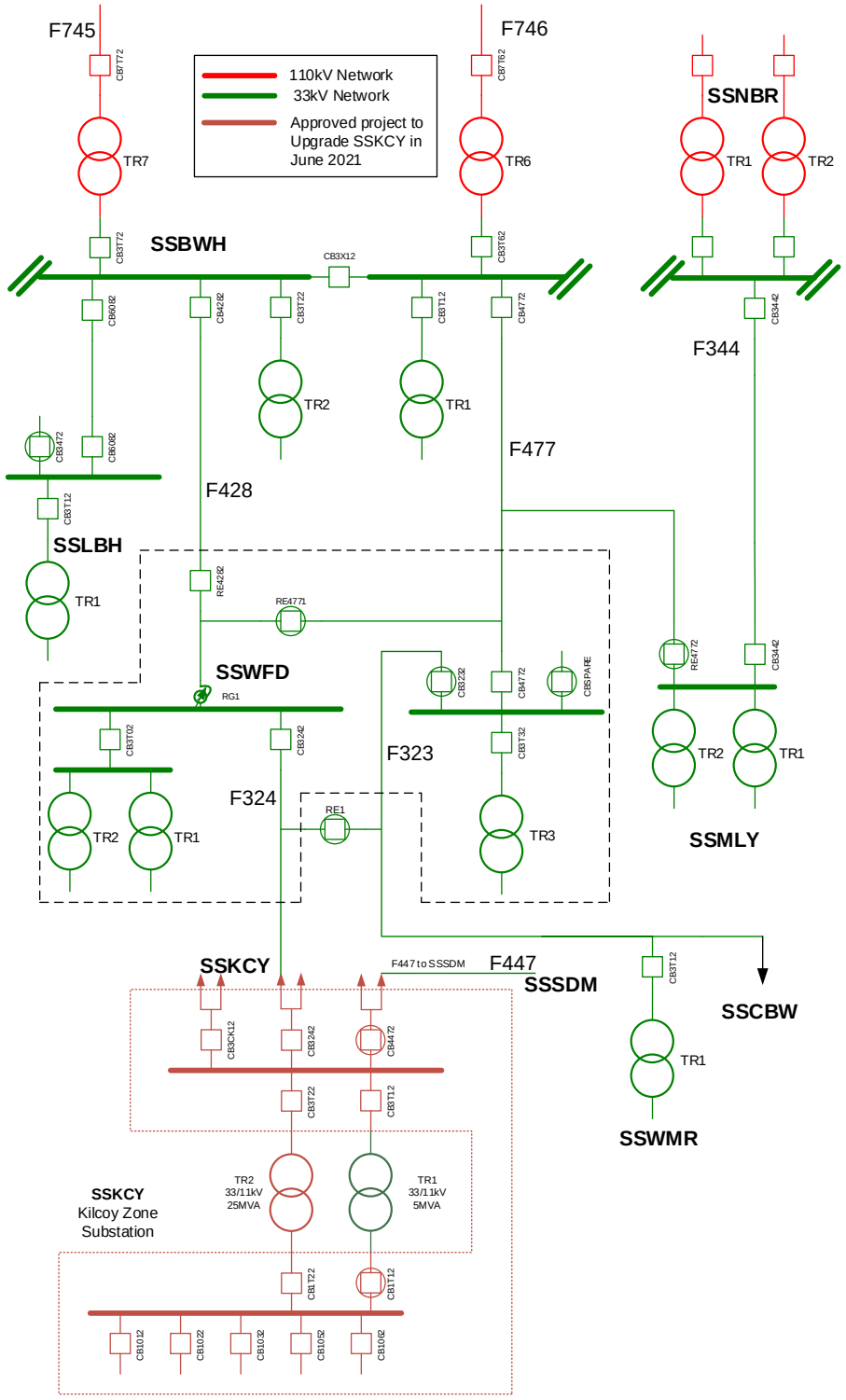


Figure 4: Existing Beerwah Network Arrangement with Approved project (Schematic View)

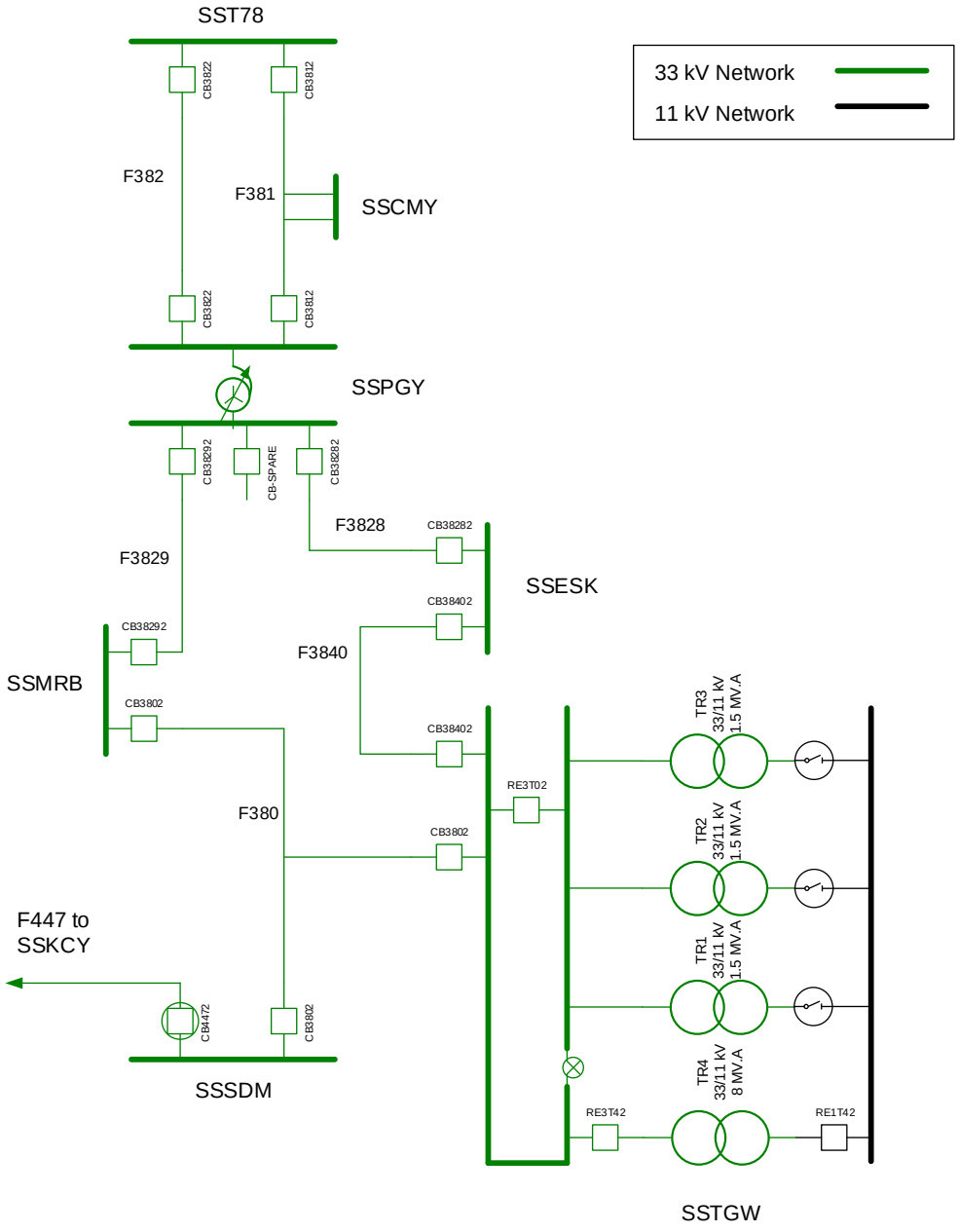


Figure 5: Existing Lockrose Network Arrangement (Schematic View)

2.1. Load Profiles

The annual load profile for SSKCY is shown in Figure 6 below.

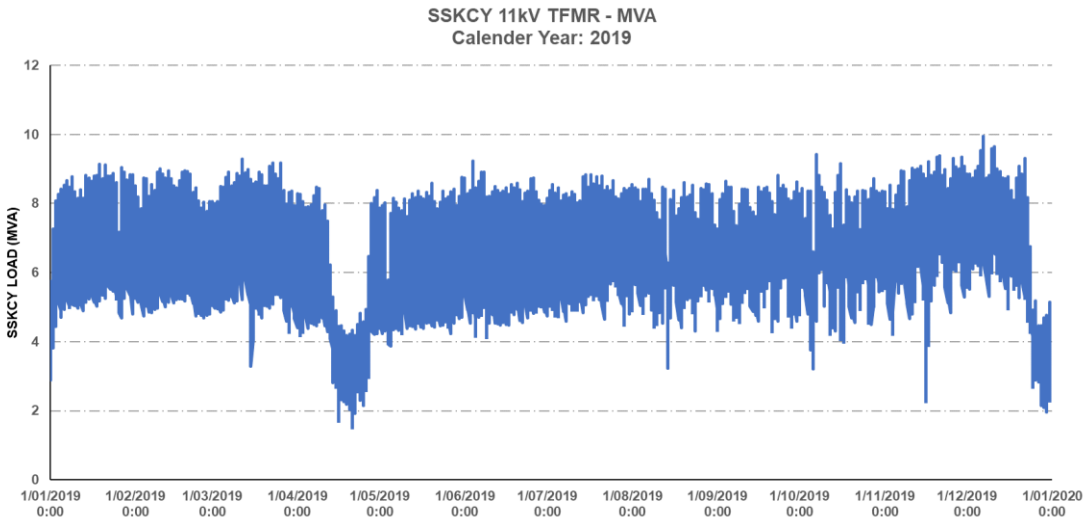
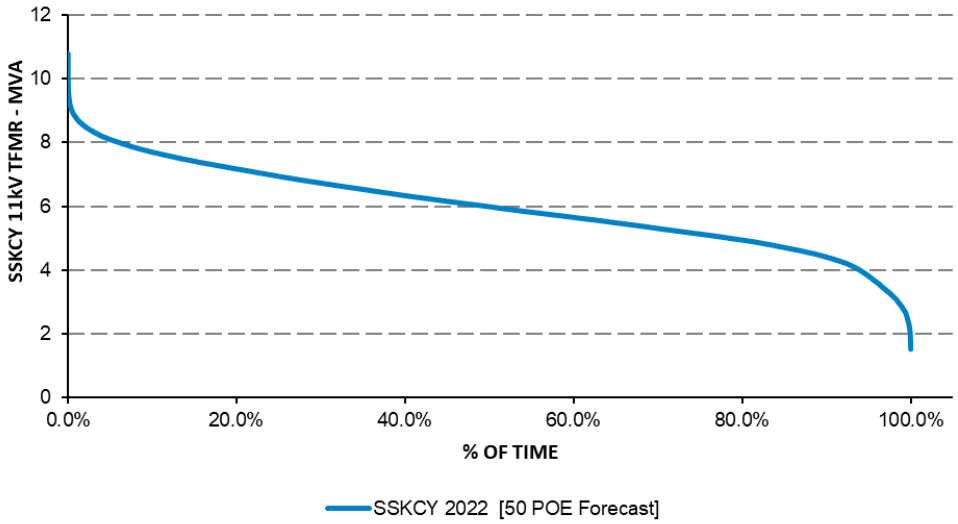


Figure 6: Annual load profile (MVA) for SSKCY in 2019

Figure 7Figure 7 illustrate the load duration curve for SSKCY. This is based on the previous 3 years of data and is scaled to the respective maximum 50% probability of exceedance (PoE) forecast.



*The values for SSKCY have been scaled to the 2022 peak forecast load.

Figure 7: Load duration curve for SSKCY

3. Identified Need

3.1. Applied Service Standard

Under its Distribution Authority, Energex must adhere to the Safety Net which identifies the principles that apply to the operation of network assets under network contingency conditions. System contingency related capability is assessed against a 50PoE forecast load, available load transfers, emergency cyclic capacity (ECC) ratings, non-network response, mobile plant, mobile generators, and short-term ratings of plant and equipment where available. This process allows load at risk under contingency conditions to be identified and assessed. Energex's Distribution Authority can be accessed by the following link:

https://www.dnrme.qld.gov.au/__data/assets/pdf_file/0003/219486/distribution-authority-d0798-energex.pdf

As per the Energex Safety Net criteria, for sub-transmission lines F324 and F447 supplying rural zone substations, during a single contingency event, interruption of supply up to 40MVA is permissible for the first 30 minutes, followed by a maximum interruption of up to 15MVA, provided all load except for up to 10MVA can be restored within 4 hours, and the remaining load fully restored after 12 hours. Table 1 below outlines the Safety Net criteria.

Category	Demand Range	Allowed Outage to be OK
Urban	> 40MVA	No outage OK
	12-40MVA	30 minutes OK
	4-12MVA	3 hours OK
	<4MVA	8 hours OK
Rural	>40MVA	No outage OK
	15-40MVA	30 minutes OK
	10-15MVA	4 hours OK
	<10MVA	12 hours OK

Table 1: Summary of Safety Net Criteria

In addition to meeting the Safety Net criteria, the timing of a network augmentation may be advanced if there is a positive economic benefit. For example, when the Total Value of Customer Reliability (VCR) exceeds the annualised capital cost of the augmentation. This is demonstrated in Figure 8.

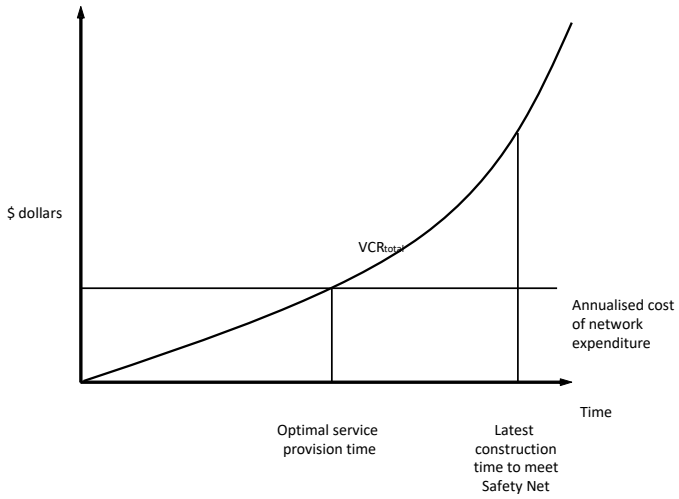


Figure 8: Total VCR v.s. Annualised Capital Cost of Network Augmentation

3.2. Description of the Identified Need

3.2.1. Safety Net Non-Compliance

There is no safety net limitation for 33kV sub-transmission feeders F447 (SSKCY - SSSDM) and F324 (SSWFD - SSKCY) and Kilcoy zone substation. This assessment shows that without F447, F324 can sufficiently support SSKCY zone substation load under system normal 10 PoE load and 50 PoE load under contingency.

Refer to Section 3.3.1 for VCR analysis outlining the need for network investment.

3.2.2. Sub-transmission Network Condition Limitations

Based on a Condition Based Risk Management (CBRM) analysis of the effect of current condition and ageing on the expected life of 7/.104 overhead conductor, the following limitations have been identified in the study area:

- Approximately 23km of F447 is deemed to reach its retirement age in August 2023
- Approximately 26km of F324 is deemed to reach its retirement age in August 2026

A risk assessment has been undertaken on the condition of these feeders and Energex has deemed that without undertaking remediation the safety risk associated with the feeder's condition would not be reduced to be So Far As Is Reasonably Practicable (SFAIRP). Secondly, there is also an environmental risk associated that will also not be As Low As Is Reasonably Practicable (ALARP). As such, retention of these feeders in their current condition is not considered an acceptable option.

3.3. Quantification of the Identified Need

3.3.1. Value of Customer Reliability (VCR)

Energex would technically meet its Safety Net obligations outlined in its Distribution Authority, through supplying the load at SSKCY via a single 33kV feeder, accepting the risk of an outage and supplying the load using load transfers and deployment of mobile generation.

However, due to limited load transfers, high outage rate of long 33kV feeders and high value of unserved energy due to the industrial loads in the area, there is a significant VCR cost associated with supplying the substation via a single 33kV feeder. The VCR for the case of supplying Kilcoy via a single 33kV feeder has been modelled using the below assumptions:

- **VCR rate of $50.95 –** based on a load that is 25% domestic, 15% commercial and 60% industrial.
- **Forced outage rate of 2.45 outages/year –** Energex uses an outage rate of 9.5 outages per 100km, with the feeder supplying SSKCY being around 26km. This is supported by 13 historic feeder outages in the past 6 years.
- **Load Transfers and Repair Time** – due to its remote location, there are almost no load transfers available at SSKCY, therefore the lost energy is the entire substation. Furthermore, the repair time to restore the 33kV feeder has been assumed at 8 hours.

Figure 9 below shows the VCR costs associated with supplying SSKCY with a single 33kV feeder.

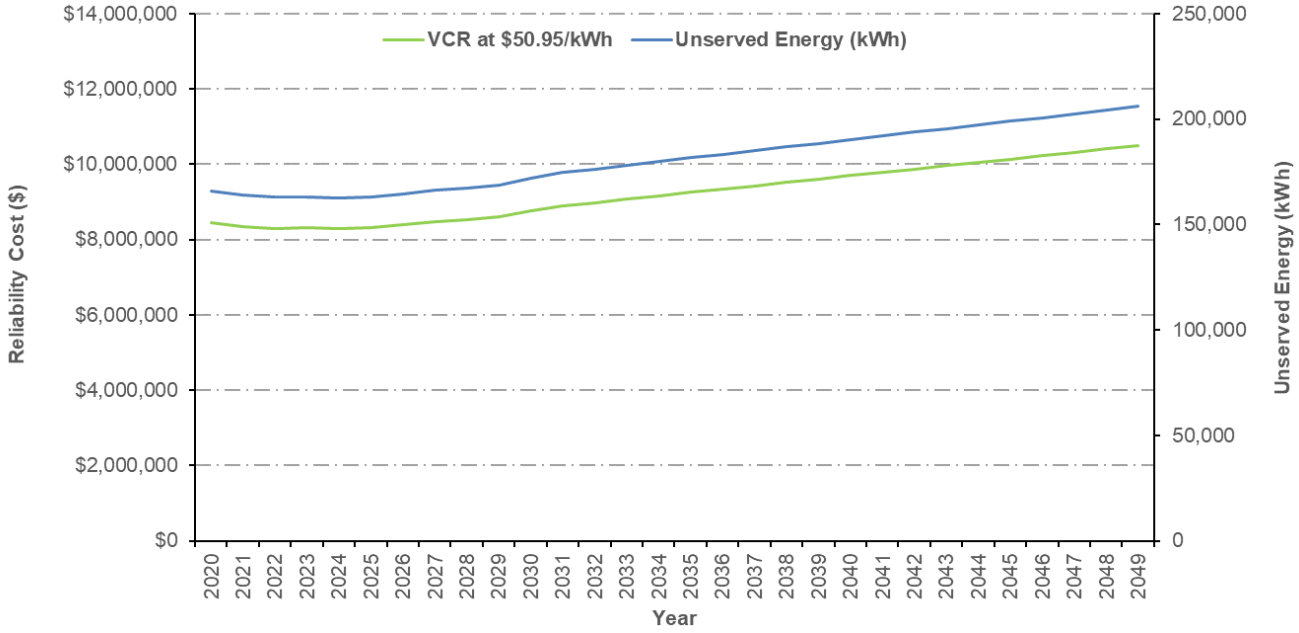


Figure 9: VCR Calculation Values for Single 33kV Supply to SSKCY

As shown above, there is a VCR cost of over $8M/year for an unserved energy rate of $50.95. The options presented in Section 5.2 have capital costs in the vicinity of $15M which is an annualised cost of $400k, meaning that considering an option of a single 33kV feeder is not economically equivalent given the high VCR figures. As such, Energex have not considered supplying SSKCY from a single feeder as a feasible network option given the high economic amenity provided by a second 33kV feeder.

4. Assessment Methodology & Assumptions

4.1. Demand Forecasts

Please refer to Section 5 (Network Forecasting) of the latest Energex DAPR publication for in-depth details regarding the methods and assumptions behind Energex's demand forecasts.

4.2. Discount Rate

Calculations for annual deferral values of projects are based on Energex's regulated pre-tax real WACC (Weighted Average Capital Cost). This value is prescribed by the AER for a specific regulatory period. The identified need described in this NNOR occurs in the 2020-2025 AER period, where the WACC is 2.62%. (Note that this is lower than the WACC in the previous regulatory period.)

4.3. Cost Estimates

Project costs are calculated using standard estimate components which are developed & evaluated by estimation teams in Energex. The costs are split into 2 components: direct cost, which is the costs which are directly costed to the project; and indirect costs which cover overheads associated with the business. All costs provided in this report are estimated to fall within ± 40% accuracy of the stated cost.

4.4. Evaluation Test Period

Consideration of network options is assessed over an evaluation period of 60 years.

5. Internal Options Considered

5.1. Non-Network Options Identified

No purely non-network options have been identified at this stage.

5.2. Distribution Network Options Identified

5.2.1. Do Nothing (Base Case)

The identified need is non-compliance against Energex's Distribution Authority obligations. As such, the Do Nothing option is not an acceptable outcome.

Specifically:

- The 33kV F447 between SSKCY and SSDM is deemed to reach its retirement age by August 2023, and there will be a resultant increase in the likelihood of failure.
- The 33kV F324 between SSWFD and SSKCY is deemed to reach its retirement age by August 2026, and there will be a resultant increase in the likelihood of failure.

As such, Energex considers that the Base Case is an unacceptable solution for the identified limitations.

5.2.2. Option 1: Reconductor F447 and F324 in-situ

This option involves upgrading both 33kV feeders. Specifically:

August 2023

- Reconductor feeder F447 between SSKCY and SSSDM to remove the ageing conductor
- Establish a new communications link between SSSDM and SSKCY.
- No extra work would be required to be included in recovery of TR2 and replacement of 33kV and 11kV isolators at SSWFD. Other options require further work to be included in this project.
- Estimated capital cost: $9.8 million ± 40%
- Estimated operating cost per annum: $48,840

August 2026

- Reconductor feeder F324 between SSWFD and SSKCY
- Establish a new communications link between SSWFD and SSKCY.
- Estimated capital cost: $10.4 million ± 40%
- Estimated operating cost per annum: $52,910

VCR Implications

Following the reconductoring of each of the 33kV feeders, Energex forecasts that there will be significant unserved energy ranging from 18MWh to 38MWh, resulting in VCR costs between $1M to $2M. This is due to F447 only being able to supply 6MVA of the load at SSKCY due to voltage constraints on the network highlighted in the previous section.

Figure 10 below shows these values over time.

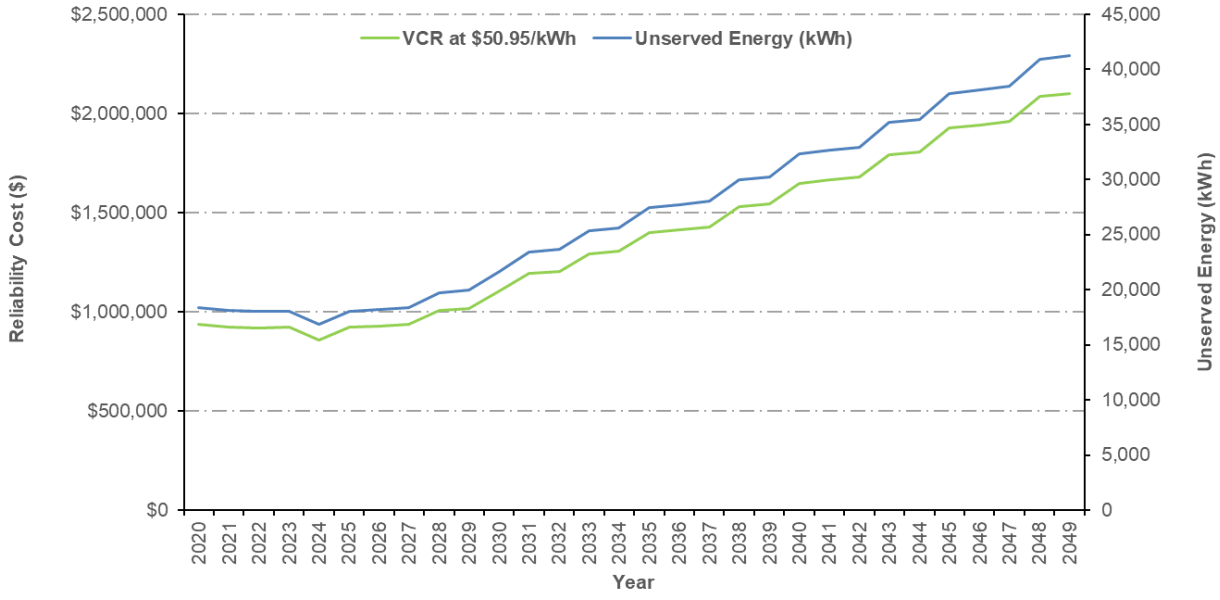


Figure 10: VCR implications for Option 1

5.2.3. Option 2: Construct new SCCT 33kV feeder between SSWFD and SSKCY, de-commission F447 and re-conductor F324

This option constructs a single circuit (SCCT) feeder between SSWFD and SSKCY and reconductors the existing feeder F324. Specifically:

August 2023

- Overbuild existing 18.5km of 11kV feeder as 33kV and construct 7.5km of new 33kV overhead feeder with between SSWFD and SSKCY.
- Establish a new communications link between SSWFD and SSKCY.
- Recover 24km of F447
- Required works at SSWFD and SSKCY to connect the new 33kV feeder.
- Estimated capital cost: $15.68 million ± 40%
- Estimated operating cost per annum: $52,910

August 2026

- Reconductor feeder F324 between SSWFD and SSKCY
- Estimated capital cost: $10.4 million ± 40%
- Estimated operating cost per annum: $52,910

Figure 11 shows the schematic diagram below.

VCR Implications

Following the construction of the new 33kV feeder from SSWFD to SSKCY, Energex forecasts that there will be no unserved energy, and therefore no VCR costs due to SSKCY being supplied by two 33kV feeders, both of which will be able to fully supply the forecast SSKCY load.

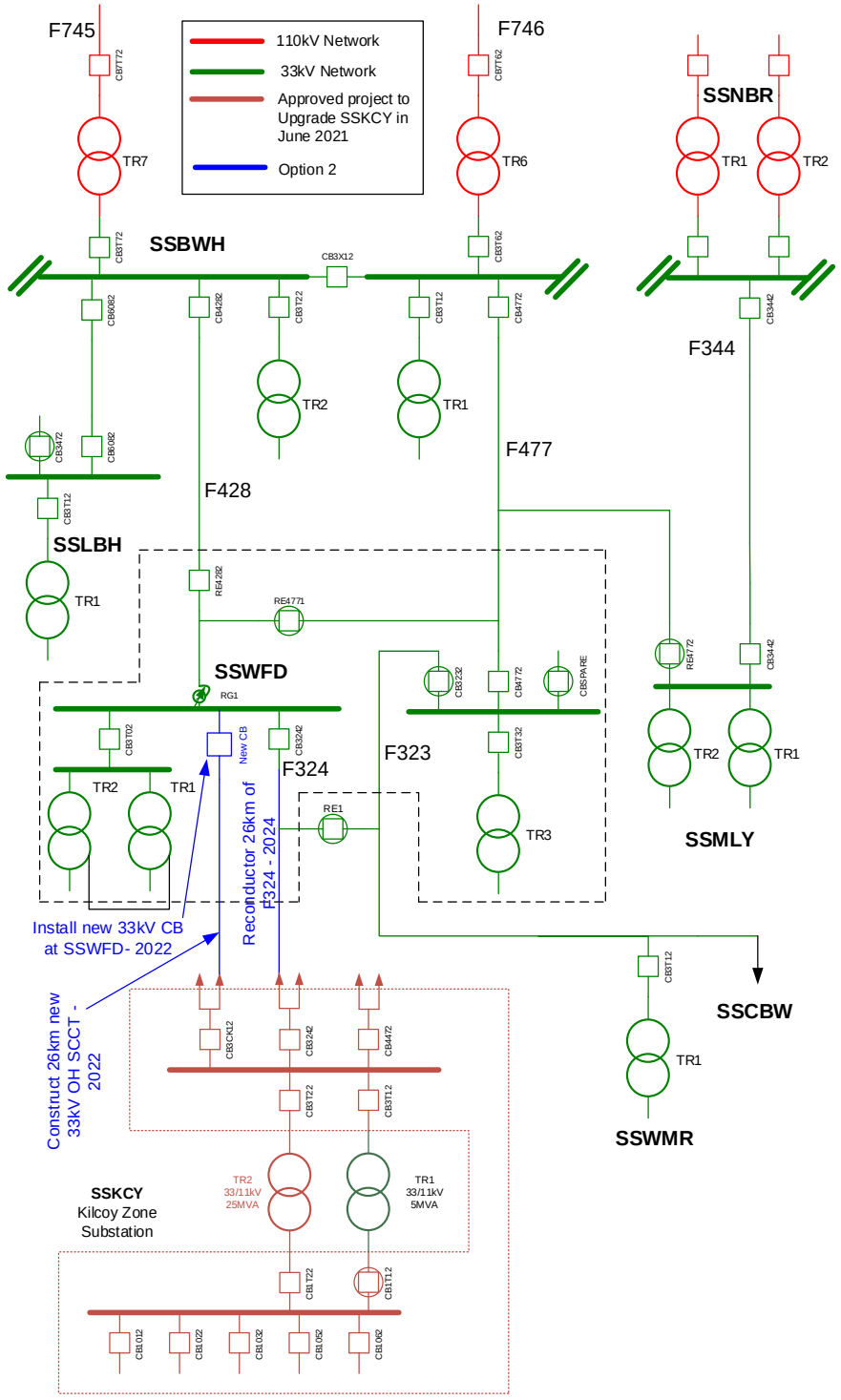


Figure 11: Proposed Beerwah Network Arrangement with Approved project (Schematic View)

5.2.4. Option 3: Construct DCCT 33kV Feeder from SSWFD to SSKCY

This option constructs a new double circuit feeder from SSWFD to SSKCY and decommissions feeder 324. Specifically:

August 2023

- Construct 26km of DCCT 33kV overhead feeder between SSWFD and SSKCY.
- Recover 24km of F447
- Establish a new communication link between SSWFD and SSKCY.
- Required works at SSWFD and SSKCY to connect the new 33kV feeder.
- Estimated capital cost: $26.7 million ± 40%
- Estimated operating cost per annum: $105,820

August 2026

- Recover feeder F324
- Estimated capital cost: $3.2 million ± 40%
- Estimated operating cost per annum: Not Applicable

The resultant single line network arrangement following completion of both projects is identical to that shown in Figure 11.

VCR Implications

Following the construction of the new 33kV feeder from SSWFD to SSKCY, Energex forecasts that there will be no unserved energy, and therefore no VCR costs due to SSKCY being supplied by two 33kV feeders, both of which will be able to fully supply the forecast SSKCY load.

5.2.5. Option 4: Reconductor feeder F447 and F324, and run 3MVA on-site permanent generator

This option has the same network arrangement as that of Option 1, however retains the existing 3MW generators currently on site to provide generation for a loss of feeder F324 at peak load. Specifically:

August 2023

- Reconductor feeder F447 between SSKCY and SSSDM.
- Establish a new communication link between SSSDM and SSKCY.
- Required works at SSWFD and SSKCY to connect the new 33kV feeder.
- Estimated capital cost: $15.68 million ± 40%
- Estimated operating cost per annum: $82,910

August 2026

- Reconductor feeder F324 between SSWFD and SSKCY
- Establish a new communication link between SSWFD and SSKCY.
- Estimated capital cost: $10.4 million ± 40%
- Estimated operating cost per annum: $52,910

The resultant single line network arrangement following completion of both projects is identical to that shown in Figure 2 and Figure 3.

VCR Implications

Following the reconductoring of each of the 33kV feeders, Energex forecasts that there will be significant unserved energy ranging from 7MWh to 11MWh, resulting in VCR costs between $0.350M to $0.550M. This is due to the onsite generation only being able to supply 3MVA of the load and the remaining feeder being able to supply 6MVA at SSKCY. Figure 12 below shows these values over time.

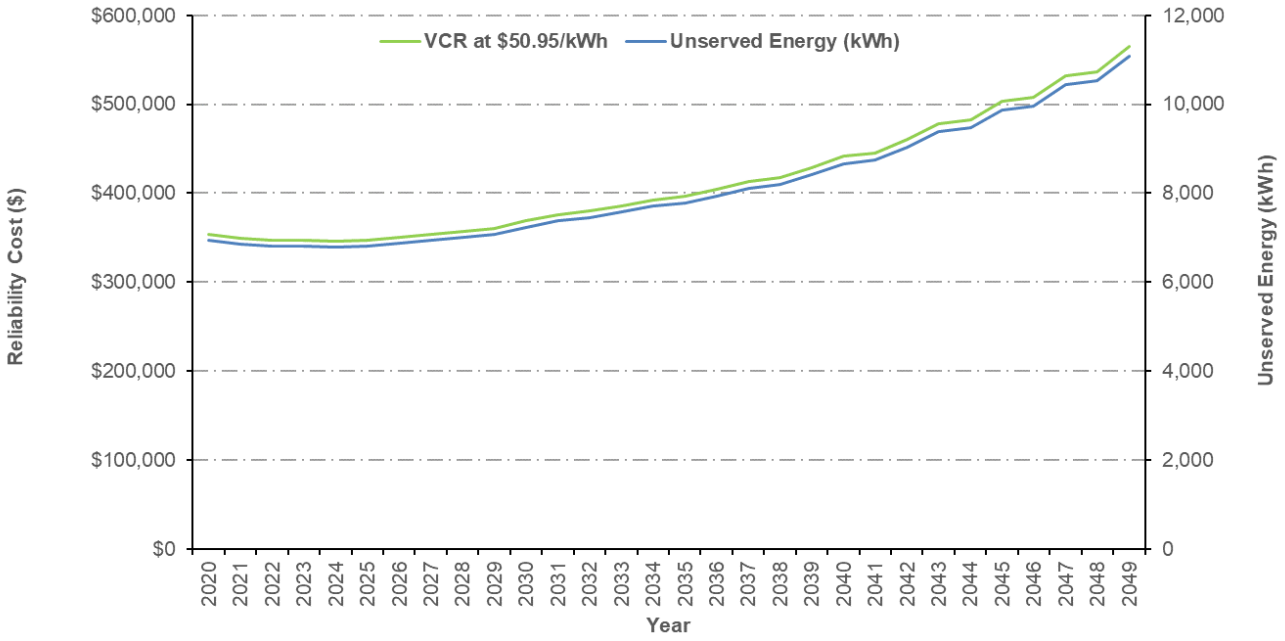


Figure 12: VCR implications for Option 4

5.3. Options deemed non-feasible

5.3.1. Construct new DCCT 33kV feeders between SSWFD and SSKCY, de-commission feeders F447 and F324

This option was deemed non-feasible because of the high initial capital cost incurred as part of establishing a DCCT on an existing route that is next to major arterial roads and highways.

5.4. Preferred Network Option

The preferred network option is Option 2;

- Recover F447 by 2023.
- Establish a new 33kV feeder between SSWFD and SSKCY by 2023.
- Reconductor F324 by 2026.

This has estimated capital project cost of $14.68M, and an annual operating cost of approximately $50,250.

5.5. Potential Deferred Augmentation Charge

Energex have estimated the capital cost of the network options to within ± 40% of estimation accuracy. Using these costs as a guide, a deferral of the preferred network option by a year represents a deferral saving of approximately $438,000 per annum, assuming the same reliability outcomes are maintained as with the preferred network option. While this should not be considered as the precise deferral cost available to a non-network proponent, it serves as a guide for interested parties to determine the viability of their proposal. Energex will work with non-network proponents based on the specifics of what the proponents offer and any necessary further works that Energex may have to undertake to ensure the reliability, security and safety of the network are maintained.

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6. Non-Network Options

6.1. Assessment of Non-Network Solutions

To reduce, defer or avoid network expenditure, a non-network proponent would need to improve reliability at SSKCY to reduce the VCR cost of approximately $6M/annum were the substation to be supplied via a single 33kV feeder. The assessment of any non-network solution to defer or eliminate the need for network investment, will need to consider the trade-off between VCR and the cost to deploy the solution.

6.2. Feasible vs Non-Feasible Options

6.2.1. Potentially Feasible Options

The identified need presented in this NNOR is driven by an existing safety and environmental risk if Energex were to retain their existing 33kV feeders. If Energex were to remove one of these 33kV feeders, there will be a significant reduction in customer reliability in the Kilcoy area as demonstrated by the VCR costs outlined in Section 3.3.1.

As such, solutions that prudently and efficiently address these constraints will be considered.

A non-exhaustive list of potentially feasible options includes:

- Embedded dispatchable network generation
- Embedded energy storage systems
- Embedded energy storage systems combined with Generation (possibly dispatchable or non-dispatchable)
- Load curtailment agreements with customers to disconnect from the network following a contingency.

6.2.2. Options That Are Unlikely To Be Feasible

Without attempting to limit a potential proponent's ability to innovate, unproven, experimental or undemonstrated technologies are unlikely to be considered as feasible options to address the identified limitation.

6.2.3. Timing of Feasible Options

Any proposed solution must be available by August 2023.

7. Submission and Next Steps

7.1. Submission from Solution Providers

Energex invites written submissions to address the identified need in this report from registered participants and interested parties. With reference to Section 5, all submissions should include enough technical and financial information to enable Energex to undertake comparative analysis of the proposed solutions against alternative options. The proposals should include, but are not limited to, the following:

- Full costs of completed works including delivery and installation where applicable.
- Whole of life costs include operational costs.
- Project execution strategy including design, testing and commissioning plans.
- Engineering network system studies and study reports.

Energex will not be legally bound or otherwise obligated to any person who may receive this RIT-D report or to any person who may submit a proposal. At no time will Energex be liable for any costs incurred by a proponent in the assessment of this RIT-D report, 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 RIT-D report.

The RIT-D process is aimed at identifying a technically feasible non-network alternative to the internal option that has greater net economic benefits. However, the selection of the solution provider to implement the preferred option will be done in accordance with Energex's standards for procurement.

Submissions in response to the report may be submitted to demandmanagement@energex.com.au and are due by 28 September 2020**.**

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7.2. Next Steps

Energex intends to carry out the following process to assess what action should be taken to address the identified need in the Kilcoy supply area:

Step 1	Publish NNOR (this report) inviting non-network options from interested participants	Date Released: **22 June 2020**
Step 2	Submissions in response to the NNOR	Due Date: **28 September 2020**
Step 3	Review and analysis of proposals by Energex This is likely to involve further consultation with proponents and additional data may be requested.	Anticipated to be completed by: **26 October 2020**
Step 4	Release of Draft Project Assessment Report (DPAR)	Anticipated to be released by: **9 November 2020**
Step 5	Submissions in response to the Draft Project Assessment Report.	Due Date: **11 January 2021**
Step 6	Review and analysis by Energex. This is likely to involve further consultation with proponents and additional data may be requested.	Anticipated to be completed by: **15 February 2021**
Step 7	Release of Final Project Assessment Report (FPAR) including summary of submissions received	Anticipated to be released by: **1 March 2021**
Energex reserves the right to revise this timetable at any time. The revised timetable will be made available on the Energex website.		

Energex will use its reasonable endeavours to maintain the consultation program listed above. However, due to changing power system conditions or other circumstances beyond the control of Energex, this consultation schedule may change. Up-to-date information will be available on the Current Consultations webpage which can be accessed by the following link:

https://www.energex.com.au/home/our-services/projects-And-maintenance/current-consultations

During the consultation period, Energex will review, compare and analyse all internal and external solutions. At the conclusion of the consultation process, Energex will publish a final report which will detail the most feasible option. Energex will then proceed to take steps to progress the recommended solution to ensure any statutory non-compliance is addressed and undertake appropriately justified network reliability improvement, as necessary.

8. Compliance Statement

This NNOR complies with the requirements of NER section 5.17.4(e) as demonstrated below:

Requirement	Report Section
(1) a description of the identified need;	3
(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;	3.1
(3) if available, the relevant annual deferred *augmentation* charge associated with the identified need;	5.5
(4) the technical characteristics of the identified need that a non-network option would be required to deliver, such as: (i) the size of *load* reduction or additional *supply*; (ii) location; (iii) contribution to *power system security* or *reliability*; (iv) contribution to *power system* fault levels as determined under clause 4.6.1; and (v) the operating profile;	6
(5) a summary of potential credible options to address the identified need, as identified by the RIT-D proponent, including network options and non-network options;	5.2
(6) for each potential credible option, the RIT-D proponent must provide information, to the extent practicable, on: (i) a technical definition or characteristics of the option; (ii) the estimated construction timetable and commissioning date (where relevant); and (iii) the total indicative cost (including capital and operating costs); and	5.2
(7) information to assist non-network providers wishing to present alternative potential credible options including details of how to submit a non-network proposal for consideration by the RIT-D proponent.	6 & 7

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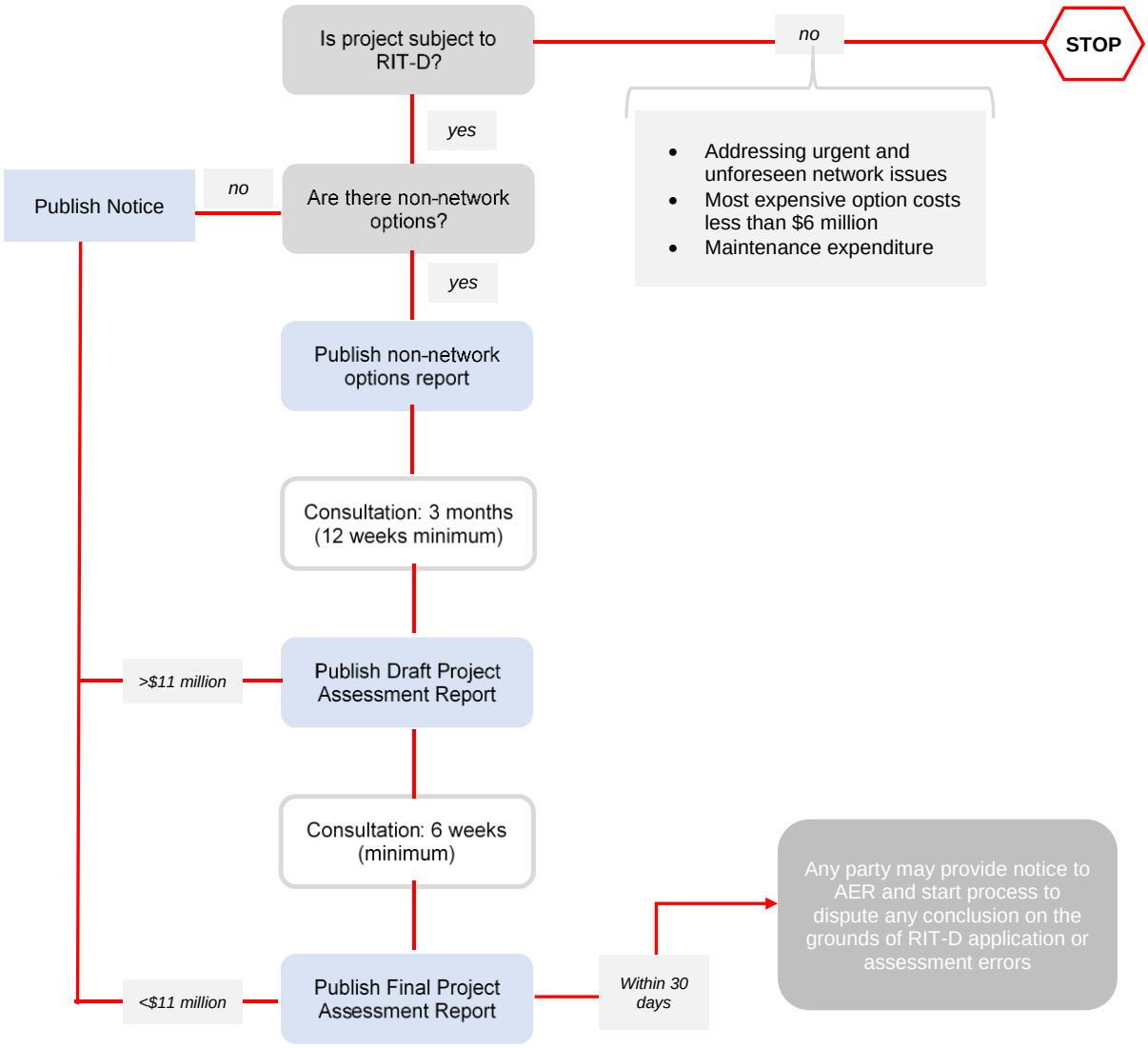
Appendix A – The RIT-D Process



Source: AEMC, *Rule determination: National Electricity Amendment (Replacement expenditure planning arrangements) Rule 2017*, July 2017, p. 64.

Appendix B – Glossary of Terms

Term	Definition
Peak Risk Period	The time period over which the load is highest (Day/Night).
NCC Rating (MVA)	Normal Cyclic Capacity – the total capacity with all network components and equipment in service. The maximum permissible peak daily loading for a given load cycle that plant can supply each day of its life. Taking impedance mismatch into consideration, it is considered the maximum rating for a transformer to be loaded under normal load conditions.
10 PoE Load (MVA)	Peak load forecast with 10% probability of being exceeded (one in every 10 years will be exceeded). Based on normal expected growth rates & weather corrected starting loads.
LARn (MVA)	Security standard load at risk under system normal condition, expressed in MVA.
LARn (MW)	Security standard load at risk under system normal condition, expressed in MW.
Power Factor at Peak Load	Compensated power factor at 50 PoE Load. Capacitive compensation is switched according to the size of the capacitor banks installed at the substation, compensation is generally limited to prevent a substation from going into leading power factor.
ECC Rating (MVA)	Emergency Cyclic Capacity – the long term firm delivery capacity under a single contingent condition. The maximum permissible peak emergency loading for a given load cycle that an item of plant can supply for an extended period of time without unacceptable damage. For substations with multiple transformers, the ECC is the minimum emergency cyclic capacity of all transformer combinations taking impedance mismatches into consideration, with one transformer off line.
50 PoE Load (MVA)	Peak load forecast with 50% probability of being exceeded (one in every two years will be exceeded). Based on normal expected growth rates and weather corrected starting loads.
Raw LAR (MVA)	The amount of load exceeding ECC rating. (50 PoE Load – ECC Rating)
2-Hour Rating (MVA)	Two-Hour Emergency Capacity (2HEC) – the short term or firm delivery capacity under a single contingent condition. The maximum permissible peak emergency loading for a given load cycle that an item of plant can supply up to two hours without causing unacceptable damage. For substations with multiple transformers, the 2HEC is the minimum two hour emergency rating of all transformer combinations taking impedance mismatches into consideration, with one transformer off line.

Term	Definition
Auto Trans Avail (MVA)	SCADA or automatically controlled load transfers that can be implemented within one minute.
Remote Trans Avail (MVA)	Load transfers that can be implemented through SCADA switching procedures by the network control officer. It is assumed that this can generally be achieved within 30 minutes excluding complex or time –consuming restoration procedures.
Manual Trans Avail (MVA)	Load transfers can also be deployed via manually controlled switchgear locally by field staff. It is assumed that the implementation of manual switching procedures to isolate the faulted portion of the network to restore supply to healthy parts of the network can be fully implemented within three hours (urban) or four hours (rural). Manual transfers are obtained from load flow studies performed on each 11 kV distribution feeder based on the forecast 2016/17 load, the sum of all available 11 kV transfers at a substation is multiplied by a 0.75 factor to account for diversity and to provide a margin of error to avoid voltage collapse. The same approach applies throughout the forward planning period.
LARc (MVA)	Security standard load at risk for single contingent conditions.
LARc (MW)	Estimated generation / load reduction required to defer the forecast system limitation. This is the security standard load at risk for a single contingency, expressed in MW.
Customer Category	For security standard application, the general type of customer a substation or feeder supplying the area.
SSKCY	Kilcoy Zone Substation
SSWFD	Woodford Zone Substation
SSSDM	Somerset Dam
SSBWH	Beerwah bulk supply and zone substation
SSMLY	Maleny Zone Substation
SSLBH	Landsborough Zone substation
SSNBR	Nambour zone substation
SSWMR	Wamuran zone substation
SSCBW	Caboolture West zone substation
SST78	Lockrose bulk and zone substation
SSCMY	Coominya zone substation

Term	Definition
SSPGY	Paddy Gully Regulator
SSMRB	Murrumba zone substation
SSTGW	Toogoolawah zone substation