Non-Network Options Report

7 February 2021

Version 1.0

Kallangur Network Limitation

Consultation Period Starts: 08/02/2021

Consultation Period Closes: 10/05/2021

Part of the Energy Queensland Group

EXECUTIVE SUMMARY

ABOUT ENERGEX

Energex is a subsidiary of Energy Queensland Limited, a Queensland Government Owned Corporation. Energex distribute electricity to over 1.5 million residential, commercial and industrial customers across a population base of around 3.4 million in South East Queensland.

IDENTIFIED NEED

Kallangur zone substation (SSKLG) is supplied from Griffin bulk supply substation (SSGFN) via a 33kV mesh network, which also supplies Mango Hill zone substation (SSMHL) and a direct customer connection. SSKLG provides electricity supply to approximately 14,025 predominantly domestic customers in the Kallangur, Kurwongbah, Petrie, Murrumba Downs, and Griffin areas. With new developments in the Petrie area, loads are forecast to increase significantly causing network limitations in the area.

The identified need for this Non-Network Options Report (NNOR) is that Energex will exceed its Substation system normal cyclic capacity (NCC) rating and will not meet its Safety Net obligation as outlined in its Distribution Authority at SSKLG in the summer of 2025/26 due to load growth in the area.

In order to eliminate the system normal load at risk and satisfy the Safety Net obligations, Energex has identified two network options to address the limitations identified, as below:

- Option 1: Establish a single 25MVA 33/11kV Petrie modular substation
- Option 2: Replace existing transformers TR2 and TR3 at Kallangur substation with two new 25MVA 33/11kV transformers

The requirements of a non-network option to solve the identified need are summarised in Table 1 and Table 2.

Customer Category	Total Limit	Year	Forecast 10 PoE Load (MVA)	Security Standard Load At Risk (MVA)	Days Above Limit	% Time Above Limit	Hrs Over Limit
Urban	44.6 MVA	2020/21	40.8	0.0	-	-	-
		2021/22	41.2	0.0	-	-	-
		2022/23	41.6	0.0	-	-	-
		2023/24	43.2	0.0	-	-	-
		2024/25	44.7	0.0	-	-	-
		2025/26	46.1	1.5	3	0.04%	3.5
		2026/27	48.3	3.7	4	0.09%	7.5
		2027/28	50.2	5.6	5	0.13%	11.5
		2028/29	50.8	6.2	6	0.15%	13.5
		2029/30	51.7	7.1	8	0.20%	17.5

Table 1: Non-network Option Requirements for SSKLG under System Normal (N)

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

Customer Category	Total Limit	Year	Forecast 50 PoE Load (MVA)	Security Standard Load At Risk (MVA)	Days Above Limit	% Time Above Limit	Hrs Over Limit
Urban	39.3 MVA	2020/21	35.2	0.0	-	-	-
		2021/22	35.5	0.0	-	-	-
		2022/23	35.9	0.0	-	-	-
		2023/24	37.4	0.0	-	-	-
		2024/25	38.9	0.0	-	-	-
		2025/26	40.3	1.0	2	0.03%	3
		2026/27	42.7	3.4	4	0.09%	8
		2027/28	44.5	5.2	5	0.14%	12.5
		2028/29	45.1	5.8	7	0.17%	15
		2029/30	45.8	6.5	8	0.22%	19.5

Table 2: Non-network Option Requirements for SSKLG under System Contingency (N-1)

As part of its operational strategy following a contingency, Energex will deploy 4MVA of generation using its fleet of mobile generators. In addition to the requirements above, Energex would be interested in any network support solutions that provide a cost-effective alternative to this requirement. Submissions to this NNOR should clearly separate their proposal for this extra support opportunity from their proposed solution to the identified need.

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 Kallangur 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 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 10 May 2021 by 4:00 PM. For further information on this or to enquiry further, please refer to section 1.2 Contact Details.

CONTENTS

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

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 Non-Network Options Report (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 10 May 2021.

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

2. Background

2.1. Existing Network

Kallangur zone substation (SSKLG) is supplied from Griffin bulk supply substation (SSGFN) via a 33kV mesh network, which also supplies Mango Hill zone substation (SSMHL) and a direct customer connection. SSKLG provides electricity supply to approximately 14,025 predominantly domestic customers in the Kallangur, Kurwongbah, Petrie, Murrumba Downs, and Griffin areas.

Geographic and schematic views of the network area under study are provided in Figure 1, Figure 2 and Figure 3.

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

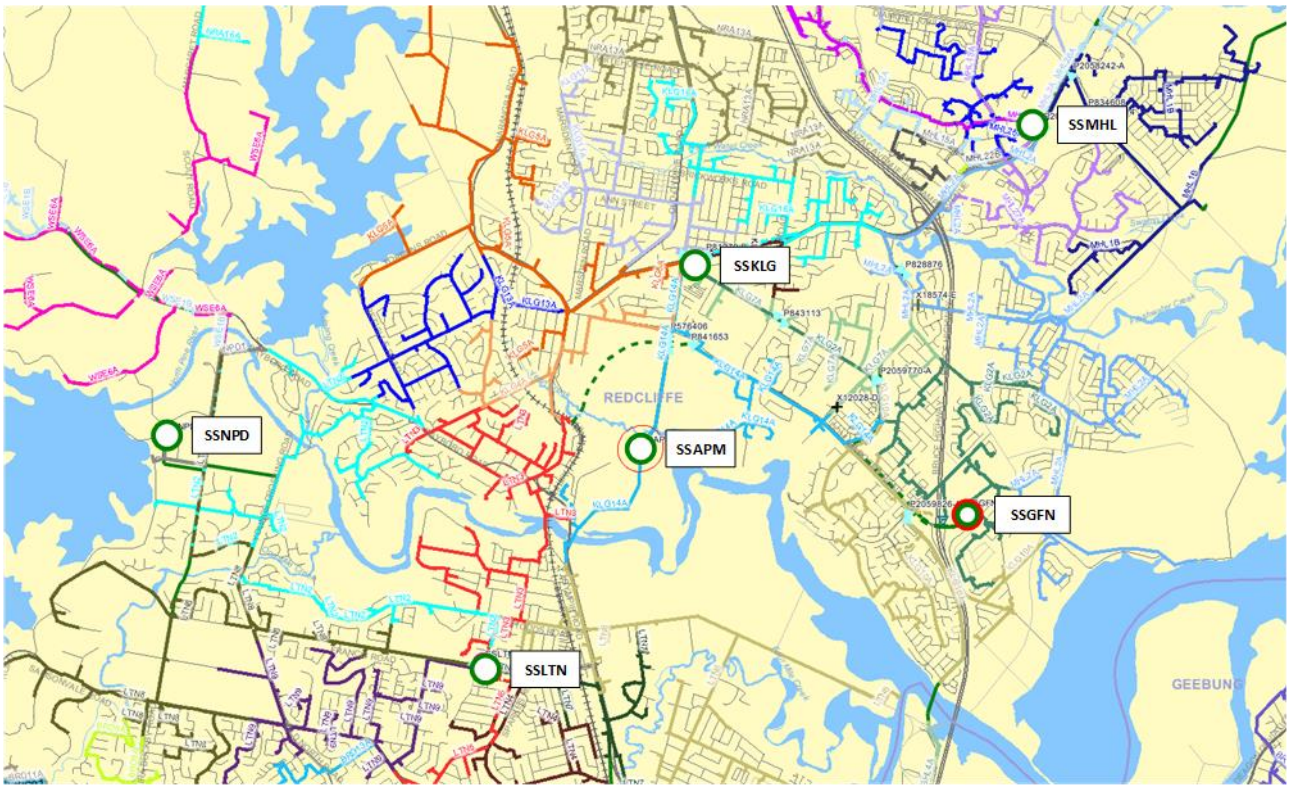


Figure 2: Existing 11kV network arrangement (Geographic view)

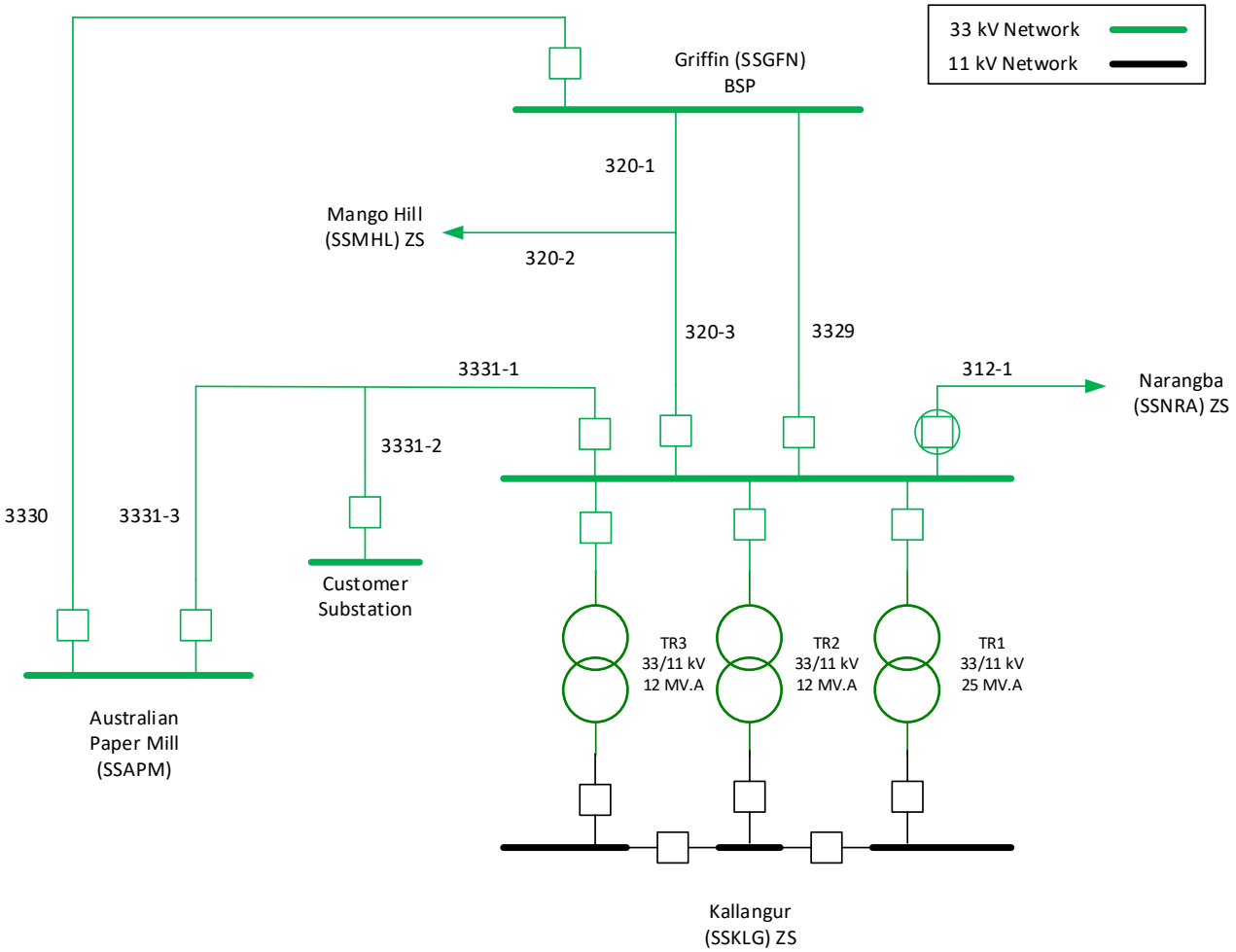


Figure 3: Existing network arrangement (schematic view)

Note: SSAPM will be recovered as part of the land development in the area. The recovery cost is not part of this RIT-D and will be done as a separate project.

2.2. Load Profiles

The annual load profiles for SSKLG is shown in Figure 4 below.

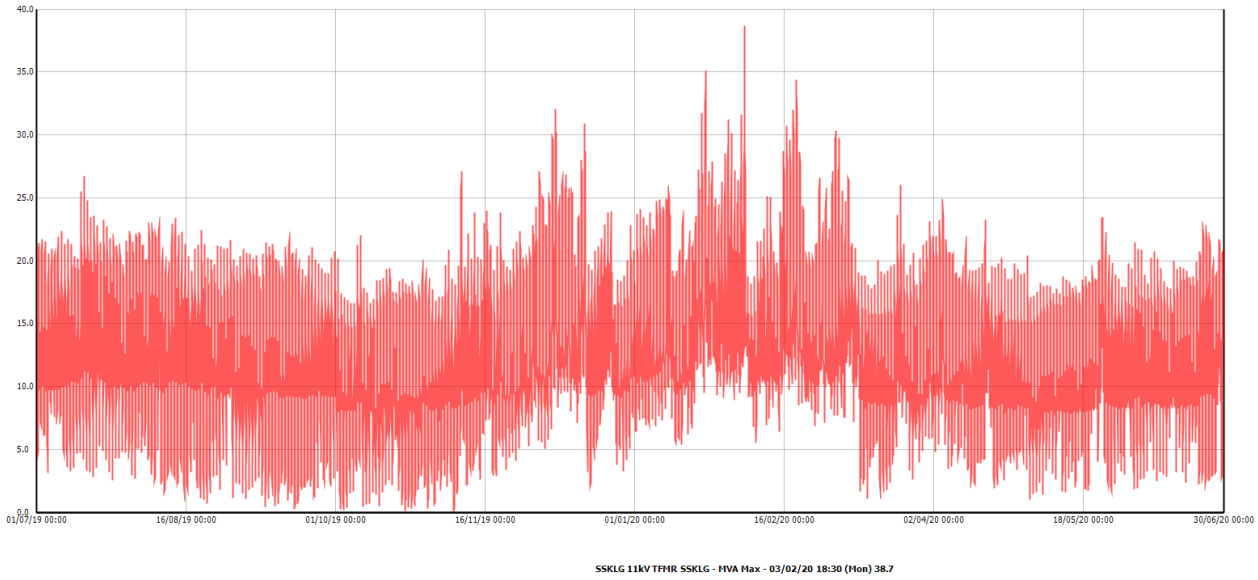
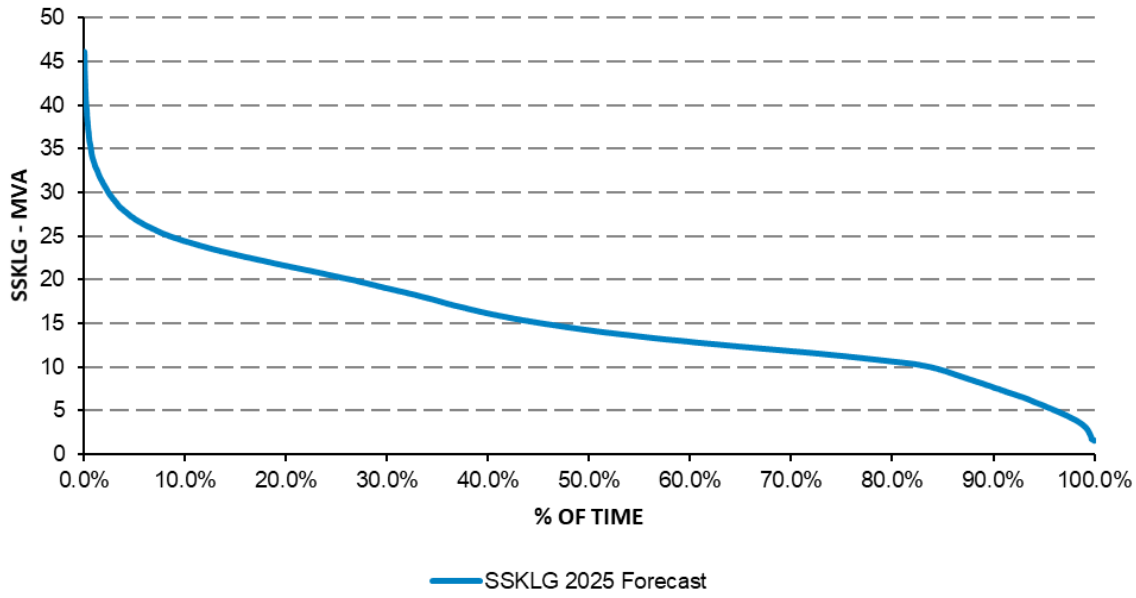


Figure 4: Annual load profile (MVA) for SSKLG in 2019/20

Figure 5 show the load duration curves for SSKLG under System Normal (N) and System Abnormal (N-1). These are based on the previous 3 years of data and are scaled to their respective maximum 10% Probability of Exceedance (10PoE) and 50% Probability of Exceedance (50PoE) forecasts.



*The values for SSKLG have been scaled to the 2025 peak forecast load of 46.1MVA. 2025 is the year the identified need first appears at SSKLG.

Figure 5: Load duration curve for SSKLG

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 50% probability of exceedance (PoE) 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 substations supplying urban load, 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 12MVA, provided that all load except for up to 4MVA can be restored within 3 hours, and the remaining 4MVA is fully restored within 8 hours. Table 3 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

Table 3: Summary of Safety Net Criteria

Further to an assessment against its Safety Net obligations, Energex also undertake analysis of system capacity under normal conditions with all plant in service against the 10 PoE load. The total capacity of the substation or the system Normal Cyclic Capacity (NCC) limit with all assets in service, shall not be exceeded to avoid reducing its designed life.

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

3.2. Description of the Identified Need

3.2.1. Safety Net Non-Compliance

The existing supply to the Kallangur and Petrie areas do not meet the Safety Net for an unplanned outage of a transformer at SSKLG as well as under System Normal. The following section outlines the substation limitations of the existing network. The system normal condition is assessed against the 10%PoE load forecast for SSKLG. The 50%POE load forecast is used for N-1 contingency analysis.

3.3. Quantification of the Identified Need

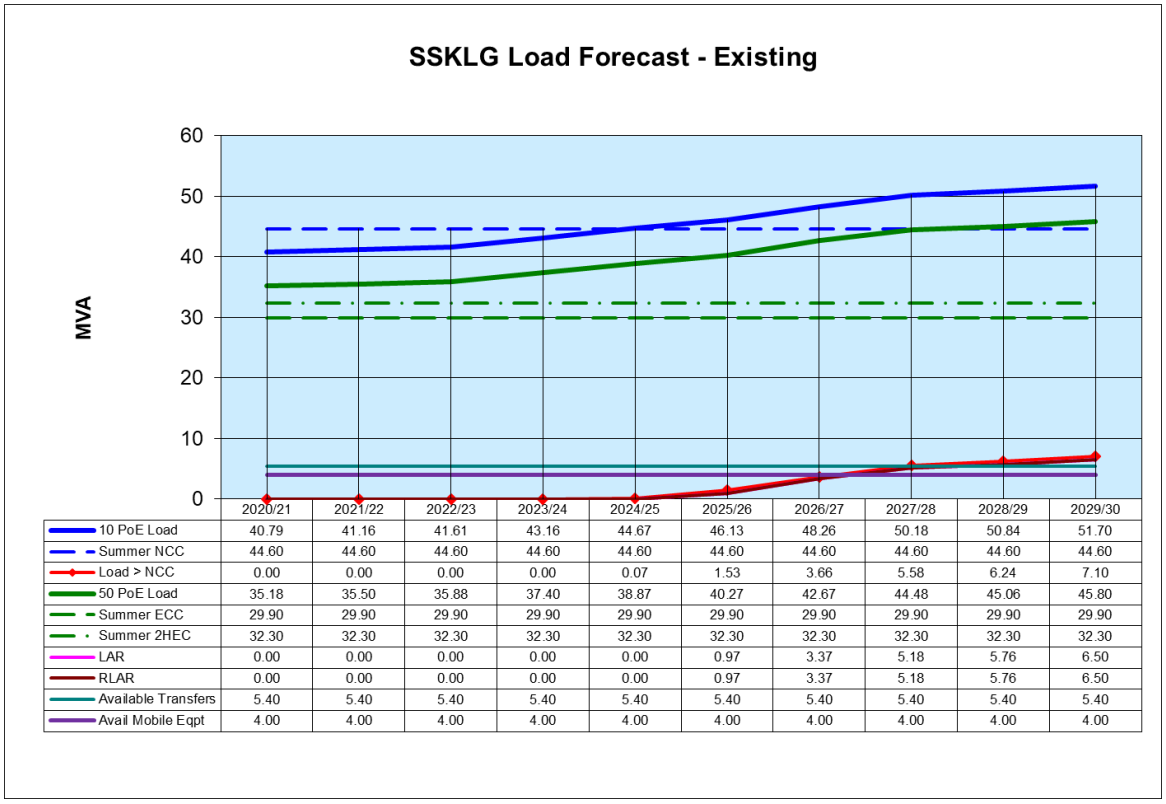
3.3.1. Safety Net Non-Compliance

SSKLG Limitations

SSKLG is equipped with one 25MVA 33/11kV transformer and two 10/12.5MVA 33/11kV transformers. The substation capacity is limited by the transformers and provides an NCC, ECC and 2HEC as below:

- Normal Cyclic Capacity (NCC) – 44.6MVA
- Emergency Cyclic Capacity (ECC) – 29.9MVA
- 2 Hour Emergency Capacity (2HEC) – 32.3MVA

Figure 6 shows the limitations at SSKLG.

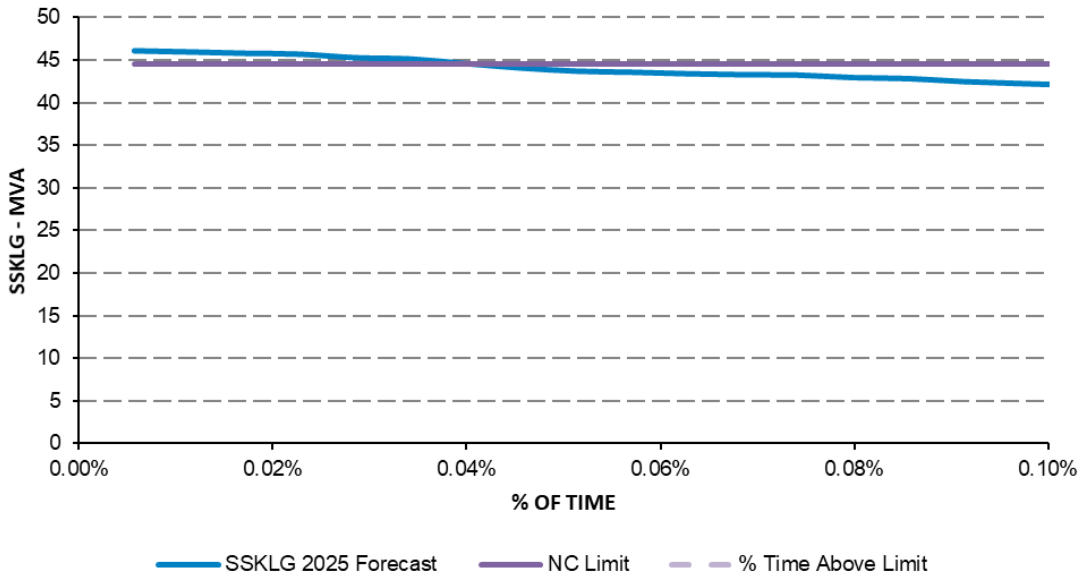


	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30
10 PoE Load	40.79	41.16	41.61	43.16	44.67	46.13	48.26	50.18	50.84	51.70
Summer NCC	44.60	44.60	44.60	44.60	44.60	44.60	44.60	44.60	44.60	44.60
Load > NCC	0.00	0.00	0.00	0.00	0.07	1.53	3.66	5.58	6.24	7.10
50 PoE Load	35.18	35.50	35.88	37.40	38.87	40.27	42.67	44.48	45.06	45.80
Summer ECC	29.90	29.90	29.90	29.90	29.90	29.90	29.90	29.90	29.90	29.90
Summer 2HEC	32.30	32.30	32.30	32.30	32.30	32.30	32.30	32.30	32.30	32.30
LAR	0.00	0.00	0.00	0.00	0.00	0.97	3.37	5.18	5.76	6.50
RLAR	0.00	0.00	0.00	0.00	0.00	0.97	3.37	5.18	5.76	6.50
Available Transfers	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40	5.40
Avail Mobile Eqpt	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00

Figure 6: SSKLG Load at Risk

Figure 6 illustrates that there is an NCC load at risk (LAR) limitation with the existing transformers at SSKLG from 2025/26. There is also Safety Net limitation for an outage of a transformer at SSKLG from 2025/26.

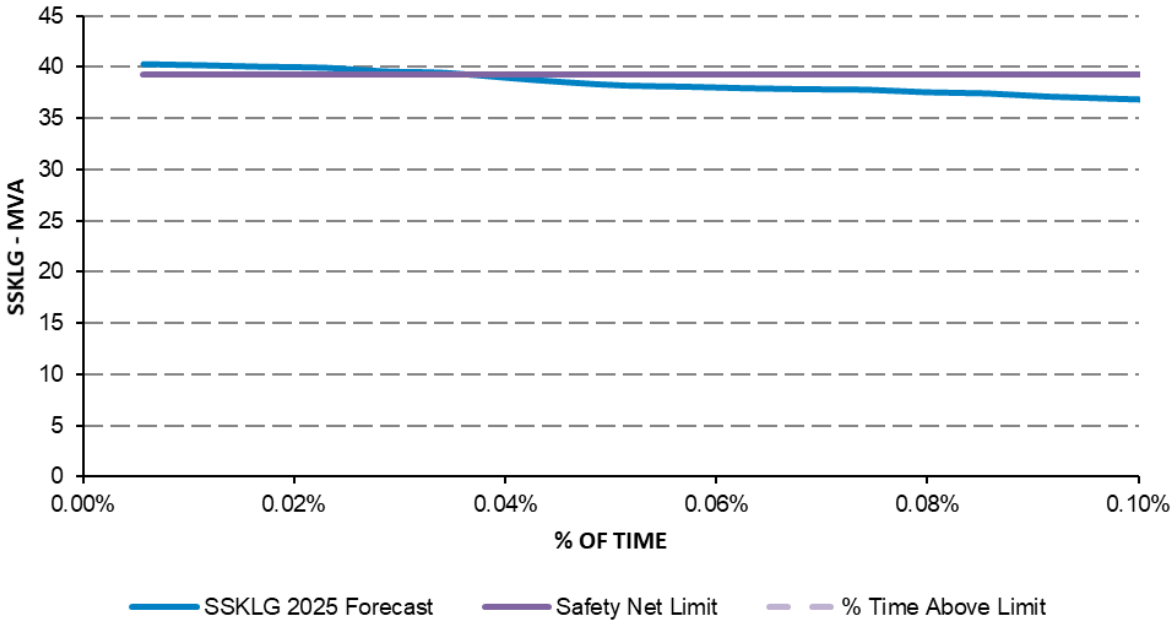
SSKLG can supply up to 44.6 MVA with all three transformers in service under system normal. Under system N-1 where one transformer has an outage, SSKLG can supply up to 39.9 MVA of load, incorporating 5.4 MVA of available load transfers and 4 MVA of mobile generation, to meet Energex's Safety Net obligation. Figure 7 and Figure 8 show the portion of the load duration curve for the 10% POE and 50% POE forecast 11kV load of SSKLG and the available capacity at SSKLG respectively.



*The values for SSKLG have been scaled to the 2025 peak forecast load of 40.3 MVA.

Figure 7: Load Duration Curve SSKLG in 2025 with NCC Limit

Figure 7 shows that approximately 0.04% of the time in 2025/26 the 10PoE load is forecast to be above the 44.6MVA limit.



*The values for SSKLG have been scaled to the 2025 peak forecast load of 40.3 MVA.

Figure 8: Load Duration Curve SSKLG in 2025 with Safety Net Limit

Figure 8 shows that approximately 0.04% of the time in 2025/26 the 50PoE load is forecast to be above the 39.3 MVA limit.

Figure 9 and Figure 10 show that as the load increases each year, the limit is surpassed for a longer duration per year for 10% POE against system normal capacity and 50% POE load forecast against N-1 contingency capacity respectively. For ease of presentation, only every second year is shown.

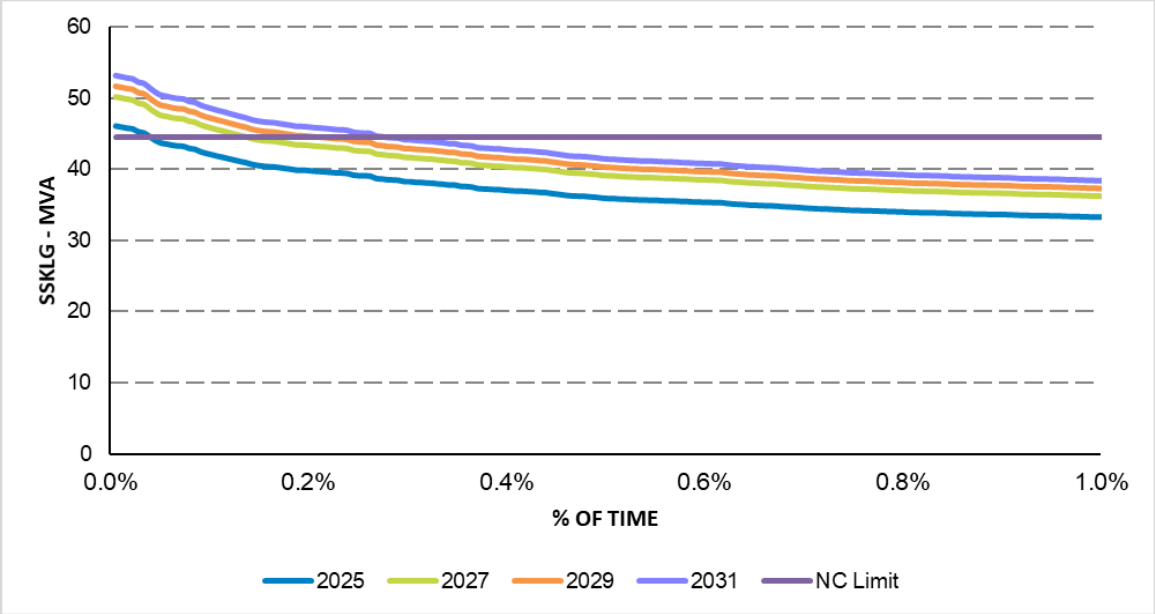


Figure 9: Load Duration Curve for 2025 – 2031 (10% POE load)

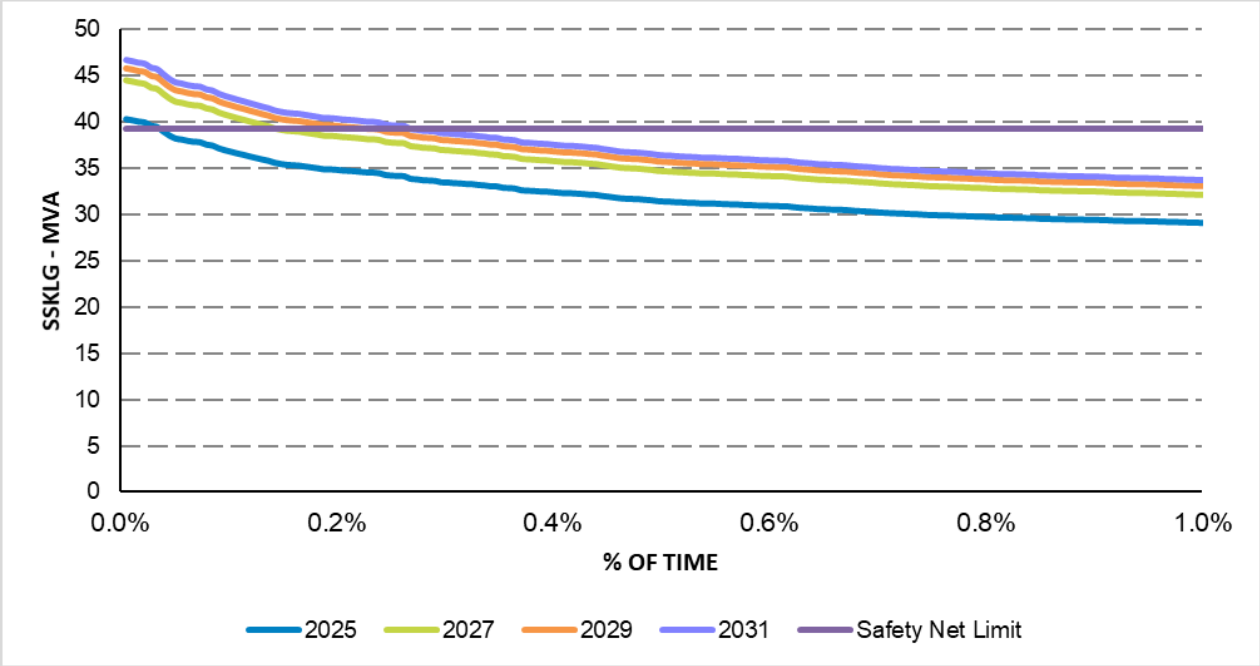


Figure 10: Load Duration Curve for 2025 – 2031 (50% POE load)

Figure 9 and Figure 10 above show that the duration in which the load is at risk rises from 0.04% to 0.3% from 2025 to 2031.

Table 4 illustrates that the amount of time support would be required is forecast to start with 3 days in 2025/26 and increases to 28 days by 2029/30.

Customer Category	Total Limit	Year	Forecast 10 PoE Load (MVA)	Security Standard Load At Risk (MVA)	Days Above Limit	% Time Above Limit	Hrs Over Limit
Urban	44.6 MVA	2020/21	40.8	0.0	-	-	-
		2021/22	41.2	0.0	-	-	-
		2022/23	41.6	0.0	-	-	-
		2023/24	43.2	0.0	-	-	-
		2024/25	44.7	0.0	-	-	-
		2025/26	46.1	1.5	3	0.04%	3.5
		2026/27	48.3	3.7	4	0.09%	7.5
		2027/28	50.2	5.6	5	0.13%	11.5
		2028/29	50.8	6.2	6	0.15%	13.5
		2029/30	51.7	7.1	8	0.20%	17.5

Table 4: Forecast duration load will be at risk under System Normal (N)

Table 5 illustrates that the amount of time support would be required is forecast to start with 2 days in 2025/26 and increases to 8 days by 2029/30.

Customer Category	Total Limit	Year	Forecast 50 PoE Load (MVA)	Security Standard Load At Risk (MVA)	Days Above Limit	% Time Above Limit	Hrs Over Limit
Urban	39.3 MVA	2020/21	35.2	0.0	-	-	-
		2021/22	35.5	0.0	-	-	-
		2022/23	35.9	0.0	-	-	-
		2023/24	37.4	0.0	-	-	-
		2024/25	38.9	0.0	-	-	-
		2025/26	40.3	1.0	2	0.03%	3
		2026/27	42.7	3.4	4	0.09%	8
		2027/28	44.5	5.2	5	0.14%	12.5
		2028/29	45.1	5.8	7	0.17%	15
		2029/30	45.8	6.5	8	0.22%	19.5

Table 5: Forecast duration load will be at risk under System Contingency (N-1)

As part of its operational strategy following a contingency, Energex will deploy 4MVA of generation using its fleet of mobile generators. In addition to the requirements above, Energex would be interested in any network support solutions that provide a cost-effective alternative to this requirement. Submissions to this NNOR should clearly separate their proposal for this extra support opportunity from their proposed solution to the identified need.

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

Lawnton zone substation (SSLTN) Limitations

SSLTN is equipped with 1 x 25MVA 33/11kV transformer, 1 x 12.5MVA 33/11kV transformer and 1 x 15MVA 33/11kV transformer. The load at SSLTN has not yet reached its Safety Net limit, but it is expected to in the next 10 to 15 years. The options presented in this report will alleviate the potential future network limitations at SSLTN, and any non-network option will be assessed in the same manner to the extent they can also treat potential limitations.

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 Weighted Average Cost of Capital (WACC). This value is prescribed by the AER for a specific regulatory period. The identified need described in this Non-Network Options Report 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 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 a non-compliance of the Energex's Safety Net obligations outlined in Energex's Distribution Authority. As such, the Do Nothing option is not an acceptable outcome.

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

5.2.2. Option 1: Establish a new 33/11kV zone substation Petrie

This option involves establishing a new zone substation at Petrie in October 2025, including:

- Establish a single 25 MVA modular substation or equivalent
- Establish 500m of 33kV double circuit OH from existing SSAPM to the new Petrie substation site
- Establish 250m of 33kV DCCT UG feeder tails into the new Petrie substation
- Establish new 11kV feeder tails from new Petrie substation
- Estimated capital cost: $17.6 million ± 40%
- Estimated operating cost per annum: $40,418

A schematic diagram of the proposed solution is shown in Figure 11 below.

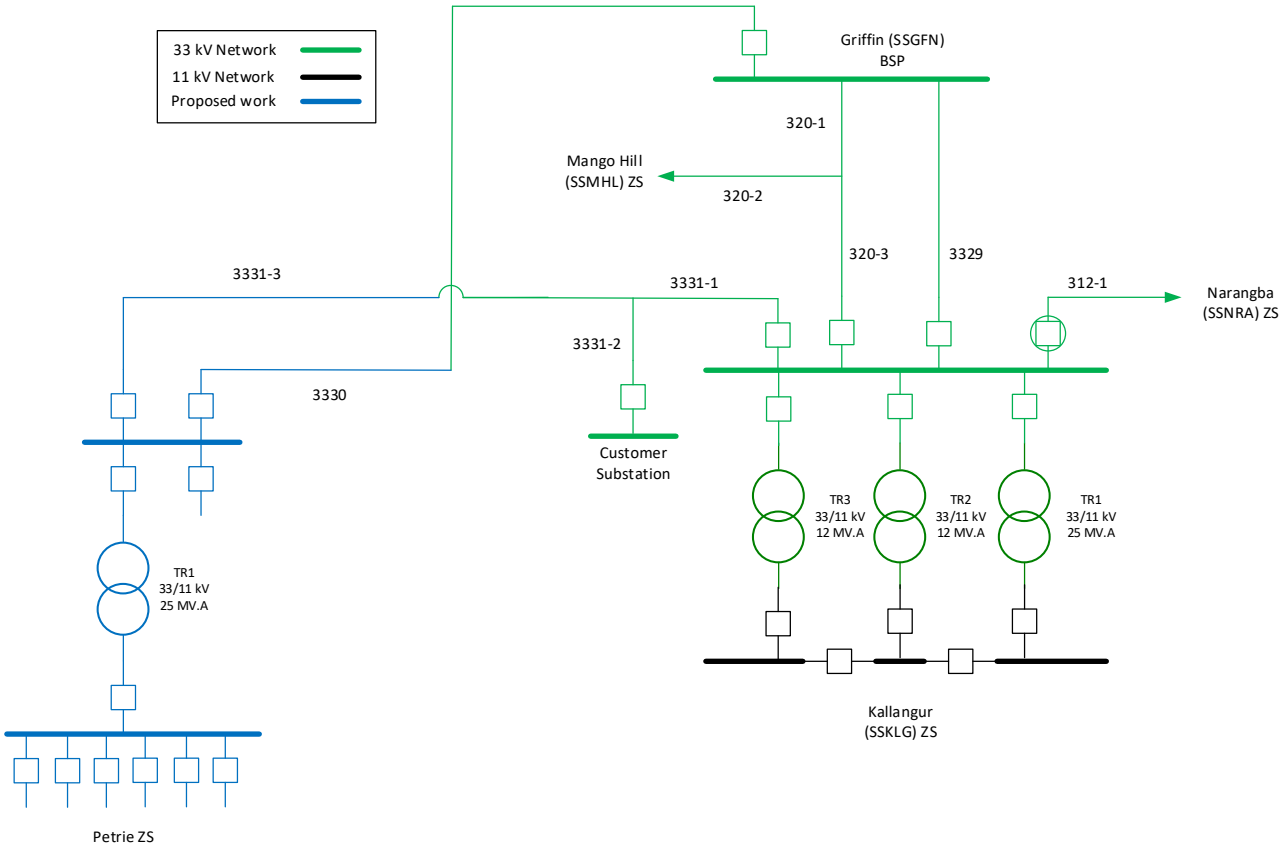


Figure 11: Proposed network arrangement under option 1

5.2.1. Option 2: Replace existing transformers TR2 and TR3 at SSKLG with two 25MVA transformers.

This option replaces the existing 2x33/11kV transformers TR2 and TR3 with two 25MVA transformers. This includes:

- Recover and scrap the existing 33/11kV transformers TR2 and TR3
- Establish foundation for new 33/11kV transformers and NEXs and install two new 25MVA 33/11kV transformers
- Establish a new 11kV feeder at SSKLG in 2026
- Estimated cost: $7.5 million ± 40%
- Estimated operating cost per annum: $4,032

A schematic diagram of the proposed solution is shown in Figure 12 below.

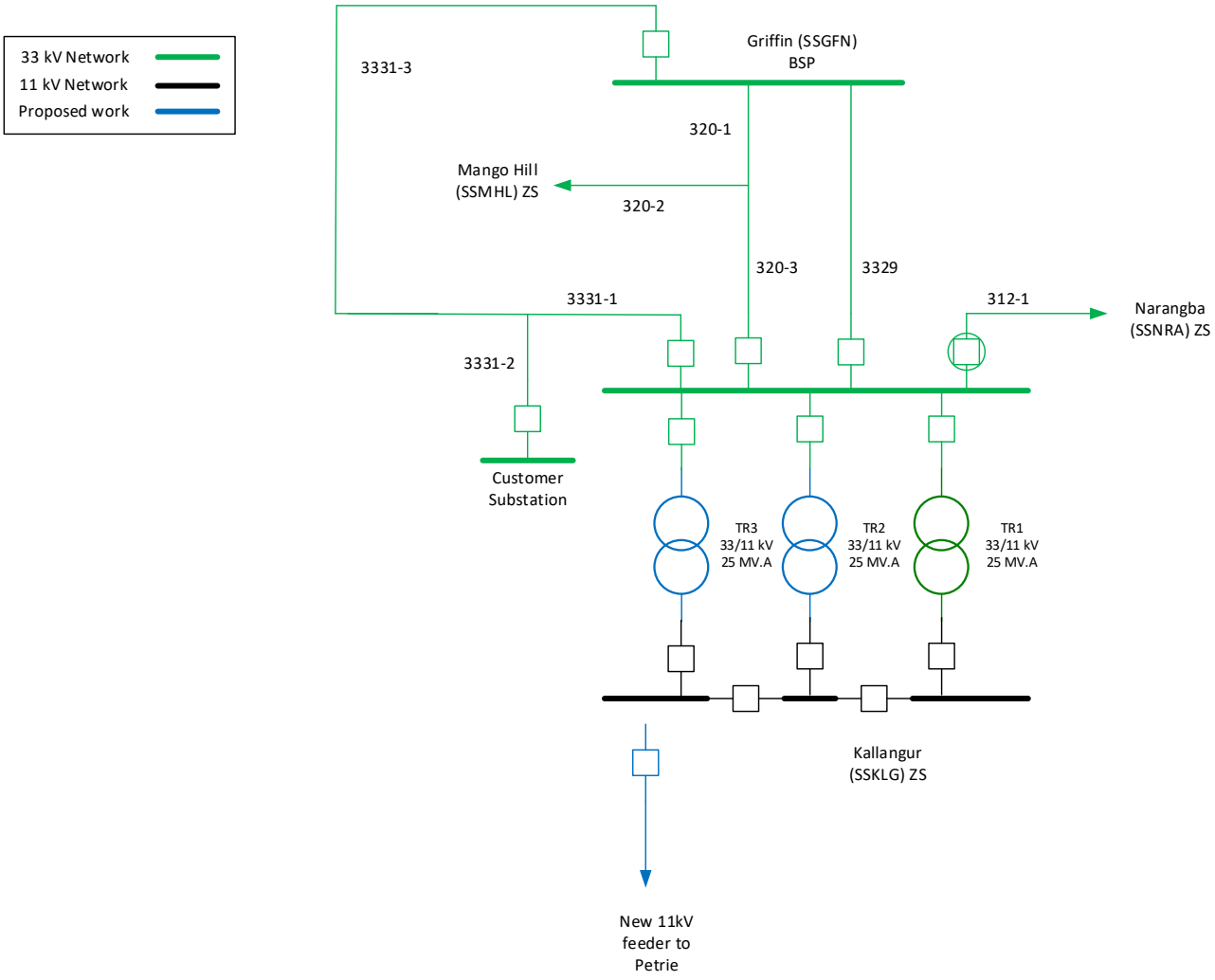


Figure 12: Proposed network arrangement under option 2

Comparing to Option 1 building a new Petrie zone substation, this option has the disadvantage of requiring long 11kV feeders to supply the load at Petrie every few years, which increases cost over the long term, while also reducing reliability and increasing unserved energy.

5.3. Preferred Network Option

Option 1 is currently the preferred network option. With Petrie substation located closer to the new developments, there are less costs to construct 11kV feeders to supply the new forecast load. The scope of the preferred network option includes:

- Establish new single transformer 33/11kV 25MVA modular substation or equivalent
- Establish 2 x 33kV feeders to supply the new substation

The preferred network option has an estimated capital project cost of $17.6M, and an annual operating cost of approximately $40,418. The project is currently forecast for completion by October 2025.

5.4. 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 $501,514 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.

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 provide a non-network option that would eliminate the Load at Risk outlined in Table 4 and Table 5.

6.2. Feasible vs Non-Feasible Options

6.2.1. Potentially Feasible Options

The identified need presented in this Non-Network Options Report is driven by Energex not meeting its Substation NC Limitation and Safety Net obligations. Specifically, under system normal with all transformers in service, there is a load at risk of 1.5MVA that the substation load at SSKLG will exceed its NC limitation in 2025. In addition, an outage of an existing transformer leads to a security standard load at risk of 1.0MVA in 2025 which increases in future years.

In respect of the requirements under 5.17.4(e)(4), any non-network option will contribute to power system security and reliability to the extent that the solution solves the Substation NC limitation and Safety Net limitation. The contribution to power system fault levels is not an issue for this limitation.

Any 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

If a proponent is unable to support the total load required, Energex still encourages the submission of any solutions to reduce the constraints as it may be possible to aggregate multiple proposals to address the limitation or to have a hybrid solution with a potential network solution.

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

The limitations presented in this report are for the summer period of 2025/26. Energex is currently forecasting that the preferred network option would not be constructed until October 2025. As such, any proposed option must be available by at least October 2025.

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 sufficient 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 10 May 2021**.**

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

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 Kallangur supply area:

Step 1	Publish Non Network Options Report (this report) inviting non-network options from interested participants	Date Released: **8 February 2021**
Step 2	Submissions in response to the Non-Network Options Report	Due Date: **10 May 2021**
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: **21 June 2021**
Step 4	Release of Draft Project Assessment Report (DPAR)	Anticipated to be released by: **28 June 2021**
Step 5	Submissions in response to the Draft Project Assessment Report.	Due Date: **23 August 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: **4 October 2021**
Step 7	Release of Final Project Assessment Report (FPAR) including summary of submissions received	Anticipated to be released by: **11 October 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.

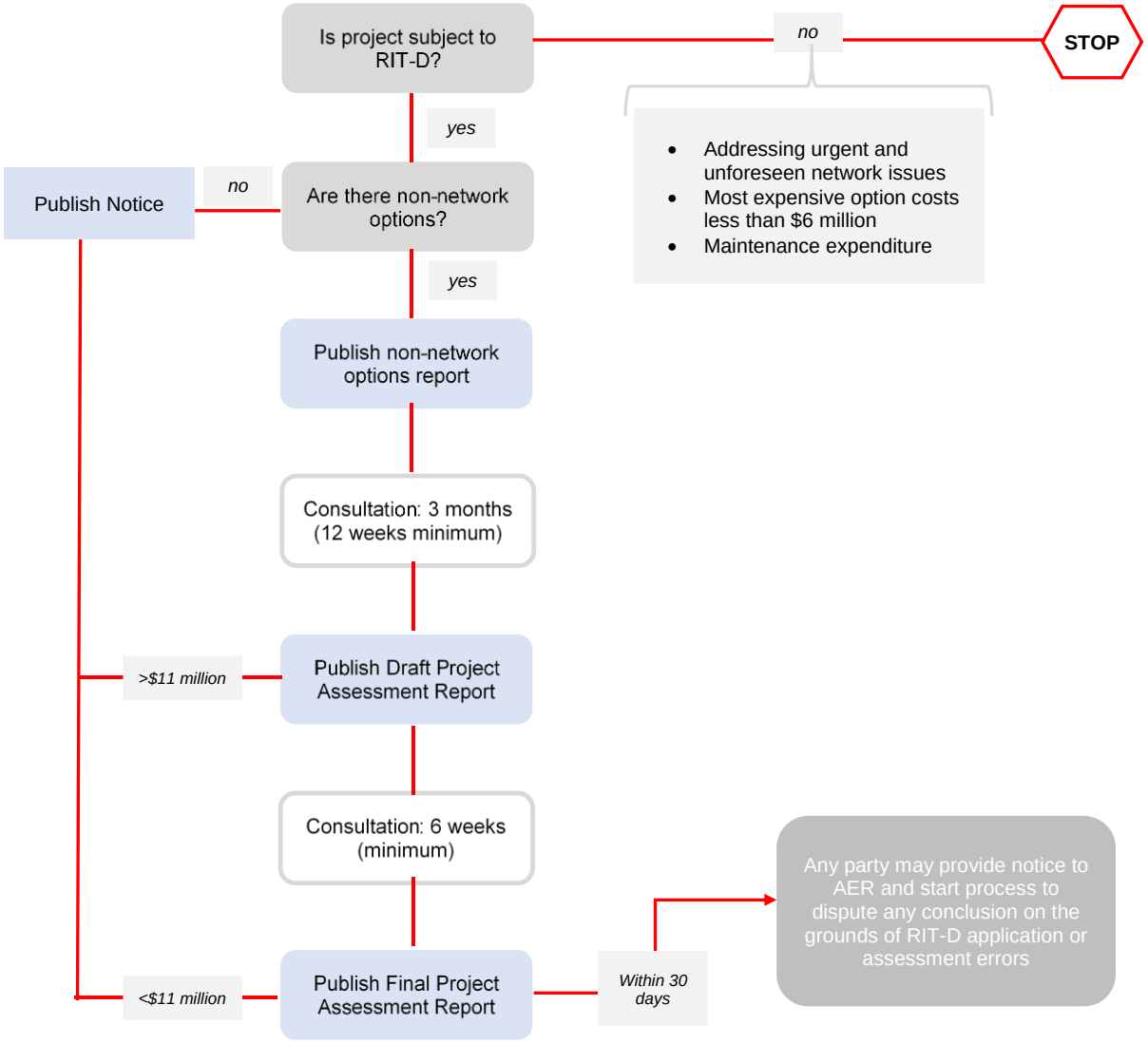
8. Compliance Statement

This Non-Network Options Report 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;	5.4
(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

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

Appendix A – The RIT-D Process



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

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

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.

Ergon Energy Corporation Limited ABN 50 087 646 062
Energy Queensland Limited ABN 96 612 535 583
Energex Limited ABN 40 078 849 055

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 11kV distribution feeder based on the forecast 2016/17 load, the sum of all available 11kV 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.