

Reliable Provision of Electricity to the Barcaldine, Longreach and Blackall area



NETWORK

Part of Energy Queensland

Notice of No Non Network Options

30/06/2020



Executive Summary

ABOUT ERGON ENERGY

Ergon Energy Corporation Limited (Ergon Energy) is part of the Energy Queensland Group and manages an electricity distribution network which supplies electricity to more than 740,000 customers. Our vast operating area covers over one million square kilometres – around 97% of the state of Queensland – from the expanding coastal and rural population centres to the remote communities of outback Queensland and the Torres Strait.

Our electricity network consists of approximately 160,000 kilometres of powerlines and one million power poles, along with associated infrastructure such as major substations and power transformers.

We also own and operate 33 stand-alone power stations that provide supply to isolated communities across Queensland which are not connected to the main electricity grid.

IDENTIFIED NEED

Barcaldine 132/66/22kV bulk supply substation (T072 BARC) has identified assets that are recommended for replacement. These assets are forecast to reach retirement based on a combination of Condition Based Risk Management (CBRM) modelling and known issues with problematic plant, which are required to be replaced or decommissioned to manage the safety and network risks associated with unplanned failure.

The assessment identified that primary and secondary plant require replacement, including one 132/66/11kV 20MVA power transformer (T1), one 66/22kV 8/10MVA power transformer (T5), two 66kV circuit breakers, one set of three 66kV current transformers, five porcelain surge arrester sets, and one protection relay.

Failure of the primary and secondary plant is a risk to network security which may lead to a breach of legislated Safety Net requirements, and significant long term outages to major customers.

The purpose of this project is to address the risk to safety and network security posed by poor condition and problematic assets.

APPROACH

The NER requires 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). Ergon Energy has determined that network investment is essential in this case for it to continue to provide electricity to the consumers in the Barcaldine, Longreach, and Blackall supply areas in a reliable, safe and cost-effective manner. Accordingly, this investment is subject to a RIT-D. An internal assessment has been carried out and it has been determined that no non-network solutions can potentially meet the identified need or form a significant part of the solution. This Notice has therefore been prepared by Ergon Energy in accordance with the requirements of clause 5.17.4(d) of the NER.

1 Background

Barcaldine 132/66/22kV Bulk Supply Substation (T072 BARC) is a bulk supply point for the Central West Region of Queensland, supplying Longreach and Blackall substations via 66kV feeders and the Barcaldine region via 22kV feeders. T072 BARC supplies a total of 6323 customers and a maximum demand of 20MVA. It's 22kV bus supplies 2206 customers in Barcaldine with a maximum demand of 7MVA.

T072 BARC has in recent years become the National Electricity Market (NEM) connection point for several utility scale solar farms: Dunblane 7.2MW, Barcaldine 20MW and Longreach 14MW. These solar farms rely on the electrical infrastructure at T072 BARC to provide a reliable connection capacity to the National Electricity Market (NEM). Barcaldine 37MW gas turbine generator is also in place connecting into T072 BARC at 132kV.

T072 BARC has two 20MVA 132/66/11kV power transformers (T1) and (T2) with four 2.5MVA reactors on 11kV tertiary windings. The substation also has two 66/22kV 8/10MVA transformers (T5) and (T6). The substation is run in an open bus arrangement due to mismatching transformers, such that when both 132/66/11kV transformers are online, T1 supplies T5 and Blackall only, while T2 supplies T6 and Longreach only.

T072 BARC was constructed in 1984, utilising some older plant manufactured in 1957 and 1962. A condition assessment has identified several assets that require replacement due to their condition and associated risk. The purpose of this project is to address limitations on aged and poor condition assets.

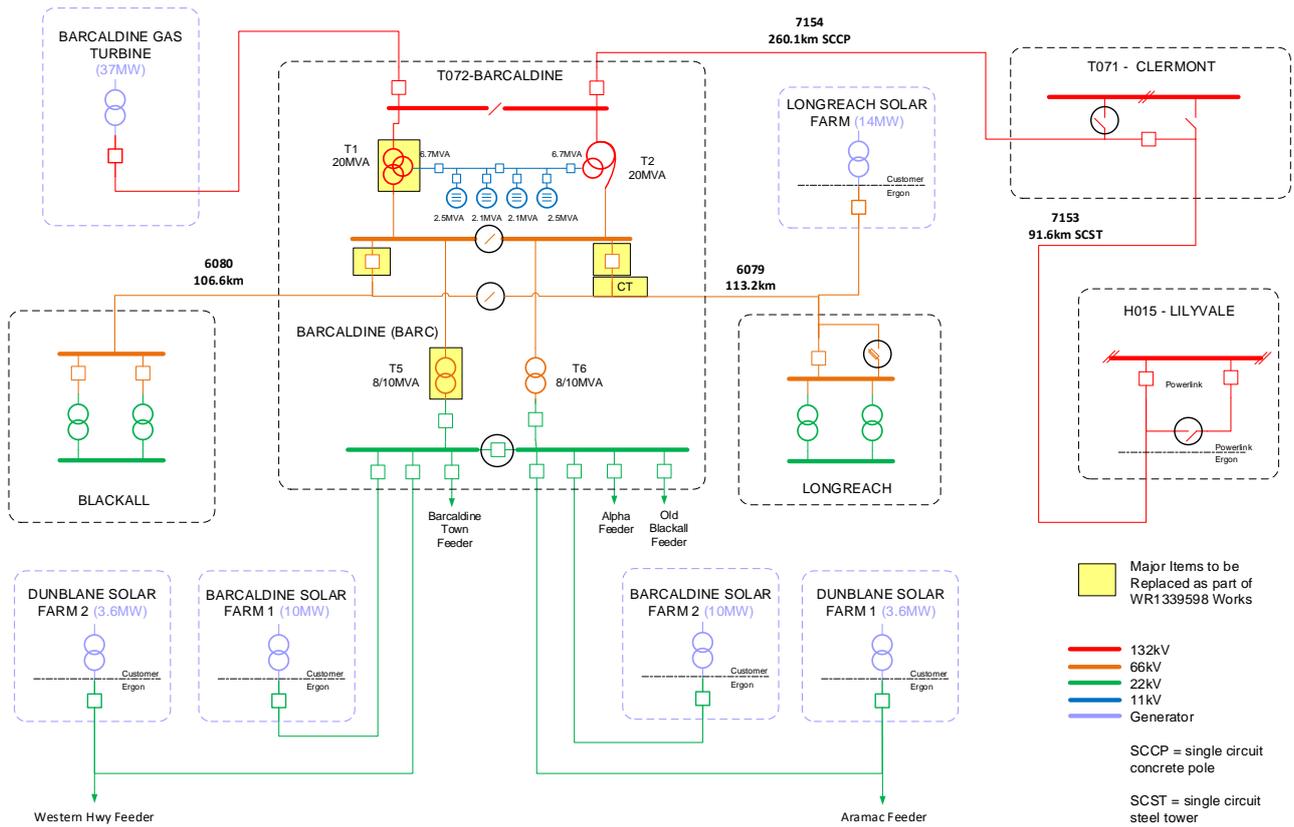


Figure 1 – Barcardine Substation and Central West area Subtransmission Network

2 Identified Need

2.1. Asset Replacement

A condition assessment of T072 BARC has identified assets that are recommended for replacement. These assets are forecast to reach retirement based on a combination of Condition Based Risk Management (CBRM) modelling and known issues with problematic plant, which are required to be replaced or decommissioned to manage the safety and network risks associated with unplanned failure.

Failure of the primary and secondary plant is a risk to environment, health and safety, and the ability to support the existing large-scale solar generation. Retirement of the identified major plant would also result in network security that does not meet Safety Net requirements.

The following primary and secondary plant assets are recommended for replacement at T072 BARC substation: -

- Transformer T1 – 132/66/11kV, 20MVA
- Transformer T5 – 66/22kV, 8/10MVA

- 2 x 66kV Circuit Breakers – Longreach feeder bay and Blackall feeder bay
- 1 x 66kV Current Transformer Set – Longreach feeder bay
- 1 x CB fail relay
- 5 x porcelain surge arrester sets

3 Network Options Considered

The preferred network option is to replace assets at T072 BARC substation that have been identified.

The estimated preferred project cost is \$5.44M at 2021/22 prices.

4 Assessment of Non Network Solutions

Ergon Energy's Demand and Energy Management (DEM) Team assesses the potential non-network options that individually or jointly might constitute a credible option. Credible options must be able to either substitute or defer the network investment, and also ensure that the solution is technically and commercially viable and can be delivered within required timeframe. Feasible non-network options must be able to be implemented in sufficient time to satisfy the identified risk to the public and/or the network due to the identified constraints.

Ergon Energy has considered a number of demand management technologies to determine their commercial and technical feasibility to assist with the identified need.

The following non-network solutions have been assessed for either deferring or replacing the network investment required in the Barcaldine bulk supply area:

- Demand Management (demand increase during times of peak solar generation) to reduce accelerated aging and defer replacement of T5 66/22kV 8/10MVA transformer. This would need to be in the order of 6MVA, 8hrs per day, >300 days per year and connect at 22kV.
- Demand Response through customer embedded (non-solar) generation, call off load and load curtailment contracts to allow a reduction from four power transformers (two 132/66/11kV and two 66/22kV) to two larger power transformers (one 132/66/11kV and one 66/22kV) while still meeting the applicable network security criteria. This would need to total in the order of 20MVA, and would introduce stability issues with existing solar farms currently on separate busses.

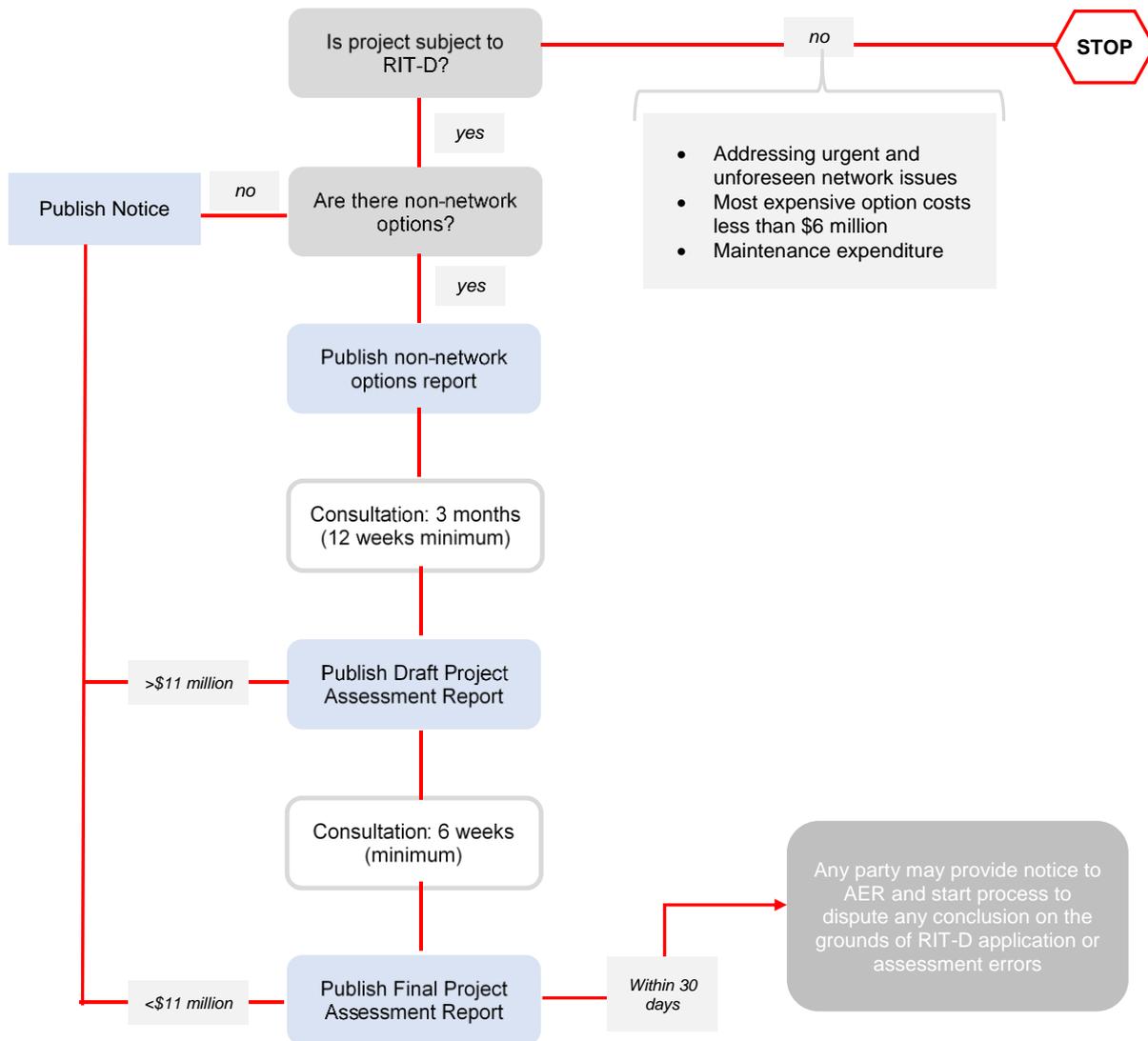
They have been assessed as not technically or economically viable as they will not address the network risk associated with poor condition assets.

5 Conclusion and Next Steps

The internal investigations undertaken on the feasibility of the non-network solutions revealed that it is unlikely to find a complete non-network solution or a hybrid (combined network and non-network) solution to provide the magnitude of network support required in the Barcaldine bulk supply area to address the identified need.

The preferred network option is to replace the assets in poor condition. This notice of no non-network options is therefore published in accordance with rule 5.17.4(d) of the National Electricity Rules. As the next step in the RIT-D process, Ergon Energy will now proceed to publish a Final Project Assessment Report.

Appendix – The RIT-D Process



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