

Regulatory Test - Request for Information

Emerging Distribution Network Limitations in the Emerald Area

8 October 2013

Ergon Energy Corporation Limited

Disclaimer

While care was taken in preparation of the information in this discussion paper, and it is provided in good faith, Ergon Energy Corporation Limited accepts no responsibility or liability for any loss or damage that may be incurred by any person acting in reliance on this information or assumptions drawn from it. This discussion paper has been prepared for the purpose of inviting information, comment and discussion from interested parties. The document has been prepared using information provided by a number of third parties. It contains assumptions regarding, among other things, economic growth and load forecasts which may or may not prove to be correct. All information should be independently verified to the extent possible before assessing any investment proposals.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
1. INTRODUCTION	2
2. BACKGROUND & PURPOSE FOR THIS REQUEST FOR INFORMATION	3
2.1. Background.....	3
2.2. Purpose of this “Request for Information”	3
3. EXISTING SUPPLY SYSTEM TO THE EMERALD AREA	4
3.1. Geographic Region.....	4
3.2. Existing Supply System	5
4. EMERGING DISTRIBUTION NETWORK LIMITATIONS	6
4.1. Timeframes for Taking Corrective Action	6
4.2. Known Future Network and Generation Development	6
5. INFORMATION ABOUT CRITERIA THAT SOLUTIONS MUST MEET	7
5.1. Size.....	7
5.2. Timing.....	8
5.3. Location	8
5.4. Quality.....	8
5.5. Reliability	8
5.6. Longevity	8
6. EVALUATION PROCESS	9
6.1. Evaluation Criteria	9
6.2. Submissions from Solution Providers	9
6.3. Timetable for Submissions	10
6.4. Assessment and Decision Timetable.....	11

EXECUTIVE SUMMARY

Ergon Energy Corporation Limited (Ergon Energy) is responsible (under its Distribution Authority) for electricity supply to the Emerald area in Central Queensland. We have identified emerging limitations in the electricity distribution network supplying the township of Emerald. The loads on Ergon Energy's 66kV lines supplying Emerald have progressively increased such that augmentation is required if reliable supply is to be maintained.

The Emerald Township, comprising approximately 8000 customers, is currently supplied from Ergon Energy's Emerald 66/11kV 3 x 20MVA zone substation which receives supply from a 66kV line from H015 Lilyvale bulk supply substation and a 66kV line from T032 Blackwater bulk supply substation. The Emerald load is presently 37MVA and is forecast to grow at over 3% per annum for the next 10 years. The Emerald load levels are such that the Blackwater 66kV feeder alone can supply only about half of the Emerald load and the Lilyvale feeder alone will not be able to supply the full Emerald load within a couple of years. Therefore loss of either one of these long rural 66kV lines may result in load shedding at Emerald, with this potential load shedding being significant for loss of the Lilyvale 66kV line.

To meet the security of supply criteria for the Emerald area Ergon Energy needs an additional minimum of 40 MVA firm capacity at 66 kV to be provided to this area. This size has been matched to expected load requirements within Ergon Energy's typical 10 year planning horizon.

This is a Request for Information where Ergon Energy is seeking information about possible solutions to the emerging limitations which may be able to be provided by parties other than Ergon Energy.

Submissions in writing (electronic preferably) are due by **3 December 2013** and should be lodged to:

Attention: Network Planning and Strategy

Email: regulatory.tests@ergon.com.au

Updated information will be provided on our web site:

<http://www.ergon.com.au/community--and--our-network/network-management-and-projects/regulatory-test-consultations>

For further information and inquiries please submit to the email address above.

1. INTRODUCTION

Ergon Energy has identified emerging limitations in the electricity distribution network supplying the township of Emerald in central Queensland.

This is a Request for Information where Ergon Energy is seeking information about possible solutions to the emerging limitations which may be able to be provided by parties other than Ergon Energy.

Submissions in writing (electronic preferred) are due by **3 December 2013** and should be lodged to:

Attention: Network Planning and Strategy

Email: regulatory.tests@ergon.com.au

A decision is required by February 2014 if the initial stage of any option involving significant construction is to be completed by 30 November 2015.

Updated information will be provided on our web site:

<http://www.ergon.com.au/community--and--our-network/network-management-and-projects/regulatory-test-consultations>

2. BACKGROUND & PURPOSE FOR THIS REQUEST FOR INFORMATION

2.1. Background

If technical limits of the distribution system will be exceeded and the rectification options are likely to exceed \$10M, Ergon Energy is required under the National Electricity Rules (NER)¹ to notify affected Registered Participants², AEMO and Interested Parties³ within the time required for corrective action and meet the following regulatory requirements:

- Consult with affected Registered Participants, AEMO and Interested Parties regarding possible solutions that may include local generation, demand side management and market network service provider options⁴.
- Demonstrate proper consideration of various scenarios, including reasonable forecasts of electricity demand, efficient operating costs, avoidable costs, costs of ancillary services and the ability of alternative options to satisfy emerging network limitations under these scenarios.
- Ensure the recommended solution meets reliability requirements while minimising the present value of costs when compared to alternative solutions⁵.

Ergon Energy is responsible for electricity supply to the Emerald area (under its Distribution Authority) and has identified emerging limitations in the electricity network supplying the township of Emerald. The load on Ergon Energy's 66 kV lines supplying Emerald has progressively increased such that augmentation is required if reliable supply is to be maintained.

2.2. Purpose of this "Request for Information"

The purpose of this Request for Information is to:

- Provide information about the existing distribution network in the Emerald area.
- Provide information about emerging distribution network limitations and the expected time by which action must be taken to maintain the reliability of the distribution system.
- Provide information about the criteria that solutions to be provided by parties other than Ergon Energy must meet.
- Explain the process (including approach and assumptions) to be used to evaluate alternative solutions, including distribution options that are currently being investigated by Ergon Energy.

¹ Clause 5.6.2(f)

² As defined in the NER

³ As defined in the NER

⁴ NER, clause 5.6.2(f)

⁵ In accordance with the Australian Energy Regulator's Regulatory Test Version 3, November 2007

3. EXISTING SUPPLY SYSTEM TO THE EMERALD AREA

3.1. Geographic Region

The geographic region covered by this Request for Information is the Emerald township and its surrounds. The township of Emerald is located 240km west of Rockhampton in central Queensland. The map portion below shows the Emerald township and the subtransmission infrastructure in the vicinity.

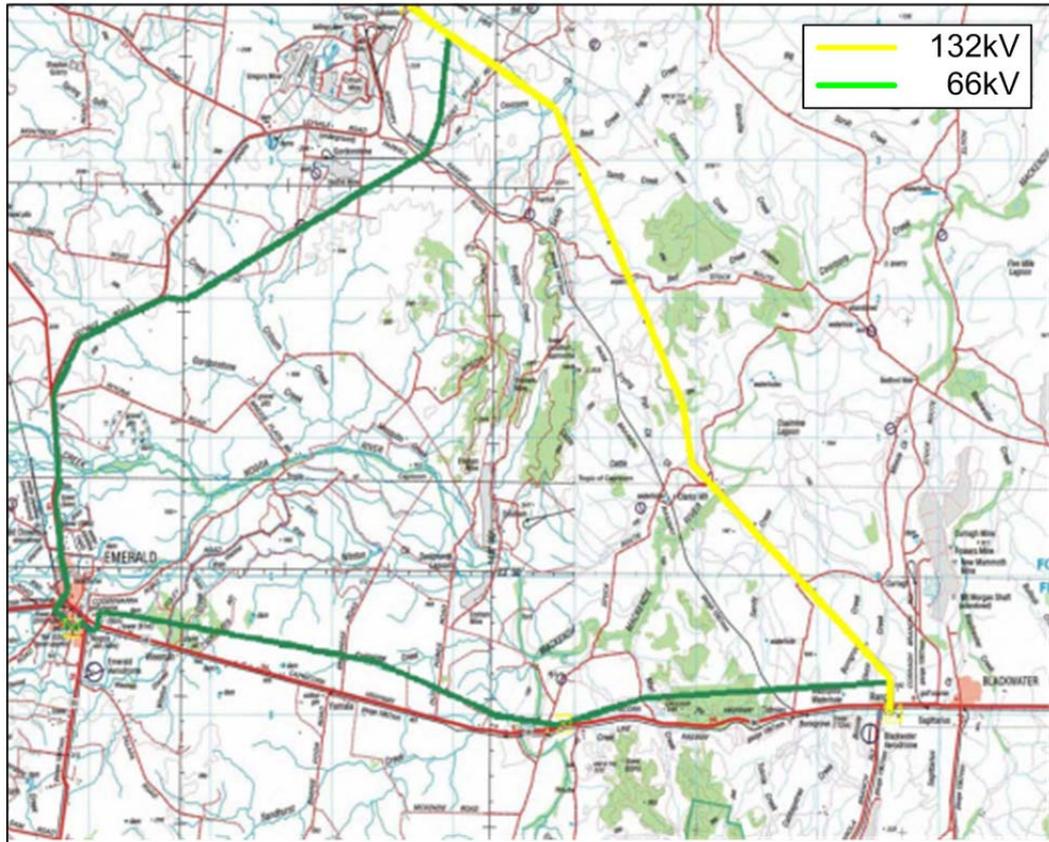


Figure 1 Blackwater to Emerald Sub-Transmission System

3.2. Existing Supply System

The Emerald township, comprising approximately 8000 customers, is currently supplied from Ergon Energy's Emerald 66/11kV 3 x 20MVA zone substation which receives supply from a 66kV line from H015 Lilyvale bulk supply substation and a 66kV line from Blackwater. The Blackwater line also supplies the Comet 5+2MVA zone sub via a tee-off.

The Emerald load levels are such that the Blackwater 66kV feeder alone can supply only about half of the Emerald load and the Lilyvale feeder alone will not be able to supply the full Emerald load within a couple of years. Therefore loss of either one of these long rural 66kV lines may result in load shedding at Emerald, with this potential load shedding being significant for loss of the Lilyvale 66kV line.

Ergon Energy's planning criteria requires that subtransmission feeder loads in excess of 15MVA should be supplied at an N-1 security level (i.e. loss of a single line should not cause network outages). Therefore additional 66 kV feeder capacity is required to Emerald to comply with this criterion.

- Nothing can be done with the existing Blackwater-Emerald 66kV line to allow it to supply all the Emerald and Comet maximum demand loads by itself.
- Due to mining leases and broad acre farming in the area installing a 3rd 66kV line to Emerald would be extremely difficult.

4. EMERGING DISTRIBUTION NETWORK LIMITATIONS

The 2012-13 peak load at Emerald was 39.1 MVA, and the N-1 capacity of the 66kV supply to Emerald is 20MVA. The Emerald maximum demand load is forecast to increase at 3.5% per annum over the next 5 years and 3% per annum after this.

The Comet substation load comprises a large proportion for water pumping and as water has not been available for the last couple of years these years have shown a reduced demand. Over the longer term the Comet sub load is forecast to be 2.7MVA with zero demand growth expected.

A load forecast is shown in Table 1 below.

TABLE 1 – Emerald Area – Supply Substations Load History & Forecast

Feeder Name	Maximum Annual Demand (MVA)									
	Actual Load			Forecast Load						
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2022/23	2027/28
Emerald Zone Sub	36.2	39.1	39.1	42.7	43.4	45.1	46.6	46.2	50.39	54.8
Comet Zone Sub	2.1	2.5	2.5	2.7	2.7	2.7	2.7	2.7	2.7	2.7

With the present network (Emerald 22kV capacitors in service) the 66kV lines can supply the following maximum loads:

Blackwater-Emerald line only: 20MVA at Emerald & 4MVA at Comet

Lilyvale-Emerald line only: 35MVA at Emerald & 4MVA at Comet

It is clear from the load data in Table 1 and the 66kV line transfer capacities given above that N-1 66kV feeder capacity to Emerald has been exceeded.

The above information also indicates that rebuilding the aged lower capacity single circuit Blackwater-Emerald 66kV line will still not restore N-1 66kV line capacity to Emerald as the newer higher capacity Lilyvale-Emerald 66kV line cannot supply the peak Emerald loads alone.

4.1. Timeframes for Taking Corrective Action

In order to ensure that security of supply to customers in the Emerald area complies with Ergon Energy's planning and security criteria, corrective action should be completed before summer 30 November 2015. However the earliest achievable completion date for the first stage of major network augmentation programme is 30 November 2015.

A decision about the selected option is required by February 2014 if any option involving significant construction is to be completed by 30 November 2015.

4.2. Known Future Network and Generation Development

(i.e. projects that have been approved and are firm to proceed)

Ergon Energy is not aware of any other network augmentations or generation developments in the Emerald area that could relieve the emerging network limitations described in section 4.0 above.

5. INFORMATION ABOUT CRITERIA THAT SOLUTIONS MUST MEET

It is essential that corrective action be taken prior to 30 November 2015 to maintain a reliable electricity supply to the Emerald area. This may involve network augmentation or the implementation of local generation or demand side management options which reduce, delay or remove the need for new network investment.

This Request for Information, and subsequent consultation, provides an opportunity for alternative solutions to be submitted for consideration. The information provided in this document is intended to enable affected Registered Participants, AEMO and Interested Parties to formulate and propose feasible local generation and demand side management solutions.

Ergon Energy has identified the following criteria, to assist solution providers understand the technical and other requirements. These criteria must be satisfied if solutions are to compensate or rectify the emerging technical limitations of the distribution network.

As a distribution network service provider (DNSP), Ergon Energy must comply with technical standards in the NER. In particular, requirements relating to reliability and system security contained in Schedule 5.1 of the NER are relevant to planning for future electricity needs.

Amongst other things, Schedule 5.1 requires that:

- the frequency variations are within the limits described in S5.1.3;
- voltage fluctuations do not exceed limits set out in S5.1.5;
- voltage harmonic & notching distortion do not exceed limits set out in S5.1.6;
- voltage unbalance does not exceed limits set out in S5.1.7;
- the power system can operate in a stable state as defined in S5.1.8;
- faults can be cleared in times specified in S5.1.9;
- load control is in place in accordance with S5.1.10;
- automatic reclosure requirements are met, S5.1.11; and
- AEMO be advised of current ratings as required in S5.1.12. AEMO has a related obligation (4.3.1 (f)) to operate the power system within all plant capabilities.

Schedule 5.1 also includes details of credible contingencies and levels of redundancy to be considered in planning and operating the distribution network, such as:

- 'System Normal': the absolute minimum level of reliability required. Defined as the ability to supply all load with all elements of the electricity system intact (i.e. loss of supply would occur during a single fault or contingency),
- 'N-1': able to meet peak load with the worst *single* credible fault or contingency,
- 'N-2': able to supply all peak load during a *double* contingency.

Ergon Energy has certain obligations to comply with technical standards under the NER and its Distribution Authority (and subsidiary instruments). These obligations must be taken into consideration when choosing a suitable solution for the Emerald network technical limitations discussed in this Request for Information.

5.1. Size

To meet the security of supply criteria for the Emerald situation, Ergon Energy needs an additional minimum of 40 MVA firm cyclic capacity at 66 kV to be provided to this area. This size has been matched to expected load requirements within Ergon Energy's typical 10 year planning horizon.

5.2. Timing

Commissioning needs to be completed by 30 November 2015.

5.3. Location

Additional capacity is to be delivered to the Emerald zone substation located in Emerald, with capability to extend out to other locations (if necessary).

5.4. Quality

Proposed solutions must comply with the relevant standards in the NER and furthermore, must not inhibit Ergon Energy's ability to meet its obligations under the NER and other statutory instruments.

5.5. Reliability

The National Electricity Rules' Schedule 5.1 includes details of credible contingencies and levels of redundancy to be considered in planning and operating the distribution network, such as:

- 'System Normal': the absolute minimum level of reliability required. Defined as the ability to supply all load with all elements of the electricity system intact (i.e. loss of supply would occur during a single fault or contingency),
- 'N-1': able to meet peak load with the worst single credible fault or contingency
- 'N-2': able to supply all peak load during a double contingency.

Ergon Energy's security of supply criteria requires that for a load of the Emerald size, N-1 security is required at the 66kv busbar. This level of security implies the parallel operation of critical elements (eg. transformers, generators, circuit breakers) under normal circumstances such that there will be no loss of supply (even momentary) during a single contingency event.

5.6. Longevity

Options must be capable of providing solutions to the projected limitation in the Emerald area for a period of at least 10 years. Alternatively solutions must be able to defer additional network investment for a number of years.

6. EVALUATION PROCESS

6.1. Evaluation Criteria

The Australian Energy Regulator's (AER) Regulatory Test⁶ and Chapter 5⁷ of the NER mandates the evaluation criteria and requires Ergon Energy to consider demand side management, generation and market network service provider options on an equal footing. The Regulatory Test also specifies the assessment methodology to be used:

“An option satisfies the regulatory test if:

In the event the option is necessitated principally by the inability to meet the service standards linked to the technical requirements of Schedule 5.1 of the NER or in applicable regulatory instruments – **the option minimises the costs of meeting those requirements, compared with alternative option/s in a majority of reasonable scenarios.**⁸

An augmentation proposed to meet minimum network performance requirements of Schedule 5.1 of the NER, or other statutory requirements including the Queensland requirements described in Ergon Energy's Network Management Plan⁹, is referred to as a 'reliability augmentation'.

This means that the assessment of solutions will be based on minimising the present value of costs while meeting minimum network performance requirements.

A public process is required which includes disclosure of project costs and comparison of alternatives. It is important that all feasible options proposed are considered in the process.

If a non-network option satisfies technical requirements, and can be implemented for a lower cost than a distribution augmentation in the required timeframe, it will be necessary for Ergon Energy to enter into a network support agreement with the proponents of the alternative project to ensure supply quality and reliability can be maintained.

Since regulated funding (collected via Ergon Energy's network charges) will be required, it is necessary that network support arrangements satisfy the Regulatory Test in terms of both economics and disclosure of relevant costs to the market.

6.2. Submissions from Solution Providers

This is not a tender process. Submissions are requested so that Ergon Energy can meet its regulatory obligations to compare the present value cost of alternatives against options of augmenting a distribution supply system to maintain reliability of supply.

Ergon Energy will not be legally bound in any way or otherwise obligated to any person who may receive this Request for Information or to any person who may submit a proposal. At no time will Ergon Energy be liable for any costs incurred by a proponent in the assessment of this Request for Information, any site visits, obtainment of further information from Ergon Energy or the preparation by a proponent of a proposal to this Request for Information.

Ergon Energy may seek clarification of details from the proponent of a proposed option provided this does not materially alter the proposal.

If you propose a solution, it should contain the following information:

- Details of the party making the submission (or proposing the solution);
- Details of the party responsible for the providing the solution (if different to the proponent);
- An explanation of the relevance of the proposal and/or options presented;

⁶ AER's Regulatory Test Version 3, November 2007.

⁷ Clause 5.6.2 (f) and (g)

⁸ Emphasis added by Ergon Energy

⁹ Ergon Energy's Network Management plan is available on its website - <http://www.ergon.com.au/community--and--our-network/network-management/network-management-plan>

- Technical details of the project (capacity, reliability, availability, proposed connection point if relevant etc) to allow an assessment of the likely impact on supply capability;
- If applicable to the solution being offered:
 - the size, type and location of load(s) that can be reduced, shifted, substituted or interrupted
 - the size, type and location of generators that can be installed or utilised if required;
 - the type and location of action or technology proposed to reduce peak demand/provide electricity system support;
- Sufficient information to allow the costs of the solution to be incorporated in a cost effectiveness comparison in accordance with AER's Regulatory Test;
- Information about the impact on the proposal if electricity demand were to be 25% above/below Ergon Energy's forecasts.
- An assessment of the ability of the proposed solution to meet the technical requirements of the NER;
- Timing for availability of the option, and whether it is a committed project¹⁰;
- The level of payment required to fund the proposal (initial payment, availability payment, dispatch payment etc) in both \$s and/or \$/kVA;
- Other material that would be relevant in the assessment of the proposed solution.

Submissions to this "Request for Information" will need to be described in the consultation process and will be made public. As such, any commercially sensitive material, or material that the party making the submission does not want to be made public, should be clearly identified.

It should be noted that Ergon Energy is required to publish the outcomes of the Regulatory Test analysis. If solution providers elect not to provide specific project cost data for commercial-in-confidence reasons, Ergon Energy may rely on cost estimates from independent specialist sources.

6.3. Timetable for Submissions

Submissions in writing are due by **3 December 2013** and should be lodged to:

Attention: Network Planning and Strategy

Email: regulatory.tests@ergon.com.au

¹⁰ As defined in the AER's Regulatory Test

6.4. Assessment and Decision Timetable

Ergon Energy intends to carry out the following process to assess what action should be taken to address the identified distribution network limitations:

Step 1	Request for (initial) Information (i.e. this Request for Information).	Date Released: 8 October 2013
Step 2	Submissions in response to the Request for Information.	Due Date: 3 December 2013
Step 3	Review and analysis by Ergon Energy. This is likely to involve further consultation with proponents and additional data may be requested.	Anticipated to be completed by: 17 December 2013
Step 4	Release of Ergon Energy's Consultation Paper and Draft Recommendation of solution which satisfies the Regulatory Test.	Anticipated to be released by: 7 January 2014
Step 5	Submissions in response to the Consultation Paper & Draft Recommendation.	Due Date: 4 February 2014
Step 6	Release of Final Recommendation (including summary of submissions received).	Anticipated to be released by: 18 February 2014
Ergon Energy reserves the right to revise this timetable at any time. The revised timetable will be made available on the Ergon Energy website.		

Ergon Energy will use its reasonable endeavours to maintain the consultation program listed above. However this program may alter due to changing power system conditions or other circumstances beyond the control of Ergon Energy. Updated information will be made available on our website: <http://www.ergon.com.au/community--and--our-network/network-management-and-projects/regulatory-test-consultations>.

The consultation timetable is driven by the need to make a decision by February 2014 if any option involving significant construction is to be in place by 30 November 2015.

At the conclusion of the consultation process, Ergon Energy intends to take steps to progress the recommended solution to ensure system reliability is maintained.