



# DEMAND SIDE ENGAGEMENT DOCUMENT

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**Non-Network Options Strategy**

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**Asset Strategy and Planning**

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February 2017

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# 1.0 DEMAND SIDE ENGAGEMENT DOCUMENT

## 1.1 PURPOSE

This Demand Side Engagement Document outlines how Endeavour Energy engages with non-network service providers, interested stakeholders, registered parties and customers on the supply of demand side solutions. It details our approach and processes to identify and evaluate non-network options for addressing network constraints, and how non-network service providers are invited to submit proposals.

## 1.2 SCOPE

This document addresses the requirements set out in clause 5.13.1(e) of the National Electricity Rules and describes our demand management process. The process includes:

- Screening for non-network options;
- Non-Network Options Reports;
- Evaluation of credible options to determination of the preferred option (RIT-D process);
- Implementation process for a non-network option;
- Lodgement of connection applications for embedded generators; and
- How financial incentives payments for non-network options are determined.

## 1.3 INTRODUCTION

It is Endeavour Energy's responsibility to ensure a reliable and safe electricity supply to customers. When the demand for electricity, at peak times (referred to as peak demand), approaches the capacity limits of the electricity network, Endeavour Energy will commence investigation to identify credible options to address the limitation. Approaching the capacity limit is not necessarily the trigger for investment but the commencement of investigations. The trigger for investment is generally driven by the risk levels and by the value of expected unserved energy. An effective demand management (DM) program can help manage the load at risk and defer or avoid network upgrades.

Credible options may be either to increase the network capacity (supply side management or network option) or reduce the peak electricity demand on the network (non-network option, also known as demand management). Embedded generation or alternative energy sources are considered and evaluated as part of the non-network option investigations

Effective use of DM has the potential to reduce the cost of operating the network and lowering the electricity bills. There are a range of demand management solutions available for use by Endeavour Energy which includes:

- Shifting appliance or equipment use from peak periods to non-peak periods (load shifting or reshaping the load curve)
- Converting the appliance energy source from electricity to an alternative power source (e.g. fuel switching)
- Use of more energy efficient appliances (energy efficiency)
- Operating appliances at lower power demand for short periods (load curtailment)
- Operating appliances during off-peak times (controlled load)
- Use of Battery Energy Storage Systems to reduce peak demand (peak lopping)
- Operation of embedded generators (demand limiting)
- Power factor correction (efficient use of electricity)

## 1.4 PLANNING PROCESS

Endeavour Energy follows its annual planning process to identify emerging network limitations resulting from the changes in the demand forecast. This process is documented in detail in the Distribution Annual Planning Report (DAPR) and is available on the [Endeavour Energy web site](#). The non-network investigation component is summarised below.

Each constraint is analysed to determine credible options to overcome the constraint. Network options are developed first to determine the estimated network cost. The network constraint is then screened to identify if a non-network option is feasible, refer to section 3.0. This is the start of the tender process to request submissions for non-network options. The objective is to find the lowest cost solution that meets the required reliability standards, refer to section 4.3.1. The non-network investigation is comprised of six separate stages:

1. Planning review to identify emerging network constraint with credible network options;
2. Conduct Non-network option screening;
3. Where DM is feasible, issue a Non-network Options Report as part of the community consultation process to obtain proposals from interested parties. This process is run as a Request for Proposal (RFP) for probity and due diligence reasons and is subject to internal approval;
4. Perform the RIT-D evaluation to identify the most cost effective option(s) ; and
5. If a non-network option is identified as the most cost effective option, negotiate with proponents to implement the program.

This is in line with the AER's RIT-D process and will be followed for all projects where the most expensive credible option is greater than \$5 million. A non-network investigation will also be conducted for projects with a capital cost of less than \$5 million but may not necessarily adopt the RIT-D process. These projects are nominated as Non RIT-D projects. A simplified process will generally be utilised to determine the cost effectiveness of non-network options and may include negotiating with commercial and industrial customers to identify low cost demand reduction initiatives. The level of investigation will commensurate with the level of network investment and likely benefit.

## 1.5 DISTRIBUTION ANNUAL PLANNING REPORT (DAPR)

The DAPR is produced annually as part of Endeavour Energy's annual planning process. This document details the latest summer and winter demand forecasts and identifies emerging network constraints for all transmission and zone substations, subtransmission and primary distribution feeders where appropriate. It also contains information where demand management has been investigated and where demand management opportunities exist.

The DAPR provides an overview of the network performance and planning review outcomes and details where network enhancement is required. Interested parties are able to identify areas where they are able to submit proposals for demand management (non-network) options. A copy of the latest reports is on the Endeavour Energy Web page.

## 1.6 DEFINITIONS

### **Australian Energy Regulator (AER)**

Australia's national energy market regulator and has a range of responsibility in the national energy markets.

### **Avoided Distribution Cost (ADC)**

The expected change in the Present Value of the distribution operating costs and capital expenditure resulting from the deferral or postponement (temporarily or indefinitely) of expenditure on the distribution system.

### **Credible Option**

An option (or group of options) that: (1) address the identified need; (2) is (or are) commercially and technically feasible; and (3) can be implemented in sufficient time to meet the identified need, and is (or are) identified as a credible option in accordance with paragraphs (b) or (d) in cl 5.15.2 in the NER.

### **Demand Management (DM)**

Any initiative that reduces peak demand drawn from the electricity network by reducing customer demand (temporarily or permanently) or by incorporating a separate energy source downstream of the network constraint for the sole purpose of avoiding or deferring the expansion of the electricity network, also known as demand side management, non-network option or system support option.

### **Distribution Annual Planning Report (DAPR)**

An annual report produced by the Distribution Network Service Provider of part of their distribution annual planning process.

### **NER**

National Electricity Rules

### **Network Option**

A means by which an identified constraint can be fully or partly addressed by expenditure on a distribution asset which is undertaken by a Network Service Provider.

### **Non-Network Option**

A means by which an identified constraint can be fully or partly addressed other than by a network option.

### **Non-Network Option Report**

A report prepared under cl 5.17.4 of the NER.

### **Peak Demand**

When the demand for electricity reaches its maximum value for a period being; day, month, season or year. It is caused by customers connected to the electricity network using high levels of electricity simultaneously resulting in a reduction in diversity of electricity use, generally as a result of extreme weather conditions.

### **RIT-D**

The Regulatory Investment Test for Distribution defined in the NER.

## **2.0 PEAK DEMAND**

A peak in the demand for electricity is caused from the coincident use by a large number of consumers. An example of this is on extremely hot days when the majority of air conditioners are used at the same time and do not cycle off due to the heat build-up within the house. This does not occur frequently and generally cause by extreme weather conditions.

Endeavour Energy's network area is made up of diverse climatic areas. Western Sydney is typically hotter than the coastal area of Wollongong and the South Coast which is different again to the Blue Mountains and Southern Highlands. The hotter climate areas tend to be summer peaking while the cooler climate areas can be winter peaking.

Load profiles as can be seen in Figure 1 will vary according to the customer type. A non-network option may need to target a particular load profile type. Industrial/Commercial generally has a peak demand time in the middle of the day whereas the peak demand time will be from late afternoon for residential.

**Figure 1: Typical Industrial/Commercial and Residential Load Profiles**



### 3.0 DEMAND MANAGEMENT SCREENING

In accordance with the NER, Endeavour Energy will identify network limitations based on the current load forecast and the total capacity of the network. Also identified are all credible options to address the network limitation. Each identified network limitation will be screened for non-network opportunities to address the network limitation to either avoid or defer the network option.

The Screening Test is a structured analysis using the available information pertaining to an electricity network. The outcome of the Screening Test will be either; (a) a non-network option is feasible and should proceed to the Non-Network Option Report phase of consultation or; (b) a non-network option is not feasible and should proceed to consultation of the preferred network option (see Appendix A, RIT-D process). Results of the screening will be included in the DAPR. If the screening shows that a non-network option is not credible the results will also be published on the website as soon as possible. Proponents are still welcome to make a submission to the publication of the screening report if it is believed that a feasible non-network option exists.

The screening for non-network options process includes investigating the drivers of the peak demand and an analysis of demand growth. This includes the peak demand characteristics such as timing, duration and season. An analysis of the existing customer base is conducted to determine to potential for demand reduction. In an existing network (brownfield site) there would generally be sufficient opportunity to reduce demand to at least defer the network augmentation. Greenfield sites pose more of a challenge as it usually involves rural areas being re-developed into medium and high density housing with a commercial development component.

### 4.0 DEMAND SIDE ENGAGEMENT STRATEGY

The objective of the Demand Side Engagement Strategy is to provide all stakeholders an understanding of how Endeavour Energy engages with non-network service providers and other interested parties. All parties are provided with the opportunity to submit proposals for non-network alternatives during the process. The Non-Network Options Report is the means by which proposals are submitted however, submission may be made based on the DAPR or the publication of the screening report.

This document also provides instructions on how to submit non-network option proposals and the information to be included in a submission. Furthermore, information is provided describing how submissions are evaluated and how service providers will be engaged.

## 4.1 COMMUNITY CONSULTATION

Interaction is made with potential service providers and the community each time Endeavour Energy releases a public document and information on network limitations. This includes, but not limited to, the DAPR, publication of a screening report or a Non-Network Options Report, the Draft Project Assessment Report or the Final Project Assessment Report. These documents are available on Endeavour Energy's web site. Each document will provide details on how to make a submission. The information required by Endeavour to evaluate a submission is covered in section 4.3. Responses can be email to [consultation@endeavourenergy.com.au](mailto:consultation@endeavourenergy.com.au).

Endeavour Energy also notifies all parties on our Register of Interested Parties of any documents that are made available regarding network planning and invite submissions for non-network alternatives. Consultation is conducted at each stage during the RIT-D process. Endeavour Energy also investigates alternative supply strategies with developers for new release areas and is a player in the Urban Development infrastructure committee. Developers are welcome to contact Endeavour Energy to discuss alternative supply arrangements either through the infrastructure committee or directly.

## 4.2 NON-NETWORK OPTIONS REPORT – PROCUREMENT PROCESS

The Non-Network Options Report is produced and issued as a means of soliciting submissions for non-network options from service providers. The Non-Network Options Report is Endeavour Energy's procurement process for non-network services. The reason Endeavour prefers the procurement services at this stage is to avoid going to the market a second time and requesting the same information. This saves time in implementing the non-network option (if the preferred option) and avoids service providers making a second submission.

The Non-Network Options Report will follow Endeavour Energy tendering guidelines and will include other documents for proponents to make a formal complying submission. This is to meet probity and align with prudent purchasing practises. The procurement process will be open and fair and provide all parties with equal opportunity. It is incumbent on the proponent to ensure they obtain and complete all documents associated with the tender.

The Non-Network Options Report will contain the following:

- Description of the identified need, location, load profile, size and duration of the constraint;
- Assumptions used to identify the need;
- Technical characteristics that a non-network option would be required to deliver;
- A map identifying the geographical boundaries of the constraint area;
- What a non-network option needs to achieve to be successful;
- Technical, timing and cost details for identified credible options;
- A load profile showing the peak time and duration;
- Information to assist service providers in submitting credible proposals for consideration;
- Deferral value of the identified need; and
- Possible financial remuneration for peak demand reduction.

The report will be placed on the Endeavour Energy web site and will be the beginning of a three month consultation process. Upon publication of the Non-Network Options Report all participants registered on the Endeavour Energy Register of Interested Parties will be notified of the report's availability and location.

### 4.3 NON-NETWORK PROPOSAL SUBMISSION

The Non-network Options Report will include an outline of the information service providers are to include in their submission. An example of the type of information requested in the submissions is listed below:

- Name, address and contact details of the company or person making the submission; and the person responsible for the follow up contact;
- Size, type and location of load(s) that can be reduced, shifted, substituted or interrupted;
- Size, type and location of embedded generators that can be used if required;
- Type of action or technology proposed to reduce peak demand/provide alternative supplies;
- Time required to implement these measures and any period of notice required before loads can be interrupted or generators brought on-line;
- Total cost to implement these measures and any cost savings that would accrue to the owners/operators of the equipment;
- The level of contribution or assistance requested by the proponent from Endeavour; and
- Other information that would assist Endeavour Energy in investigating an evaluating the non-network option.

If there is insufficient detail provided in a submission to evaluate the impact on the peak demand and/or the cost to Endeavour Energy of the proposal, Endeavour Energy will contact the proponent to request further information.

Embedded generator proposals are to include details as stipulated in the Non-Network Options Report. Endeavour Energy will offer embedded generators an annual financial remuneration package for the term of the agreement and based on performance and as agreed to by both parties. Proponents must follow the procurements guidelines and request for information and ensure all mandatory information is provided.

#### 4.3.1 NON-NETWORK OPTION SUBMISSIONS REVIEW

All submissions are reviewed equally and ranked in accordance with the following criteria:

- Demand reduction (kVA) potential;
- Ability of the service provider to achieve the specified outcome;
- Cost of the proposal (NPV and \$/kVA);
- Time of day / seasonality of the demand reduction available;
- Timeframe for implementation;
- Reliability of demand reduction; and
- Risks associated with the proposal.

The proposal or combination of proposals that offer the best net economic value that achieves the desired outcome will be selected as the credible non-network option(s). This will then be evaluated with other credible options to identify the preferred option that maximises the net economic value to all those who produce, consume, and transport electricity in the NEM. The details of the evaluation methodology can be found in the AER RIT-D Application Guidelines <http://www.aer.gov.au/node/19146>. The market benefits included in the RIT-D that Endeavour believes are significant in assessing non-network options are:

- Changes in voluntary load shedding;
- Changes in involuntary load shedding;
- Changes in network losses;
- Differences in the timing of network investment expenditure; and
- Changes in costs for parties other than the RIT-D proponent.

These impacts will be calculated according to the AER's published RIT-D application guidelines.

A solution can comprise a number of DM options as long as each proposal is cost effective in its own right and provides a combined NPV superior to the preferred network option.

It is important for embedded generator proponents to demonstrate the reliability history of equipment to be installed and to provide examples of previous experience and usage. Other information to be submitted for review includes:

- Type of fuel and storage;
- Reliability of fuel supply;
- Proposed connection point and location;
- Ability to meet quality of supply and network protection requirements.

The tender process may include an interview of the top complying proponents to clarify the submission details and for the proponents to fully understand the project requirements. This allows each proponent to make adjustments and further develop their non-network option proposal and submit a best and final offer. Worked example of a non-network option investigation and evaluation is included as Appendices B and C. The first example is hypothetical to show the ability of a program to alter its objective based on submissions received. The second is a real life program detailing the network limitation in the Minto zone substation.

#### **4.3.2 AVOIDED TRANSMISSION USE OF SYSTEM CHARGE**

Endeavour Energy's distribution network connects to the TransGrid transmission network at multiple connection points. TransGrid is the Transmission Network Service Provider in NSW. The transmission use of system charge (TUOS) at the connection point that is charged to Endeavour Energy is recovered from the customers connected to the distribution network.

Avoided TUOS charges are calculated using the components of the TUOS charge that are avoidable as a result of the embedded generation being connected to that part of the network. It is based on the monthly energy and demand reduction achieved by the embedded generator. The reduction in TUOS charges are passed onto the embedded generators annually that are eligible to receive the avoided TUOS under the NER. Avoided TUOS payments are required to be paid only for intervals where the embedded generator reduces the actual Endeavour Energy TUOS payment to TransGrid.

#### **4.3.3 NON-NETWORK PAYMENT LEVELS**

The payment levels for non-network options will initially be based on the avoided distribution cost (ADC) of deferring or avoiding the most credible network option. The ADC will be calculated in accordance with regulatory guidelines. This will provide a guide for the budget allocation to implement a non-network option.

The target demand reduction will be determined using the latest demand forecast for the network component experiencing the constraint. Together with the ADC, a dollar per kVA maximum payment level is calculated and made available to reduce peak demand. Individual proponent payments levels may vary and will be based on:

- The total deferral value;
- The magnitude of the demand reduction offered by the proponent;
- Duration of demand reduction delivered;
- Availability and reliability of the demand reduction offered by the proponent;
- Other running and administration costs for each initiative; and
- The proportion of the delivered demand reduction and the total requirements.

The AER is currently developing a Demand Management Incentive Scheme (DMIS) that will provide certainty to Network Service Provider's for cost recovery that will result in non-network options becoming more cost effective. Any additional certainty and savings will translate into higher DM financial incentive payments.

#### **4.3.4 ACCESS TO INCENTIVE PAYMENTS**

Endeavour Energy will pay proponents a demand management incentive payment based on performance. This will be based on measured demand reduction when required and the agreed delivery criteria. It is understood that certain initiatives may require a set-up cost. Endeavour Energy is willing to negotiate providing financial assistance in this situation based on guaranteed delivery on service.

Demand Management incentive payments may be in many forms but it is Endeavour's preference to pay based on dollar per kVA of verified demand reduction. This is subject to negotiation during the agreement negotiation phase and may include both fixed and variable components.

#### **4.4 NON-NETWORK PROGRAM IMPLEMENTATION**

On completion of the economic evaluation and the non-network option consultation process a preferred option or combination of options will be identified. A Draft and/or Final Project Assessment Report will be produced in accordance with the RIT-D process, see Appendix A. Once the Project Assessment Reports are complete the preferred option will be submitted for approval before implementation.

If the preferred option is a non-network solution the implementation phase will commence. This involves negotiating an agreement with the preferred proponent(s). Formal agreements will be entered into covering service provided, demand reduction targets, timeframes, milestones and remuneration. On signing of the agreement the marketing and recruitment and/or construction phase will commence to ensure adequate time is provided for demand reduction delivery

##### **4.4.1 EMBEDDED GENERATION**

If the preferred option involves the installation of an embedded generator the proponent will need to submit an Application for Connection of a Generator Form to commence the process for determining the appropriate connection methodology.

Embedded generation must be connected via the customer's own electrical installation. It may be used to either:

- Offset, a customer's own (on-site) demand and/or energy consumption,
- Produce and export electricity onto the local distribution network for commercial reasons, or
- To provide distribution network support under a contractual arrangement.

There exist several alternative processes to ensure efficient implementation of an embedded generator connection depending on the type and size of generator installation being:

- Micro embedded generation (via an inverter) up to 5kW
- Micro embedded generation (via an inverter) up to 10kW for single phase or 30kW for three phase
- Embedded generation up to 5MW
- Embedded generation above 5MW

An [embedded generator application guideline](#) for generators 5 MW and greater can be obtained from the [Endeavour Energy web site](#). This provides specific details to assist proponents of large embedded generators and also provides details on the application process, charges and technical standards.

The process for applying for connection of an embedded generator is detailed below:

#### Application for Connection

An application form will need to be completed by the embedded generator proponent to commence the connection application process and must be completed regardless of the generator size. There is a form for micro embedded generation, less than 5kW and another form for embedded generators greater than 5kW. These forms are available from the Endeavour Energy web site: [Connecting](#) to our network-Full list of connection services.

Endeavour Energy will consider the following high level factors during the connection enquiry and application to connect process;

- Network Safety, Security and Stability;
- Network infrastructure availability, capability and capacity to facilitate the proposal;
- Infrastructure and commercial demarcation and crossover, especially when multiple jurisdictions are involved;
- Where applicable, compliance and alignment with the RIT-D requirements;
- Consideration for non-network support opportunities;
- Network and Proposal Interconnection Protection;
- Network Infrastructure Thermal Capacity;
- Network Voltage Control;
- Generator Fault Level Contribution;
- Power Factor of Generator Operation;
- Power Quality of Supply Generated and customer impact;
- Network augmentation required to facilitate the proposal in terms of contestable and non-contestable works;
- Network scope of work delivery timeframe;
- Legal review of the connection agreement;
- Any other considerations unique to the proposal

#### Generator Connection Offer

The connection requirements will be provided in a connection offer in response to the application. For micro embedded generators simplified connection requirements have been developed. For other embedded generators network augmentation and customer installation upgrade, a more detailed analysis to determine the connection requirements is required.

#### Technical Studies and Design

For large embedded generators connection, additional technical studies may be required and the scope, process and associated costs will be detailed in the connection offer. Endeavour Energy has the obligation to ensure safety and security for its network and for all customers connected to the network.

#### Connection Works and Charges

Embedded generation connection works dedicated to the customer are contestable however, work on the shared network are usually funded by Endeavour Energy unless advised otherwise.

The NER governs the processes associated with the generator connection charges. This has many dependent factors including but not limited to: network capability and capacity, generator capacity, connection voltage, augmentation requirements and connection complexity of the proposal.

To formalise the connection, the connection applicant would be financially responsible for:

- The full cost of the generator connection assets and services; and

- Any cost of removing the distribution network constraints that are specific to the connection of the generator.

The connection applicant is also financially responsible for settlement of the charges specific to the connection process to cover the expenses reasonably incurred by Endeavour. These include but are not limited to:

- Preliminary/Detailed Enquiry application Processing Fee;
- Application to connect – Connection Charges;

The connection charges may include:

- Network Augmentation Works. If significant this may be subject to a separate commercial contract (per application);
- Expenditure recuperation for applications which expanded beyond the original scope;
- Legal and commercial negotiation charges;
- Commissioning works such as inspections and or validation; and
- Connection Sanction review

#### Connection Agreement

An embedded generator has the option of accepting a standard connection agreement or negotiating a connection agreement depending on its size and preference. Small and micro embedded generators are able to utilise the standard agreements available to streamline the connection process and accept the standard terms and conditions. This is designed to meet the need of most residential and small scale embedded generators. Embedded generators greater than 5 MW will be connected via chapter 5 of the NER and need to negotiate the connection agreement. Embedded generators less than 5 MW may elect to negotiate the connection agreement under chapter 5A of the NER.

Endeavour will document all the negotiated factors listed above during the 'Application for Connection' stage into the negotiated connection agreement.

#### Test and Commissioning

All generators connected to the network must be tested and commissioned prior to operation by the embedded generation owner. Endeavour Energy may perform a safety and/or technical compliance audit of the installation.

## **4.5 REGISTER OF INTERESTED PARTIES**

Endeavour Energy maintains a [Register of Interested Parties](#) on its web site. We are always keen to receive ideas for possible non-network solutions to identified issues or constraints on our network.

All registered parties will receive notification of the following:

- Projects that are subject to the RIT-D;
- Results of the screening for non-network options of RIT-D projects;
- The publications of Non-network options reports;
- The issue of RFP's for demand management services; and
- The publication of Draft and Final assessment reports.

All parties interested in receiving the information may register at any time via the Endeavour Energy web site or by emailing your details to [consultation@endeavourenergy.com.au](mailto:consultation@endeavourenergy.com.au). An interested party may also request to be removed from the register of interested parties at any time via the same web site and email address.

## 4.6 DISPUTE RESOLUTION

Any party may, by notice to the AER, dispute conclusions made by the RIT-D proponent on the grounds that:

- The RIT-D proponent has not applied the RIT-D in accordance to the rules; or
- There was a manifest error in the calculations performed by the RIT-D proponent in applying the RIT-D

Dispute must meet the criteria as detailed in section 5.17.5 of the NER. A copy of the dispute is to be given to the RIT-D proponent at the same time as being provided to the AER.

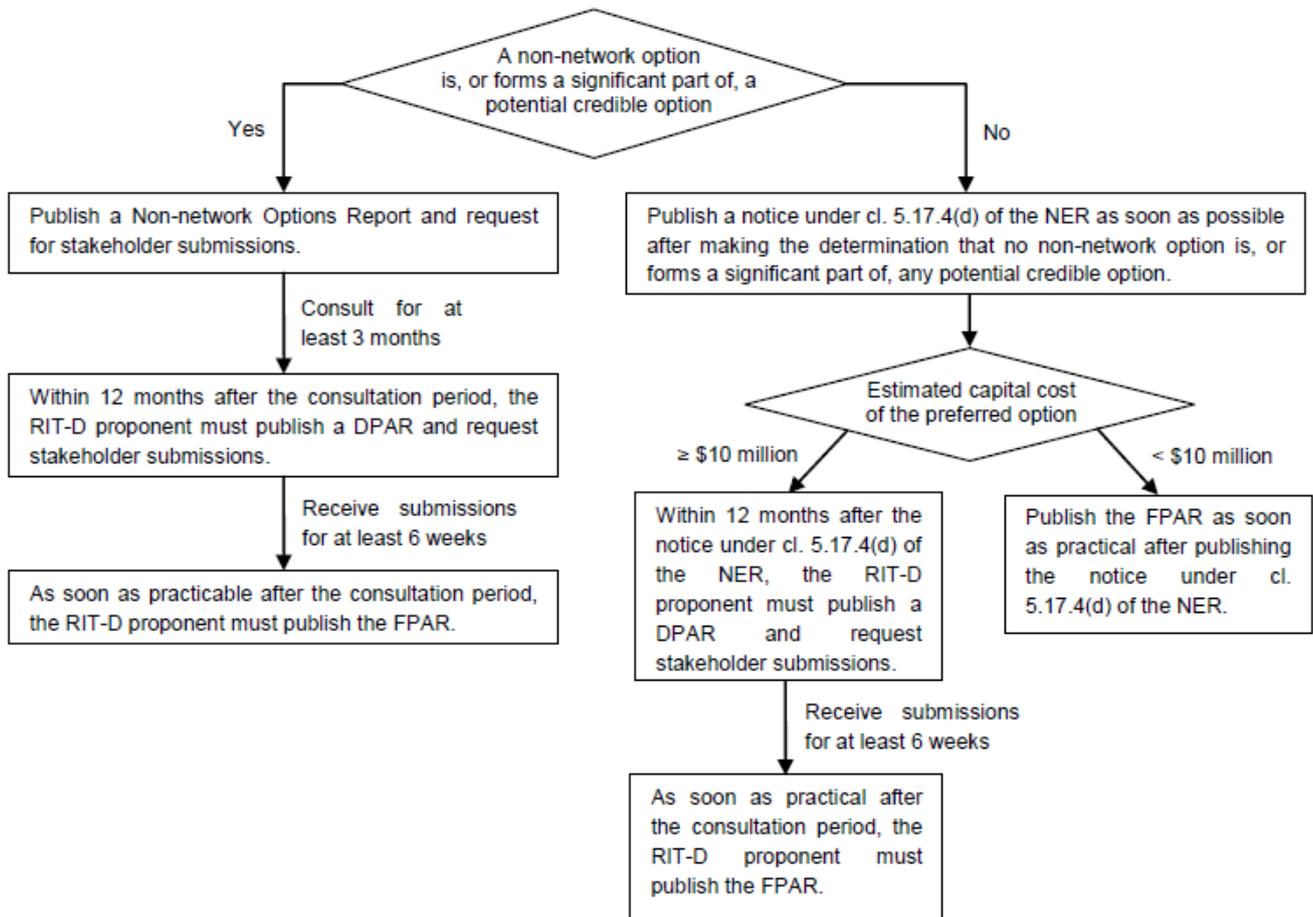
The AER will respond the dispute notice in accordance with section 5.17.5 of the NER. The RIT-D proponent will comply with the AER determination within the timeframe specified by the AER.

## 4.7 CONTACT DETAILS

Interested parties are invited to comment on this document or any other Endeavour Energy documents released as part of the annual distribution planning process. You may contact Endeavour Energy by the following methods:

Telephone: 131 081 (ask to speak to the Demand Management section)  
Email: [consultation@endeavourenergy.com.au](mailto:consultation@endeavourenergy.com.au).  
Correspondence: Chief Executive Officer  
Endeavour Energy  
PO Box 811  
Seven Hills NSW 1730

## APPENDIX A – RIT-D Process for Non-network Options



## APPENDIX B – Worked Example (Hypothetical)

The following examples are to assist non-network proponents understand Endeavour Energy's assessment criteria for non-network proposals.

### Result of Avoided Distribution Cost Calculation:

Target Demand Reduction:	4,600 kVA
Deferral period:	2 years (from 2017/18 to 2019/20)
Duration of DM Program:	4 years
Hours of overload over 4 years:	150 hours

Payment level per kVA:	Between \$170 to \$190 per kVA
Payment level per kWh:	Between \$1.10 to \$1.30 per kWh

### Non-network Option Submissions Received:

Six proposals were received:

1. AA Energy Management Consultant  
Providing energy audits and assistance to customers implement demand peak reduction
2. BB Energy Management Consultant  
Providing energy audits and assistance to customers implement demand peak reduction
3. CC Energy Management Consultant  
Providing energy audits and assistance to customers implement demand peak reduction
4. DD Generator Hire Company  
Providing diesel generators on a monthly rental basis
5. EE DSR Aggregator  
Identifying customers with DSR potential and scheduling DSR for network support
6. FF Embedded Generation Facility  
Establishing a 2 MW natural gas fired generator for network support

### Submissions Evaluation

Submissions were evaluated in terms of specified criteria. The result of the evaluation is shown below.

**Table 1: Non-Network Option Criteria Evaluation**

Non-Network Option Criteria Evaluation						
	Submissions					
	1	2	3	4	5	6
Effective demand reduction proposal	Yes	Yes	Yes	Yes	Yes	Yes
Reliability of peak demand reduction (High/Medium/Low)	High	High	High	High	High	High
Flexibility to change demand reduction target	Yes	Yes	Yes	Yes	Yes	Yes
Total cost within ADC	Yes	Yes	No	No	Yes	Yes
Level of risk to deliver demand reduction (High/Medium/Low)	Low	Low	Medium	Low	Medium	Low
Able to meet timeframe	Yes	Yes	Yes	Unknown	Unknown	Yes

The financial evaluation was conducted to identify the most cost-effective non-network option or combination of options. The results are shown below.

**Table 2: Non-Network Option Proposal Ranking**

Non-Network Option Financial Evaluation				
Submission	Demand Reduction (KVA)	Total Cost (\$)	Cost per kVA (\$)	Rank
1	4,600	730,000	159	2
2	4,600	840,000	193	4
3	4,600	910,000	198	5
4	4,600	1,250,000	272	6
5	1,000	180,000	180	3
6	2,000	290,000	145	1

The evaluation has identified the most cost effective non-network option being submission 6, natural gas fired embedded generation providing 2,000 kVA of network support. As the target demand reduction is 4,600 kVA a second proposal need to be identified to meet the target. The second most cost effective proposal (submission No.1) has the flexibility to change the level of demand reduction delivered. Subsequent to negotiations, the following non-network option was identified.

It was initially believed that only a two year deferral was possible. However, there is the potential to negotiate additional demand reduction with submission 5 and achieve an increased deferral as option 5 employs a different initiative to the others and is cost effective in its own right. This is dependent on addressing the risk of delivery issue and timeframe, refer Table 1. Assuming the issue can be resolved and an appropriate DM incentive payment structure is reached it would be selected as a component of the preferred option. An increased deferral period will be determined based on the demand reduction provided and the demand growth on the network.

**Table 3: Preferred Non-Network Options**

Preferred Non-Network Options (Combination of Initiatives)			
Submission	Target Demand Reduction	Total Cost	Cost per kVA
AA Energy Consultant	2,600 kVA	\$415,000	\$159
FF Embedded Generation Facility	2,000 kVA	\$290,000	\$145
EE DSR Aggregator	1,000 kVA <sup>1</sup>	\$180,000	\$180
<b>Total</b>	<b>5,600 kVA</b>	<b>\$885,000</b>	<b>\$153</b>

Note 1: Level of demand reduction offered by the proponent to achieve an addition one year of deferral

The preferred non-network options postpone the network option by three years and is below the calculated ADC which makes them cost effective proposals. The RIT-D evaluation methodology allows for a non-network option to be combined with a network option and be presented as one option to be evaluated against other options. The RIT-D evaluation has identified that the combination of the non-network and network option provides the highest net present value and is the preferred option.

### Recommendation

The Final Project Assessment Report recommends, as the preferred option, the implementation of a demand management program combining three non-network initiatives to defer the preferred network option by three years. Prior to implementing the network option after the three year deferral period another screening for non-network options will be performed.

## APPENDIX C – Worked Example (Eschol Park DM Program)

The information provided below was contained within the Request for Proposals (RFP) document that was issued in November 2011.

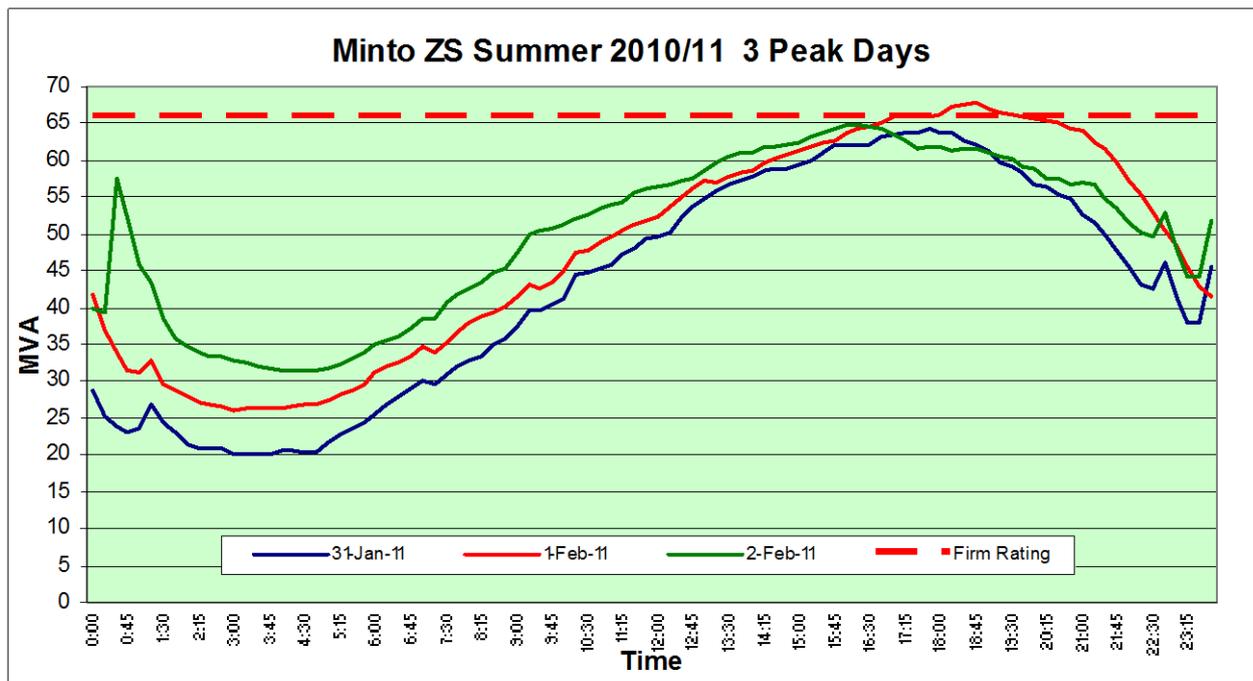
### Extract of the RFP Document:

The Minto Zone Substation supplies the Minto industrial area, commercial centre and the surrounding residential areas. These areas are experiencing natural growth in demand predominantly from the industrial area. This is resulting in current capacity limits being reached and the need for additional electricity network to supply this increase in electrical demand. Peak demand on the Minto ZS will grow at about 0.9 MVA per annum over the next ten years. The network option proposes to construct the Eschol Park ZS which will provide additional power supply to the area. Successful DM initiatives may help defer this capital expenditure. Endeavour is investigating the potential of a non-network option to defer the capital cost of \$20.5 million by two years.

**Table A2.4 – Minto ZS Yearly Overload Statistics**

	2012/13	2013/14	2014/15	2015/16	2016/17
Firm Rating (MVA)	66	66	66	66	66
Feeder 862 Rating (MVA)	64	64	64	64	64
Feeder 863 Rating (MVA)	64	64	64	64	64
Demand on Zone Sub (MVA)	73.7	74.6	75.4	76.3	77.2
Load at Risk less emergency rating	9.7	10.6	11.4	12.3	13.2
Total Duration of Overload (hrs)	24	32	40	48	56
Demand Reduction Required	<b>9.7</b>	<b>10.6</b>	<b>11.4</b>	-	-

The load profiles for the top three days during the 2010/2011 summer for Minto ZS are shown below.



A successful DM program would be one that reduces the summer afternoon peak demand by **11.4 MVA** to defer the construction of Eschol Park kV ZS by two years. Load reduction may be either permanent (energy efficiency) or temporary (load shedding/embedded generation) to achieve this objective.

Endeavour Energy is able to offer a maximum financial incentive for permanent demand reduction of about **\$130 to \$154** per kVA as a one-off payment for the implementation of DM initiatives. Payments are based on certain criteria of reliability and sustainability being met. The actual customer bounty payment will depend on the running cost of the program.

### Program Technical and Financial Evaluation:

A technical and financial review was conducted for the non-network option and is summarised below:

- Preferred network option cost: \$20.5 million
- Avoided distribution cost for a two year deferral: \$1.38 million
- Total demand reduction required: 11.4 MVA
- Targeted demand reduction: 9.0 MVA
- DM Financial incentive available: \$130 to \$154 per kVA

### Submission Received:

Eight submission were received providing the following services:

- Six Energy Service companies conducting audits and identifying demand reduction opportunities;
- Two Embedded Generation Services.

The energy services companies proposed to conduct energy audits of the major industrial and commercial customers in the Minto ZS supply area to identify cost effective demand reduction initiatives. An offer would then be made to the customer with assistance to implement each approved initiative. Endeavour would provide the financial incentive to encourage installation.

One embedded generation proposal was to install diesel generation sets located on Endeavour Energy Sites throughout the supply area. The second proposal was to install one large natural gas fired power plant located within the industrial area.

### Submission Review:

A review of submission identified that combining the most cost-effective Energy Services company and Embedded Generation submissions resulted in sufficient customer financial incentive payment to encourage customer participation in the DM program. The results of the financial evaluation is detailed in Table 1 below;

**Table 1: Preferred Non-Network Option Financial Review**

Demand Reducing Initiative	Cost
Embedded Generation providing peak demand reduction of 5,000kVA	\$705,000
Energy services company conducting energy audits identifying 4,000kVA	\$111,250
Customer financial incentive payment of \$142 / kVA for 4,000kVA	\$567,750
<b>Total</b>	<b>\$1,384,000</b>

It important to note that the customer financial incentive payment to implement customer initiatives was set at \$142 per kVA so that the total program cost meets the allocated budget and provide maximum incentive for take-up of each identified initiative.

The program was approved and agreements were prepared and signed for the engagement of both service providers.

## Program Results:

The program commenced in June 2012 and ended on 31 March 2015. The results are listed in Table 2.

**Table 2: DM Program Results**

Demand Management Program Results	Results
Number of Customers approached	19
Number of Customers agreed to receive energy audits	13
Number of Customer that implemented initiatives	6
Number of initiatives identified	55
Total demand reduction identified (kVA)	5,600
Number of initiatives implemented	10*
Total demand reduction implemented (kVA)	3,700
Total peak demand of participating customers (MVA)	15.7
Percentage demand reduction to peak demand	23.6%
Total peak demand reduction from Embedded Generator (MVA)	0

Note \*: Initiatives implemented; 1-lighting, 6-Power Factor Correction, 3-Load Curtailment

## Summary:

The energy audits successfully implemented 3,700kVA of demand reduction via a combination of permanent and temporary DM initiatives. The embedded generation proposal failed obtain the required environmental and council approval and did not proceed.

Although the program only achieved 3,700kVA of demand reduction against the target of 9,000 kVA it was still able to sufficiently reduce the load and energy at risk to postpone network investment. Subsequent to the program commencement there was a downturn in the industrial sector which saw manufacturing in the Minto industrial area close or move off-shore resulting in a drop in demand on the Minto zone substation. This was a unique situation with a number of events coinciding that resulted in a downturn in the industrial sector across Endeavour's network area. The DM program was able to delay the decision for investment to when more information regarding demand growth was available leading to a better decision.

The demand growth on Minto zone substation has returned in recent years but has not reached its previous peak. A proposal to develop a new residential area close to Minto zone substation has emerged and a watching brief will be maintained to determine the expected demand growth and any future network limitation. A Non-Network Options Report will be issued if the network limitation re-emerges.