

MAINTAINING RELIABLE ELECTRICITY SUPPLY TO PORT LINCOLN

APPLICATION NOTICE

**ElectraNet Pty Ltd
(ABN 41 094 482 416)**

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EXECUTIVE SUMMARY

Introduction

Port Lincoln is situated on the southern tip of the Eyre Peninsula which is located in western South Australia. Port Lincoln is a major town on the Eyre Peninsula and has a population of 14,000.

Electricity Supply to the Port Lincoln region is provided by a radial 132 kV transmission line connecting Whyalla to Port Lincoln. An intermediate 132 kV substation (ElectraNet's Yadnarie substation) is located on this line near Cleve, which is approximately half way between Whyalla and Port Lincoln.

Electricity demand at the Port Lincoln connection point is expected to increase by approximately 3% per annum over the next ten years, due to economic growth and spot-load increases that occur in response to local requirements.

ElectraNet is bound by the service obligations of the South Australian Electricity Transmission Code (ETC), which focuses primarily on supply reliability at individual connection points. The latest change to the ETC which comes into effect from July 2008 increased the reliability requirements of the Port Lincoln connection point, where the requirement for transmission line capacity under a single contingency event (N-1), has increased from 66.6% (2/3) to 100% of the Agreed Maximum Demand (AMD). In the event of a supply interruption at the Port Lincoln connection point as a result of a single contingency event (N-1), the new ETC service standards requires ElectraNet to use best endeavours to restore equivalent transmission line capacity to supply 100% of the Agreed Maximum Demand within one hour of the interruption.

As a consequence of the changes to the ETC supply obligations and the timing of the expiration of the existing generation Network Support Services contract at Port Lincoln, planning studies have been undertaken to evaluate potential network and non-network options to address the transmission line capability requirement at Port Lincoln under a single contingency condition (N-1).

This Application Notice has been prepared for the purposes of clause 5.6.6(c) of the National Electricity Rules in relation to a proposal to establish new large transmission network assets.

This Application Notice contains the results of the planning investigations and economic assessment of feasible supply options. In accordance with the Regulatory Test prescribed by the Australian Energy Regulator (AER), the supply solution that meets the reliability requirements at the lowest present value cost is recommended for implementation.

Options Considered

ElectraNet issued a 'Request for Information' paper to Registered Participants and interested parties in November 2005, which invited submissions from potential non-network solution providers to address the future Eyre Peninsula supply requirements.

Six submissions were received from electricity industry participants and Government. ElectraNet has reviewed these submissions and have included viable augmentation options based on these proposals.

In addition to these submissions, a transmission network augmentation option to address the transmission line capability limitations to the Port Lincoln connection point under a single supply contingency event was also developed.

The following two feasible network options were evaluated in detail to compare the present value of the costs, in accordance with the Regulatory Test:

Option	Description
Option 1	Port Lincoln Generation
Option 2	Single Circuit 132 kV Transmission Line – Cultana to Pt Lincoln

Evaluation and Conclusion

The Regulatory Test requires that, for reliability augmentations, the recommended option minimises the PV of costs in a majority of reasonable scenarios.

The options were compared on an equivalent basis over 15 years, including anticipated/modelled projects that are expected to be required within this period to meet forecast electricity demand growth at the Port Lincoln connection point.

The economic analysis in this Application Notice identifies Option 1 (Port Lincoln Generation) as the least cost solution for all reasonable scenarios considered over the 15-year analysis timeframe. Sensitivity analysis shows Option 1 to be a robust, preferred solution under a range of assumptions.

Consequently, this Application Notice contains a draft recommendation to implement Option 1, comprising:

- Establishment of a 10 year network support services agreement for the provision of Pt Lincoln based power station capacity support by July 2009, which includes the establishment of a new 33 kV bus at Port Lincoln for the connection of additional generator/s; and
- Purchasing additional land adjacent to the existing Port Lincoln substation.

The present value of the estimated costs of these works, as defined in the Regulatory Test, is estimated at \$64 million based on a 15 year term. Costs are based on 2007 dollar values.

ElectraNet invites written submissions from Registered Participants and interested parties on any matter in this Application Notice. The closing date for submissions is 18 January 2008.

1. INTRODUCTION

The Port Lincoln load contains a mixture of electrical loads including residential, commercial, agriculture, aquaculture and grazing.

ElectraNet currently meets the existing ETC transmission capability requirements at the Port Lincoln connection point, by contracting with the local power station owner at Port Lincoln for generation network support services.

As a consequence of the changes to the new ETC which comes into effect from 1 July 2008 and the associated changes to the Port Lincoln connection point reliability requirements, ElectraNet is currently evaluating the impacts of the future ETC transmission capability requirements for the Port Lincoln connection point and evaluating a preferred augmentation solution to continue to maintain a non-firm N-1 transmission capability at Port Lincoln.

Where a Transmission Network Service Provider (TNSP), such as ElectraNet, proposes to establish new large network assets to address such requirements, it is required to issue an 'Application Notice' under clause 5.6.6 of the NER. The Application Notice must contain information regarding:

- the reasons the augmentation is required, including, if relevant, why it is considered a 'reliability augmentation', as defined in the NER;
- feasible options available to address the future supply requirements, including non-network alternatives;
- the recommended solution, including the timetable for implementation; and
- why the solution satisfies the Regulatory Test prescribed by the Australian Energy Regulator (AER).

This document contains a draft recommendation for works to be undertaken to meet the reliability of electricity supply obligations at Port Lincoln. This draft recommendation is based on:

- changes to the ETC;
- the consultation undertaken by ElectraNet to identify potential options to address these future supply requirements; and
- analysis of feasible options in accordance with the Regulatory Test.

The recommended option minimises the present value (PV) of the costs to Registered Participants in the National Electricity Market (NEM) while meeting the reliability standards in the NER and South Australian Electricity Transmission Code (ETC). It will allow ElectraNet to ensure a reliable supply at the Port Lincoln connection point during single network contingencies at the least cost to the market and therefore to end-use customers.

2. BACKGROUND: ELECTRICITY SUPPLY SYSTEM

Geographic Area

Port Lincoln is situated on the southern tip of the Eyre Peninsula which is located in the western part of South Australia (refer Diagram 1). Although the Eyre Peninsula covers a significant geographic area, it is only sparsely populated, containing about 2% of the South Australian population. The major population centres are at Whyalla (~25,000) and Port Lincoln (~14,000). There are several other rural centres on the Eyre Peninsula, the major ones being Ceduna (~2,800), Streaky Bay (~1000), Cleve (~800), Cowell (~700), Kimba (~700), and Wudinna (~600).

The main industries on the Eyre Peninsula are mining and steel manufacturing (at and near Whyalla), fishing, grazing, agriculture and aquaculture. The peninsula has significant mineral deposits although they have not been exploited to any great degree at present.

The Port Lincoln load comprises a mixture of electrical loads including residential, commercial, agriculture, aquaculture and grazing.

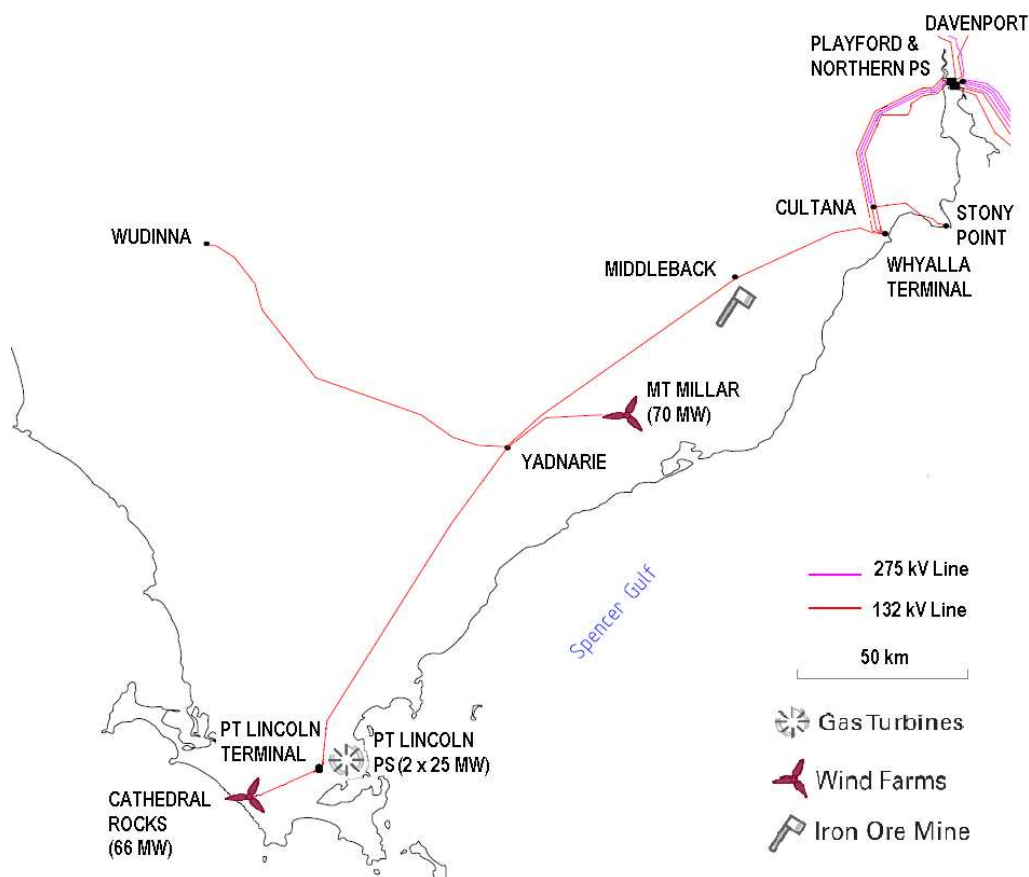


Diagram 1

*Electricity transmission network and local generators
supplying the Eyre Peninsula*

Existing supply arrangements

The present Eyre Peninsula 132 kV transmission system comprises a radial 132 kV line approximately 260 km in length, between Whyalla and Port Lincoln. An intermediate 132 kV substation is located on this line at Yadnarie (near Cleve), approximately half way between Whyalla and Port Lincoln. Another radial 132 kV line of approximately 110 km in length exits Yadnarie and connects to Wudinna substation to the north-west. Middleback 132/33 kV substation is connected on the Whyalla-Yadnarie 132 kV line and provides electricity supply to the Iron Duke mine that is operated by OneSteel.

ElectraNet's connection point at Port Lincoln supplies a 33 kV network which is owned and operated by ETSA Utilities and provides bulk supply to a number of locations at the southern end of the peninsula.

ElectraNet currently has contracts in place with the local power station at Port Lincoln for the provision of generation network support services, to supply the Port Lincoln load in the event that part or all of the radial transmission line from Whyalla to Port Lincoln is out of service.

Committed Network Developments

While there are no committed network developments scheduled to address the transmission line capability limitations at the Port Lincoln connection point for a single contingency (N-1), ElectraNet and ETSA Utilities have significant programmes of committed capital works to address load growth within the Eyre Peninsula Region. These have been considered in the planning analysis described in this document.

Committed works are detailed in ElectraNet's Annual Planning Review 2007. The most significant works are:

- ElectraNet is initiating works to increase the operating temperature of the Whyalla – Yadnarie – Port Lincoln 132 kV transmission lines. There is a need to upgrade the thermal ratings of this line because it was constructed in the mid 1960's using the British design criteria of the day. As a consequence, the Whyalla-Port Lincoln 132 kV transmission line has a design rating that is considerably less than that obtained from modern 132 kV lines using equivalent conductors.
- ElectraNet propose to extend the existing 275 kV Davenport Substation, installing two 160 MVA 275/132 kV transformers and constructing a new 132 kV substation adjacent the 275 kV extension. These works will replace the functionality of the Playford A Substation.
- ElectraNet also propose to coordinate the Playford Connection Point Upgrade project with the above works and install two new 60 MVA 132/33 kV connection point transformers to replace the existing 25 MVA units presently installed at Playford A Substation. As part of this related project, ETSA Utilities will construct a new 33 kV network bus adjacent the proposed 132 kV Davenport Substation and re-route their existing 33 kV network from Playford A to Davenport to support connection to the new facility.

- The Canowie to Davenport Radio link project will complete a radio telecommunication loop from Davenport Substation to Adelaide.

Existing and Committed Generation Facilities

Existing power generation facilities that are connected to the transmission network on the Eyre Peninsula are detailed in Table 1. When these power stations are operating, they serve to reduce the amount of electricity transferred into the Eyre Peninsula.

Location	Type	Maximum Capacity
Pt Lincoln Power Station	Distillate Turbine	2 x 25 MW
Cathedral Rocks Wind Farm	Wind Turbine	66 MW
Mt Millar Wind Farm	Wind Turbine	70 MW

*Table 1
Existing Generation Facilities on the Eyre Peninsula*

There are two distillate fuelled turbine driven generators presently connected to ElectraNet's 132 kV bus at Port Lincoln, and these generators provide back-up electricity supply capacity to the Port Lincoln area.

Because of the relatively high cost of fuel associated with these generators, they are normally only dispatched under the NEM at times of high pool prices, and this typically corresponds to periods when there is a shortage of other generation. However, this does not always correspond to times of high load on the Eyre Peninsula. Consequently, normal NEM dispatch of the Port Lincoln generators cannot be relied upon to meet service obligations in the region.

There are currently two wind-turbine powered electricity generating stations (wind farms) in the Lower Eyre Peninsula region, one at Mount Millar, west of Cowell, and the other at Cathedral Rocks, south of Port Lincoln. The Cathedral Rocks Wind Farm comprises a total of 66 MW of wind driven generation that connects to the Port Lincoln 132 kV connection point and is presently in service. The Mt Millar wind farm is undergoing commissioning and will comprise 70 MW of installed generation when completed in 2007.

Because of the unpredictable nature of the wind energy that powers these wind farms, these units are classified as unscheduled generators in the NEM. Initial analyses undertaken by the Electricity Supply Industry Planning Council (ESIPC) suggest that about 15% of this installed capacity could be considered as firm on a state-wide basis, and as such provide a source of reliable generating capacity. However, the ESIPC cautions that their analysis was based on state-wide diversity of weather/wind conditions, and that only over a broad-ranging geographic sample would the study results be applicable with an acceptable degree of certainty.

Given the relatively close geographic proximity of the two wind-farms on the Eyre Peninsula, and the likelihood that peak demand will occur at times of high ambient temperatures (40°C and above) and low wind conditions, the ESIPC suggests that

localised contribution from the wind-farms to supply the Eyre Peninsula would be negligible. On that basis, ElectraNet has assumed the firm supply capacity provided by both the Mount Millar and Cathedral rocks wind farms to the Eyre Peninsula region to be 0 MW for planning purposes.

When isolated from the main transmission network (islanded operation), the Eyre Peninsula wind farms do not have the ability to supply local customer demand independently of other generating plant.

ElectraNet is not aware of any committed non-wind based generation proposals that will potentially impact the Port Lincoln connection point or the Eyre Peninsula 132 kV transmission network.

3. BACKGROUND: ELECTRICITY DEMAND

Overview

Electricity demand forecasts over a ten-year period are obtained from ETSA Utilities and customers at each connection point in ElectraNet's transmission system. These forecasts take account of demand side management programmes in place or foreseen by ETSA Utilities, and embedded generation which may reduce the forecast of demand to be supplied via each transmission connection point.

The demand forecasts that underpin the recommendations of this Application Notice are consistent with the ten-year demand and energy forecasts published in ElectraNet's *Annual Planning Review 2007*.

Load forecast

The load forecasts for the four Lower Eyre Peninsula connection points for the coming 10-year period, as provided by ETSA Utilities for Port Lincoln, Wudinna and Yadnarie, and by OneSteel for the Middleback connection point, are shown in Table 2. The forecast summer peak demand is based on medium growth, hot weather (10% Probability of Exceedance [POE]) and excludes transmission losses and generator auxiliary loads.

CONNECTION POINT	Units	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Year from Base		0	1	2	3	4	5	6	7	8	9	10
WUDINNA (ETSA Utilities)	MW	14.3	14.6	14.9	15.2	15.5	15.8	16.1	16.4	16.7	17.1	17.4
	PF	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.98	0.98
YADNARIE (ETSA Utilities)	MW	9.8	10.0	10.2	10.4	10.6	10.8	11.0	11.2	11.5	11.7	11.9
	PF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99	0.99	0.99
PORT LINCOLN TERMINAL (ETSA Utilities)	MW	33.9	34.9	36.0	37.0	38.1	39.3	40.5	41.7	42.9	44.2	45.5
	PF	0.90	0.89	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
MIDDLEBACK (Onesteel)	MW	2.0	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
	PF	0.90	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Diversity		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Total Load	MW	60.0	80.0	81.6	83.1	84.7	86.4	88.1	89.8	91.6	93.5	95.3

Table 2
Lower Eyre Peninsula Forecast Summer peak Demand (medium economic growth)

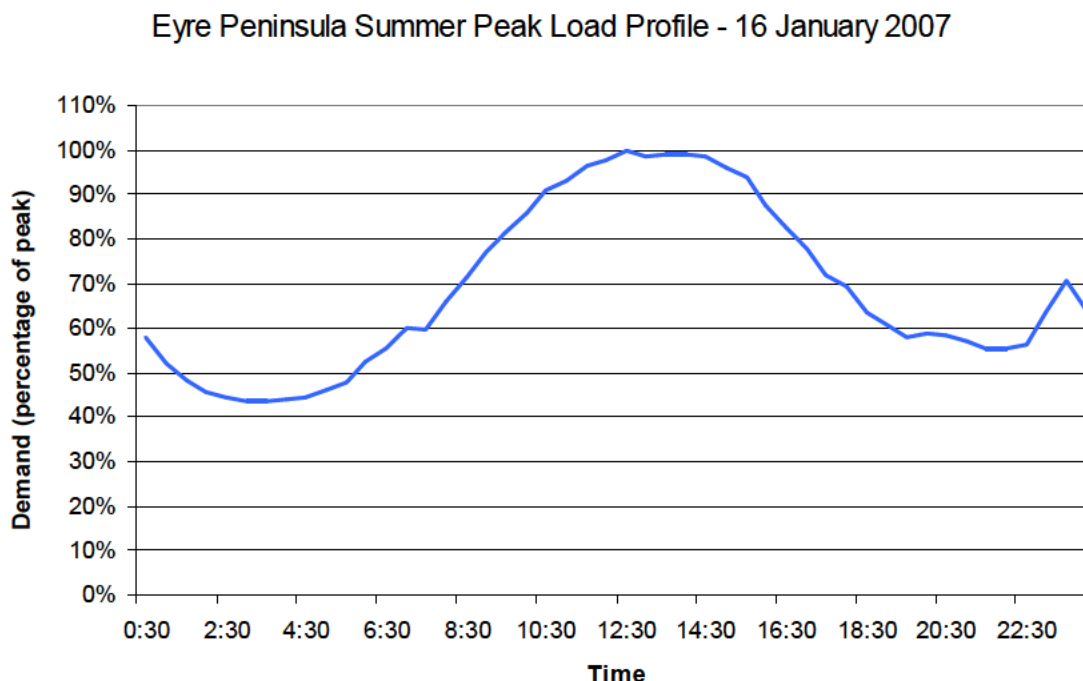
The growth in electrical load in a region is dependent upon many variables including economic growth, housing and commercial development, industrial growth, spot-load increases that occur in response to local requirements, and environmental conditions (predominately weather conditions).

Pattern of use

Peak demand on the Eyre Peninsula is experienced in summer, driven by high temperatures and high air conditioning loads. As a result, the area also has a high reactive power demand with a consequent requirement for reactive power supply.

Customer demand information for the Eyre Peninsula indicates that there is only a small amount of diversity between these loads at times of peak demand, meaning that the total demand of all of the connection points must be supplied by the 132 kV transmission line at the time of maximum load in the region.

As can be seen in Figure 1, summer weekday electricity demand on the Eyre Peninsula remains high throughout the day, with a relatively small change in demand during daylight and evening hours.



*Figure 1
Lower Eyre Peninsula Daily Load Curve – Summer 2006/07*

The load profile curve provided above does not include the impacts of the wind farms that are installed or are undergoing commissioning on the Eyre Peninsula.

While wind is not expected to make any measurable contribution to reducing the peak load on the Lower Eyre Peninsula, it will alter the load shape significantly by reducing the average load supplied by the 132 kV system from Whyalla.

As can be seen in Figure 2, the summer weekday load profile at the Port Lincoln connection point is also very similar to the Eyre Peninsula load profile, remaining high throughout the day, with relatively small change in demand during daylight and evening hours. The load duration curve for the demand at the Port Lincoln connection point over a 12 month period is shown in Figure 3.

Port Lincoln Summer Peak Load Profile - 16 January 2007

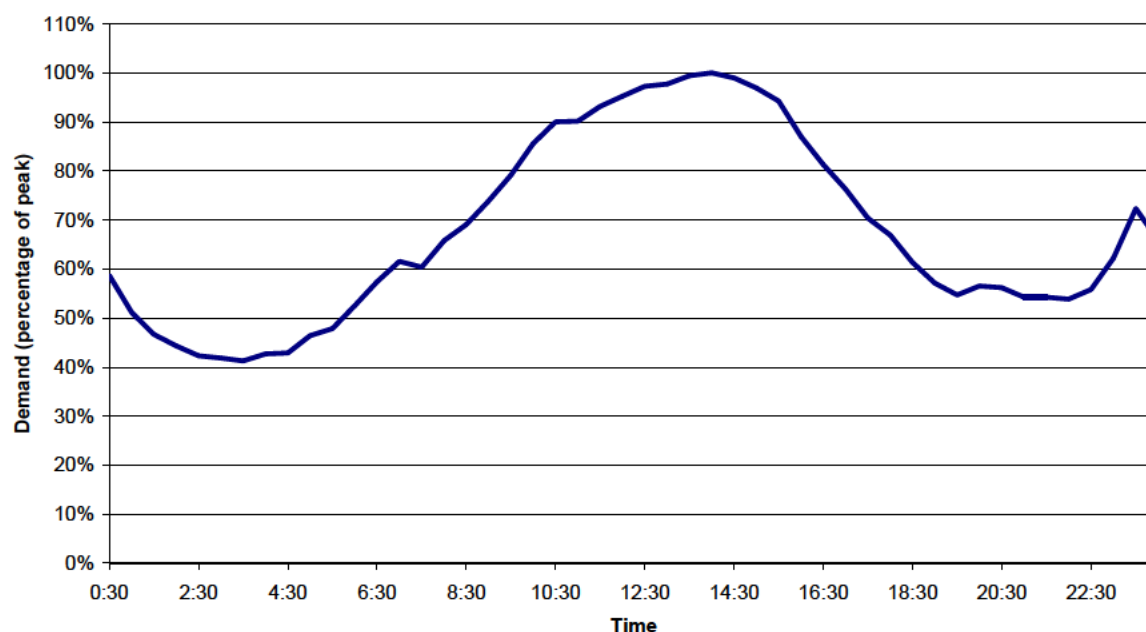


Figure 2
Port Lincoln Daily Load Curve – Summer 2006/07

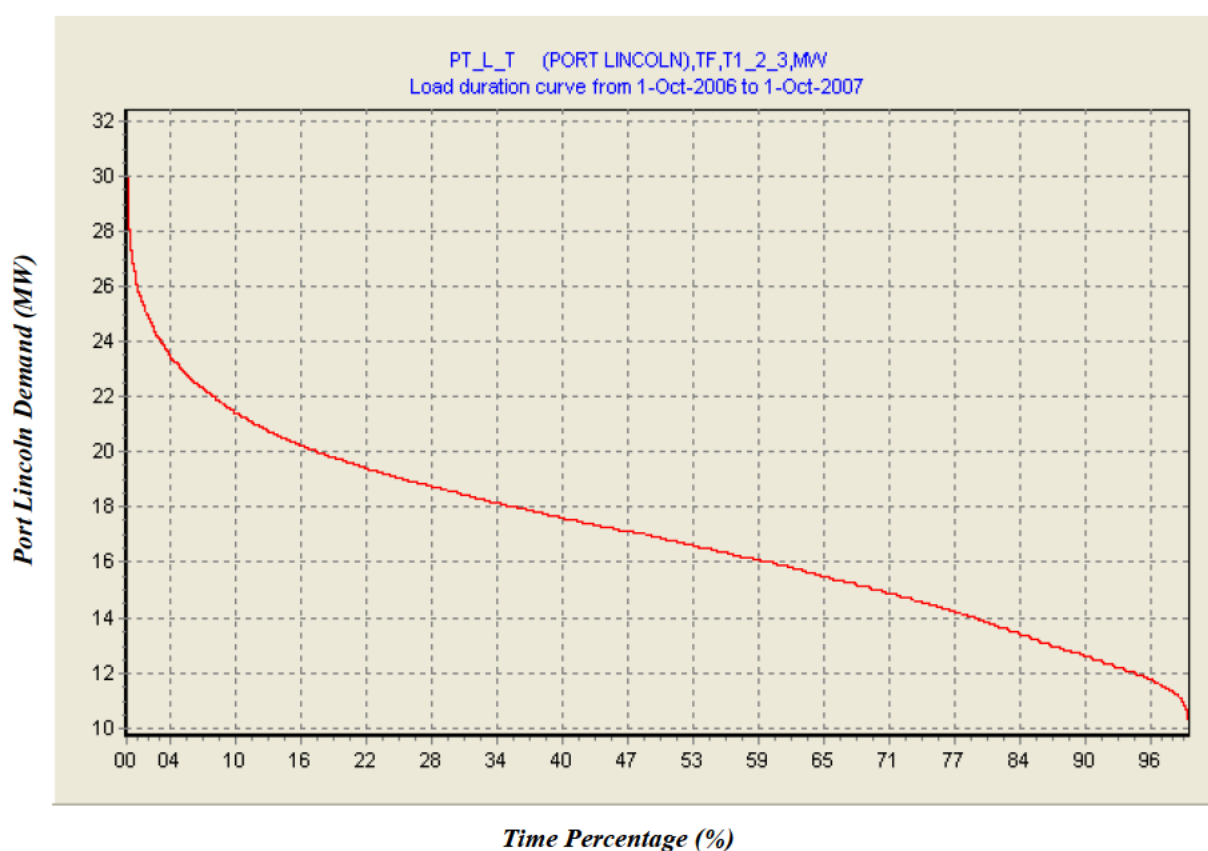


Figure 3
Port Lincoln Load Duration Curve

Potential Major Load Increases

There are several proposed industrial developments that will contribute to the ongoing increase in forecast demand on the Eyre Peninsula. They include expansions to existing customer loads and potential new loads in the regions of Stony Point, Ceduna and Middleback. Such projects are only included in the load forecasts if they become committed or highly probable.

ElectraNet is in regular discussion with the project proponents and the relevant stakeholders to ensure that the proposed augmentation is consistent with future developments. The load forecast in Table 2 does not include any “not yet committed” major industrial load developments.

4. SERVICE OBLIGATIONS

As a Transmission Network Service Provider operating in the South Australian jurisdiction of the National Electricity Market, ElectraNet is bound by the service obligations of the National Electricity Rules (NER) and the South Australian Electricity Transmission Code (ETC). These Codes place differing obligations on ElectraNet, with the Rules focussing on power system security and quality of supply, and the ETC focussing on supply reliability at individual connection points.

National Electricity Rules

The Eyre Peninsula 132 kV system south of Whyalla is a radial network that is operated as part of the shared transmission system under the NER. Schedule 5.1.2.1 of the NER requires a TNSP to plan, operate and maintain its power system to allow the transfer of power from the generators to the customers with all transmission facilities in service. However, because of system security considerations this obligation requires the non-radial portions of the power system to be planned on a single credible contingency (N-1) basis. The NER also specifies the acceptable voltage levels that should be provided at the connection points.

South Australian Electricity Transmission Code

ElectraNet is also bound by the service obligations of the South Australian Electricity Transmission Code (ETC). The ETC focuses primarily on supply reliability at individual connection points.

The ETC assigns reliability standards for each connection (exit) point or group of connection points within the transmission network, and thereby imposes specific requirements on ElectraNet for planning and developing its transmission network. The ETC also includes additional obligations with regard to response times, spares holdings, and reporting requirements.

From the 1st of July 2008, the Port Lincoln connection point will be classified as a Category 3 load under the ETC, meaning that ElectraNet is obliged to provide transmission line capacity for at least 100% of the Agreed Maximum Demand (AMD) under a single contingency event, and 100% transformer capacity with the loss of the largest transformer at the Port Lincoln connection point.

The new ETC permits transmission line or transformer capacity to be provided by an alternative network support arrangement, including transmission or distribution system support, generation, or demand side measures up to a limit of 120% of transformer or transmission line capacity.

While the ETC allows alternative network support arrangements to be implemented to meet the transmission line and transformer capacity requirements at Port Lincoln, the required capacity needs to be delivered within the prescribed timeframe on at least 95% of the occasions on which it is sought to be utilised within any 12 month period ending on 30 June.

In the event of an interruption at the Port Lincoln connection point as a result of a single contingency event (N-1), the ETC requires ElectraNet to use best endeavours to restore equivalent transmission line or transformer capacity to supply 100% of the Agreed Maximum Demand within one hour of the interruption. Following an interruption event, best endeavours are to be used to restore system normal transformer capacity, while system normal line capacity is required to be restored within 2 days.

The other connection points on the Lower Eyre Peninsula, which include Middleback, Yadnarie and Wudinna, are category 1 and 2 loads, and only require transmission line capacity for 100% of the Agreed Maximum Demand (AMD) under N or System normal operating conditions.

The new ETC reliability standard sets the timeframe for when ElectraNet must comply with the new changes to the ETC that come into effect from the 1st of July 2008, which includes using best endeavours to meet the connection point reliability changes within 12 months (July 2009) or in any case 3 years from when the new ETC changes comes into effect (July 2011).

The July 2008 ETC can be viewed in its entirety at the following website:

<http://www.escosa.sa.gov.au/webdata/resources/files/060906-R-ElecTransCodeET05.pdf>

5. NETWORK CAPABILITY AND FUTURE SUPPLY REQUIREMENTS

In order to meet the ETC Category 3 load service standards at the Port Lincoln connection point, ElectraNet will require network support levels equal to the Pt Lincoln Terminal demand levels shown in Table 2.

These required network support levels are presently provided by two (nominally rated) 25 MW distillate fuelled turbine generators, and are contracted with ElectraNet to provide back-up capacity to the Port Lincoln region. The two generators each have a rating of 21 MW under summer operating conditions (refer Table 3-2 ESIPC 2007 APR). The existing contract for generation network support services at Port Lincoln is soon to expire.

Given the timing of the expiration of the existing Network Support Services contract and changes to ETC supply obligations, ElectraNet has sought to evaluate all feasible options to provide network support at Port Lincoln, including a continuation of the current solution, to provide for a secure long-term electricity supply to the Port Lincoln region.

With the installation of a third 132/33 kV transformer and the connection of the Cathedral Rocks Wind Farm at Port Lincoln in 2004 and 2005 respectively, ElectraNet's substation at Port Lincoln has severe space limitations. The Port Lincoln 132 kV bus is currently configured in a mesh arrangement with six exits, and has no provision for further expansion without purchasing additional land adjacent to the substation. All options that are submitted to address the transmission line capability requirement at Port Lincoln under a single contingency event (N-1), will also need to take the space limitations at ElectraNet's Port Lincoln substation into consideration.

6. OPTIONS CONSIDERED

Background

Relevant industry participants and interested parties were consulted in the period from late 2005 through to July 2007 regarding the future supply requirements at Port Lincoln, and information was requested on potential non-network alternatives that could address these requirements in place of network augmentation. A number of practicable non-network alternatives were identified during the consultation process.

ElectraNet's demand and energy forecasts already consider all existing demand side management initiatives, such as routine hot water switching, which are incorporated in the demand forecasts provided by ETSA Utilities. A stand alone Demand Side Management (DSM) solution is not a practical option in this case, as it would require 100% DSM of the Port Lincoln load for an N-1 contingency event. It is important to keep in mind that any DSM program will only reduce the load, and can not contribute to reliability improvements.

The load forecasts also include an allowance for any potential co-generation and renewable energy developments embedded in the distribution networks.

ElectraNet has considered a number of alternative options and has identified and evaluated two feasible development options to address the N-1 or single contingency transmission line capability requirement at Port Lincoln. These options are listed below in Table 3.

Option	Description
Option 1	Port Lincoln Generation
Option 2	Single Circuit 132 kV Transmission Line – Cultana to Pt Lincoln

*Table 3
Feasible Network and Generation Development Options*

Localised Generation Network Support Services

ElectraNet issued a Request For Information (RFI) Paper to registered participants and interested parties in November 2005 on the Eyre Peninsula limitations, which invited submissions for potential non-network solutions. Two out of the six submissions received by ElectraNet included localised generation at Port Lincoln.

In assessing the option of using localised generation at Port Lincoln, while ensuring that the generation service meets the reliability criteria for network support arrangements as defined in the ETC, ElectraNet developed a technical specification

for the provision of generation network support services at Port Lincoln. ElectraNet then undertook a selective tendering process for the provision of generation network support services at Port Lincoln, subject to this AER regulatory consultation process, with five different generation proponents. The five generation proponents were selected based on the fact that they had either responded to the RFI with a generation solution or had previously engaged in discussions with ElectraNet on the provision of supplying network support services to ElectraNet. The preferred generation supplier was the supplier that met the ETC reliability criteria and had the lowest overall (fixed and operational) costs over a 15 year period to minimise the PV cost as required under the AER Regulatory Test. The fixed and operational costs of the preferred generation supplier have been incorporated into the generation option.

In the development of the technical specification for the generation network support services at Port Lincoln, consideration was given to using a five year contract term for the provision of network support services, which would be in alignment with ElectraNet's revenue reset period and major ETC revisions. However, a contract period of five years for the provision of generation network support services at Port Lincoln was deemed to be too short, as a new generation provider would have no revenue certainty after five years for the major capital outlay required for the establishment of a new power station. Therefore, to ensure that the tendering process for the generation network support service at Port Lincoln was competitive and provided the lowest cost to the end user, the contract term for generation network support services was extended to 10 years. A contract term beyond 10 years was considered. However increasing the term of the Network Support Services contract does not provide competition and/or flexibility for alternative augmentation solutions (which could include generation solutions) for future load growth on the Eyre Peninsula.

Option 1 : Port Lincoln generation

Date	Description
08/09	<ol style="list-style-type: none"> 1. Establishment of generation network support service agreement for the provision of Port Lincoln based power station capacity. 2. Purchasing additional land adjacent to the existing Port Lincoln substation

*Table 4
Option 1 Augmentation timing*

Option 1 involves establishing a generation network support service agreement at Port Lincoln, with the preferred tender as discussed above.

The connection of a new generator/s at Port Lincoln will require purchasing additional land at Port Lincoln and the establishment of a new 33 kV bus. As mentioned in section 5, the existing substation configuration does not readily support further expansion and does not facilitate the connection of additional generation capacity at 132kV.

To enable an additional generator/s to be connected at Port Lincoln Substation, studies confirm that a lower cost option is to build a new 33 kV bus rather than

expand the existing 132 kV bus. The cost associated with the establishment of the 33 kV bus and the connection of new generator/s at Port Lincoln will be borne by the Generation Supplier, and as such, these costs have been incorporated within the network support services contract.

As discussed above, the term of the Network Support Contract has been set to 10 years. However, to cover the economic analysis period of 15 years, this option (Port Lincoln Generation) assumes that the Network Support Contract will be renegotiated for a further 5 years after the 10 year term expires, and the cost associated with this extension will be in line with the cost escalation provisions of the proposed contract.

The Network support service agreement is estimated to have a PV cost of \$39.4 M over the 10 year period in 2007/08 prices using a discount rate of 7.17%.

The present value of the estimated cost of Option 1 is \$ 64 M, which includes extending the Network Support Generation costs to cover the 15 year analysis period, additional land at Port Lincoln substation, and the anticipated transmission losses on the Eyre Peninsula for this option.

Option 2 : Single Circuit 132kV Transmission Line to Pt Lincoln

Date	Description
08/09	Continuation of existing generation network support services agreement at Port Lincoln for two years
08/09	Strategic land purchase of additional land adjacent the existing Port Lincoln substation
10/11	Single Circuit 132 kV Transmission Line – Cultana to Pt Lincoln

Table 5
Option 2 Augmentation timing

This option involves the construction of a single circuit 132 kV transmission line between Cultana and Pt Lincoln Substations in the year 2010/11.

The present value of the estimated cost of Option 2 is \$ 124 M, which includes the items listed in table 5 and the anticipated transmission losses on the Eyre Peninsula for this option.

7. SCENARIOS CONSIDERED

Assumed Market Development Scenarios

The AER Regulatory Test requires that options to address network requirements be assessed against a number of reasonable scenarios. These scenarios need to consider:

- The existing system;
- Future network developments;
- Variations in load growth;
- Committed generation and demand side developments; and
- Potential generation and demand side developments.

The purpose of this approach is to test the present value costs of the solutions being evaluated under a range of plausible scenarios.

Existing Network and Future Transmission Development

No market development scenarios have been developed that relate to new network developments proposed by ElectraNet outside of the Eyre Peninsula Region. They are independent of the future supply requirements that are the subject of this report, and are considered to be common to all options analysed. Future network developments that are relevant to the Port Lincoln connection point reliability have been included as anticipated/ modelled projects in the analysis.

Variations in Demand Growth

Three scenarios have been developed to consider sensitivity to variations in forecast customer electricity demand:

Scenario	Forecast Electricity Demand Level
Scenario A	Medium demand forecast applied
Scenario B	Low demand forecast applied
Scenario C	High demand forecast applied

Table 7
Load Growth Scenarios

These scenarios are based on hot weather (10% probability of exceedance) forecasts for electricity usage with varying levels of economic growth. The forecasts include all known information regarding existing and planned demand side initiatives, and include independent forecasts of existing and planned local embedded generation.

Existing and Committed Generators and Demand Side Developments

As noted in section 2.4, ElectraNet are not aware of any committed Generators proposing establishment in the Eyre Peninsula Region prior to 2008. For this reason, no scenarios have been developed in which the output of existing and/or committed generators is increased. Similarly, there are no committed demand side management initiatives relevant to practically meet the Port Lincoln reliability supply requirements.

Potential New Generation

ElectraNet is not aware of any well-advanced proposals for major new generators capable of providing suitable supply capacity to the Lower Eyre Peninsula Region, hence no development scenarios have been developed to consider the establishment of major new stand-alone generators in the Eyre Peninsula Region.

8. FORMAT AND INPUTS TO ANALYSIS

Regulatory Test Requirements

The requirements for the comparison of options to meet future supply requirements are contained in the AER Regulatory Test.

The Regulatory Test requires that, for reliability augmentations, the recommended option be the option that “minimises the present value of costs compared with a number of alternative options in a majority of reasonable scenarios”.

The Regulatory Test contains guidelines for the methodology to be used to identify the lowest cost option. For example, information to be considered includes construction, operating and maintenance costs, the cost of complying with existing and anticipated laws and regulations and reasonable forecasts of the ‘efficient operating costs of competitively supplying energy to meet forecast demand’. However, the Regulatory Test specifically excludes indirect costs and costs that cannot be measured as a cost in terms of financial transactions in the electricity market.

Inputs to Analysis

A solution to meet the future transmission line capacity requirement under a single contingency (N-1) at Port Lincoln as outlined in this document, is required to satisfy reliability requirements linked to Schedule 5.1 of the National Electricity Rules, and the requirements of the South Australian Electricity Transmission Code.

According to the AER Regulatory Test, this means that the costs of all options must be compared and the least cost solution is considered to satisfy the Regulatory Test. The results of this evaluation, carried out using a discounted cash flow model to determine the present value (PV) cost of the various options, are shown in section 9.1.

Cost inputs to the economic analysis are described below.

Cost of Network Augmentations

The capital cost to implement each of the feasible options and the anticipated/modelled projects outlined in section 6 has been estimated by ElectraNet. Sensitivity studies have been carried out using variations in the capital cost estimates of plus or minus 25% in order to determine whether this affects the relative rankings of the options under consideration (see section 9.2).

The financial analysis considers all foreseeable cost impacts of the proposed network augmentations to market participants as defined by regulatory processes. ElectraNet is required to evaluate options for new transmission developments under the Regulatory Test in accordance with clause 5.6 of the National Electricity Rules.

9. ECONOMIC ANALYSIS

Present Value Analysis

Financial analysis was carried out to calculate and compare the present value (PV) of the costs to market participants of each option under the range of assumed scenarios.

A fifteen-year study period was selected as an appropriate period for financial analysis. A discount rate of 7.17% was selected as the commercial discount rate, and sensitivity analysis was conducted to test this assumption.

Under the Regulatory Test, it is the ranking of the options that is important, rather than the actual present value results. This is because the Regulatory Test requires the recommended option to have the lowest present value of costs compared with alternative options in a majority of reasonable scenarios.

The following table is a summary of the economic analysis. It shows the present value of costs for each alternative and identifies the best-ranked option for the range of scenarios considered.

The summary shows that Option 1 has the lowest present value of costs under all of the credible scenarios modelled.

Discount rate = 7.17%		Scenario A		Scenario B		Scenario C	
		Medium demand growth		High demand growth		Low demand growth	
		NPV (\$M)	Rank	NPV (\$M)	Rank	NPV (\$M)	Rank
Option 1	Port Lincoln Generation	63.78	1	63.92	1	63.58	1
Option 2	Single Circuit 132 kV Transmission line	123.6	2	123.88	2	123.47	2

Table 8
Summary of economic analysis for development options

As Option 1 has the lowest PV cost for all scenarios considered, it therefore satisfies the Regulatory Test.

Sensitivity Analysis

In addition to examining the impact of a range of reasonable scenarios, the sensitivity of the option ranking to other critical parameters was also examined. The based case assumptions and the range over which they were varied are shown in Table 9.

Parameter	Based Case	Sensitivity Test at
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Real Discount Rate	7.17%	5% and 9%
Cost of Losses	\$30/MW.h	\$25/MW.h and \$35/MW.h
Capital Costs	Nominal Value	+/-25% Increase

Table 9
Base case values and range of values used in sensitivity studies

The results for the base case and sensitivity tests are shown in Table 10.

Sensitivity Test Case		Base Case		12% Discount		8% Discount		25% Increase in Capital		25% Decrease in Capital		Losses at \$25/MW.h		Losses at \$35/MW.h	
		NPV (\$M)	Rank	NPV (\$M)	Rank	NPV (\$M)	Rank	NPV (\$M)	Rank	NPV (\$M)	Rank	NPV (\$M)	Rank	NPV (\$M)	Rank
Option 1	Port Lincoln Generation	64	1	57	1	74	1	65	1	63	1	62	1	65	1
Option 2	Single Circuit 132 kV Transmission line	124	2	109	2	144	2	150	2	97	2	122	2	125	2

Table 10
Comparison of Options – Results of Sensitivity studies

In each case Option 1 is the lowest cost option.

10. SUMMARY AND CONCLUSIONS

The following conclusions have been drawn from the analysis presented in this report:

- The augmentation proposed in this document is defined as a “reliability augmentation” under the NER, as it is the optimal solution to meet the required reliability standards under the ETC at the Port Lincoln connection point.
- As a consequence of the changes to the ETC supply obligations and the timing of the expiration of the existing Network Support Services contract, planning studies have been undertaken to evaluate potential network and non-network options to address the transmission line capability requirement at Port Lincoln under a single contingency (N-1). Two augmentation options were evaluated in detail.
- In order to meet the South Australian Electricity Transmission Code service standards at the Pt Lincoln connection point, ElectraNet will require network support levels equal to the Pt Lincoln connection point demand levels shown in Table 2.
- In the event of a supply interruption at the Port Lincoln connection point as a result of a single contingency event (N-1), the new ETC service standards require ElectraNet to use best endeavours to restore equivalent transmission line capacity to supply 100% of the Agreed Maximum Demand within one hour of the interruption.
- To comply with the new changes to the ETC service standards, which come into effect from the 1st of July 2008, ElectraNet must use best endeavours to meet the connection point reliability changes within 12 months (1 July 2009) or in any case 3 years from when the new ETC changes comes into effect (1 July 2011).
- There is no acceptable “do nothing” option. “Doing nothing” is not consistent with the electricity reliability standards that ElectraNet must comply with under the South Australian Electricity Transmission Code.
- ElectraNet issued an RFI paper inviting potential non-network solutions in November 2005. A total of six submissions were received. Of these submissions two options were identified as being viable non-network options.
- Economic analysis completed in accordance with the Regulatory Test has identified that the proposed augmentation option (Option 1 - Port Lincoln Generation) is the least-cost solution over the 15-year period of the analysis in all credible scenarios considered. Sensitivity testing showed the analysis is robust to variation in capital cost and other assumptions. That is to say, the relative ranking of the options does not change as a result of those variations. Option 1 is therefore considered to satisfy the Regulatory Test.
- Should the recommendations in this Application Notice be adopted, it is anticipated that construction of additional generation facilities at Pt Lincoln will commence in 2008, with completion by July 2009.

11. RECOMMENDATION

Based on the conclusions drawn from the analysis and the NER requirements relating to “New Large Network Assets”, it is recommended that the following action be taken to address future supply requirements at the Port Lincoln connection point:

- Establish a 10 year Network support service agreement with a service provider for the provision of generation support from a Port Lincoln based power station by July 2009. This includes the establishment of a new 33 kV bus at Port Lincoln for the connection of additional generator/s. The Network support service agreement is estimated to have a PV cost of \$39.4 million over the 10 year period in 2007/08 prices using a discount rate of 7.17%; and
- Purchase additional land adjacent to the existing Port Lincoln substation.

12. CONSULTATION

In accordance with NER requirements, ElectraNet invites submissions from Registered Participants and interested parties on this Application Notice.

Submissions are due by 18 January 2008.

Please address submission to:

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Following consideration of submissions, ElectraNet expects to publish a Final Report in February 2008.

13. GLOSSARY

ACCC	Australian Competition and Consumer Commission
Adelaide Central	That area of Adelaide which is located east of West Terrace, north of South Terrace, west of East Terrace, and south of the River Torrens.
Act	Electricity Act 1996
AER	Australian Energy Regulator
AEMC	Australian Energy Market Commission
AMD	Agreed Maximum Demand - for a connection point or a group of connection points, it is the demand specified as such in the connection agreement between ElectraNet and the relevant transmission customers or ETSA Utilities.
Application Notice	A notice made available to Registered Participants and Interested Parties pursuant to clause 5.6.6 of the Rules
Distribution Code - EDC	South Australian Electricity Distribution Code - as issued by ESCOSA
DNSP	Distribution Network Service Provider
DM, DMS	Demand Management or Demand Side Management
ElectraNet	ElectraNet is the principal transmission network service provider in South Australia. It is a privately owned company that has a long term lease for the operation, maintenance, and development of the South Australian transmission system which comprises plant and equipment mainly operating at voltages of 132 kV and above. ElectraNet is registered with NEMMCO as a Transmission Network Service Provider (TNSP)
Equivalent Transformer Capacity	Capacity to transform energy to meet demand using means including, but not limited to: transmission system capability; network support arrangements. As defined in the ESCOSA Electricity Transmission Code
ESCOSA	Essential Services Commission of South Australia established under the Essential Services Commission Act 2002

ESDP	Electricity System Development Plan (ESDP) developed annually by ETSA Utilities and published by 30 June. The ESDP includes details of projected limitations on the ETSA Utilities Distribution system for at least the next three year period and provides the information needed for a party to register as an Interested Party as defined within ESCOSA Guideline 12
ETC	South Australian Electricity Transmission Code issued by ESCOSA
ETSA Utilities	ETSA Utilities is South Australia's principal Distribution Network Service Provider (DNSP), and is responsible for the distribution of electricity to all distribution grid connected customers within the State under a regulatory framework. ETSA Utilities is a partnership of Cheung Kong Infrastructure Holdings Ltd (CKI), Hong Kong Electric International Ltd (HEI), and Spark Infrastructure
Guideline 12 (GL 12)	ESCOSA Electricity Industry Guideline 12 - Demand Management for Electricity Distribution Networks
Market Participant	A person who has registered with NEMMCO as a Market Generator, Market Customer or Market Network Service Provider under Chapter 2
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company Limited
PV	Present Value
O&M	Operating and Maintenance
OLTC	On Load Tap Changer - a device used to control the output voltage of a transformer
QOS	Quality of Supply
RDP	Regional Development Plan
Registered Participant	A person who is registered with NEMMCO as a Network Service Provider, a System Operator, a Network Operator, a Special Participant, a Generator, a Customer or a Market Participant
Regulatory Test	The test promulgated by the AER, which all major regulated network augmentation investments must comply with
RFI	Request for Information
RFP	Request for Proposals
ROA	Return on Asset

Rules	National Electricity Rules (Rules) formerly the National Electricity Code (NEC)
TNSP	Transmission Network Service Provider
TUOS	Transmission Use of System charges applicable to Registered Participants in the NEM
VoLL	Value of Lost Load as measured in the NEM
WACC	Weighted Average Cost of Capital

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14. SUPPORTING DOCUMENTS

Document Name	Document Number	Version	Issue Date
None			

15. APPENDICES

ElectraNet Capital Projects

Costs and staging of network augmentation components of each option

Development Options	FY Capex \$M		FY Capex \$M		FY Capex \$M	
	Medium demand growth		High demand growth		Low demand growth	
Option 1 Port Lincoln Land Purchase	08/09	0.4	08/09	0.4	08/09	0.4
Option 2 Port Lincoln Land Purchase	08/09	0.4	08/09	0.4	08/09	0.4
Single circ. 132kV line Cultana to Port Lincoln	10/11	135.1	10/11	135.1	10/11	135.1

Note : This table does not include the estimated present value of the costs of the proposed generation capacity network support services as applicable to the above mentioned options.