



Distribution Annual Planning Report

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SA Power Networks

www.sapowernetworks.com.au

Disclaimer

The purpose of this document is to provide information about actual and forecast constraints on SA Power Networks' Distribution Network and details of these constraints, where they are expected to arise within the forward planning period.

This document is not intended to be used for other purposes, such as making decisions to invest in generation, transmission or distribution capacity.

Whilst care was taken in the preparation of the information in this document, and it is provided in good faith, SA Power Networks accepts no responsibility or liability for any loss or damage that may be incurred by any person acting in reliance on this information or assumptions drawn from it.

This Distribution Annual Planning Report (DAPR) has been prepared in accordance with the National Electricity Rules (NER), in particular Schedule 5.8.

This document contains certain predictions, estimates and statements that reflect various assumptions concerning, amongst other things, economic growth and load growth forecasts that, by their nature, may or may not prove to be correct. This document also contains statements about SA Power Networks' plans. These plans may change from time to time without notice and should therefore be confirmed with SA Power Networks before any action is taken based on this document.

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Executive Summary

SA Power Networks is the licensed electricity distributor for South Australia. This annual report is SA Power Networks' assessment of the distribution system's capacity to meet forecasted demand over the forward planning period and possible plans for augmentation of the distribution network. It is based on the information and estimates available at this time and is subject to annual review.

This report includes an overview of SA Power Networks' system planning methodology, 15 regional development plans and specific plans for metropolitan 66kV lines. Where relevant, details of system constraints and the corresponding proposed projects are included in these development plans.

Only those projects that have the most significant customer impact have been included in detail. This generally includes substation, voltage support, power factor correction and 66kV line capacity projects with an estimated value in excess of \$5 million and asset refurbishment or replacement projects with an estimated value in excess of \$2 million.

The planning criteria used to develop distribution capacity plans are designed to meet SA Power Networks' reliability obligations and maintain historical levels of network performance.

Those network augmentations planned for completion in 2014/15 and which have financial commitment at the time of publication of this document are considered to be complete for the purposes of this report.

Future (non-committed) load increases due to large customer connections are not included in the report. Network augmentations required for such projects will be managed in accordance with the NER and assessed on a case by case basis.

Contacts

It is always prudent to consult SA Power Networks for more information regarding the content of this report. Please telephone the Network Managers for the relevant areas, prior to committing significant resources to a project:

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Glossary of Terms

Term	Meaning
ADMS	Advanced Distribution Management System.
AEMC	The Australian Energy Market Commission.
AEMO	Australian Energy Market Operator.
AER	Australian Energy Regulator.
CAIDI	Customer Average Interruption Duration Index. This is a measure of the average number of minutes per interruption each customer experiences in a given year.
CBD	Central Business District
Connection Point	A substation shared with <i>ElectraNet</i> , at which electrical power is injected from the <i>ElectraNet</i> Transmission Network into SA Power Networks' Distribution Network.
Contingency Condition (N-1)	The term used to describe the state of the <i>Distribution Network</i> when any one piece of plant (N-1) is out of service, with the rest of the Network remaining intact.
CPMP	Connection Point Management Plan – a document jointly maintained by SA Power Networks and <i>ElectraNet</i> , which outlines the predicted required timing and scope of future Connection Point upgrades.
Customer Zone Substation	A <i>Zone Substation</i> dedicated to supplying a single customer's load. Information on Customer Zone Substations is not included in this report for confidentiality reasons.
DAC	Development Assessment Commission.
DAPR	Distribution Annual Planning Report. A report published each year that describes our network, forecasts loads and constraints on the network and describes both projects completed in the previous 12 months and those planned to occur within the next 5 years. Its content is subject to schedule 5.8 in the NER.
Distribution Network	Shall have the meaning as defined within Chapter 10 of the <i>NER</i> and "Network" shall be construed accordingly.
DNSP	Distribution Network Service Provider.
Distribution System	Shall have the meaning as defined within Chapter 10 of the <i>NER</i> .
DPAR	Draft Project Assessment Report. A report published in accordance with clauses 5.17.4 (i) – (n) of the NER.

DSED	Demand Side Engagement Document.
DUOS	Distribution Use Of System charge. A charge paid to us to cover the costs of distributing electricity over our network.
EDC	Electricity Distribution Code.
ElectraNet	The company which owns and operates the Transmission System in South Australia and is registered with AEMO as the Transmission Network Service Provider for the South Australian Transmission System.
Embedded Generation	The generation of electricity by a generating unit connected within a <i>Distribution Network</i> and not having direct access to the <i>Transmission Network</i> .
ESCOSA	Essential Services Commission of South Australia. The jurisdictional service standards regulator of electricity distribution in South Australia. Many of its previous economic regulations and reporting activities have now become the responsibility of the AER.
ETC	Electricity Transmission Code.
Firm Delivery Capacity	The maximum allowable output or load of a <i>Zone Substation</i> under single <i>Contingency Conditions</i> , including any short term overload capacity.
FPAR	Final Project Assessment Report. A report published by us for most projects costing more than \$5 million that details our planned response to an identified need on our network.
Major Event Day (MED)	A day on which the cumulative SAIDI exceeds a designated threshold, and the reliability impact occurred on that day is excluded from the STPIS results.
Meshed Sub-Transmission	A Sub-transmission Line that has a source of supply available from both ends.
N	See <i>Total Capacity</i> .
N-1	See <i>Contingency Condition</i> .
NEM	National Electricity Market.
NER	National Electricity Rules. Copies of the NER can be obtained from the AEMC website: http://www.aemc.gov.au/Electricity/National-Electricity-Rules/Current-Rules.html .
Non-Network Options	This is the term used in the regulations to describe a broad range of options such as embedded generation, voluntary load curtailment, alternative sources of energy and direct load control that may be used to delay or resolve an identified need. These solutions may be delivered by groups other than SA Power Networks.
OLTC	On-Load Tap Changer.

OTR	Office of the Technical Regulator.
POE	Probability of Exceedance.
Power Factor (PF)	The ratio of real power (in kW or MW) to apparent power (in kVA or MVA) in an AC circuit.
Primary Distribution Feeder	An overhead conductor or underground cable energised at 33kV, 19kV, 11kV, 7.6kV, 6.6kV or 3.3kV supplied from a <i>Zone Substation</i> , <i>SWER</i> isolating transformer, or another <i>Distribution Feeder</i> .
PV	Photovoltaics.
QoS	Quality of Supply.
Radial Sub-transmission	A Sub-transmission Line that has a source of supply from only one end.
RDP	Regional Development Plan.
Regulator Station	An item of plant used to maintain system voltage within pre-determined voltage limits. Regulator stations are limited by their load (normal) capacity and voltage boosting capability.
RSS	Reliability Service Standard.
RIT-D	Regulatory Investment Test – Distribution.
RIT-T	Regulatory Investment Test – Transmission.
SAIDI	System Average Interruption Duration Index. This is a measure of the average number of minutes each customer is without supply in a given year.
SAIFI	System Average Interruption Frequency Index. This is a measure of the average number of interruptions each customer experiences in a given year.
SA Power Networks	SA Power Networks is South Australia’s principal <i>DNSP</i> and is responsible for the distribution of electricity to all distribution grid connected customers within the State under a regulatory framework. SA Power Networks is 51% owned by Cheung Kong Infrastructure Holdings Limited and Power Assets Holdings Ltd, which form part of the Cheung Kong Group of companies. The remaining 49% is owned by ASX-listed Spark Infrastructure.
SCADA	Supervisory Control and Data Acquisition. A technology enabling remote control and monitoring of a network device.
SCADA Substation	A <i>Zone Substation</i> with <i>SCADA</i> monitoring.
STPIS	Service Target Performance Incentive Scheme. A scheme designed and regulated by the <i>AER</i> to provide incentives to maintain and improve the reliability of distribution networks.

Sub-transmission Line	An overhead conductor or underground cable energised at 33kV or 66kV that supplies a Zone Substation.
SWER	Single Wire Earth Return. A system consisting of a single wire to convey electricity to customers utilising the earth to act as the return current path. SA Power Networks' SWER systems operate at 19kV and 6.35kV.
System Limitation	A limitation identified by a DNSP under clause 5.13.1(d)(2) of the NER.
TNSP	Transmission Network Service Provider.
Total Capacity (N)	The cyclic capacity of the Line, Feeder or Substation with all plant and equipment in service. The design life of the Line and Substation assets (typically 30 years) will be reduced if the peak cyclic load exceeds this value.
Total Nameplate Capacity	The summed Substation transformer capacity as written on each nameplate of the Substation transformers. Where different size transformers are used, the capacity of the smallest transformer may be used to calculate the total nameplate capacity.
Transmission Network	Shall have the meaning as defined within Chapter 10 of the NER.
TSP	Target Setting Period. Period used to establish average reliability standards being 1 July 2005 to 31 March 2010.
TUOS	Transmission Use Of System charge. A charge that ElectraNet recovers from the end customer via SA Power Networks to cover the cost of transmitting electricity over the Transmission system.
UCAIDI	Unplanned Customer Average Interruption Duration Index.
USAIDI	Unplanned System Average Interruption Duration Index.
USAIFI	Unplanned System Average Interruption Frequency Index.
Voltage Capacity	The amount of load capable of being carried by a Line or Feeder before causing the voltage at the extremities of the Line or Feeder to drop below the minimum acceptable levels mandated by the NER.
Zone Substation	A substation for the purpose of connecting a distribution network to a sub-transmission network.

Compliance Statement

Schedule 5.8 of the National Electricity Rules (NER) specifies the information which must be included within the Distribution Annual Planning Report. The following table indicates these requirements together with a cross reference to the relevant sections within this document where the applicable information is located.

NER Requirement	Section No(s).
(a) information regarding the Distribution Network Service Provider and its network, including:	
(1) a description of its network;	1.2
(2) a description of its operating environment;	1.2
(3) the number and types of its distribution assets;	1.2
(4) methodologies used in preparing the Distribution Annual Planning Report, including methodologies used to identify system limitations and any assumptions applied; and	2.2, 2.3
(5) analysis and explanation of any aspects of forecasts and information provided in the Distribution Annual Planning Report that have changed significantly from previous forecasts and information provided in the preceding year;	2.1
(b) forecasts for the forward planning period, including at least:	
(1) a description of the forecasting methodology used, sources of input information, and the assumptions provided	2.1
(2) load forecasts: (i) at the transmission-distribution connection points; (ii) for sub-transmission lines; and (iii) for zone substations, Including where applicable, for each item specified above: (iv) total capacity; (v) firm delivery capacity for summer periods and winter periods; (vi) peak load (summer or winter and an estimate of the number of hours per year that 95% of peak load is expected to be reached); (vii) power factor at time of peak load; (viii) load transfer capacities; and (ix) generation capacity of known embedded generating units;	8 (by region)
(3) forecasts of future transmission-distribution connection points (and any associated connection assets), sub-transmission lines and zone substations, including for each future transmission-distribution connection point and zone substation:	8 (by region)

<p>(4) forecasts for the Distribution Network Service Provider’s performance against any reliability targets in a service target performance incentive scheme; and</p>	<p>3.6</p>
<p>(5) a description of any factors that may have a material impact on its network, including factors affecting;</p> <ul style="list-style-type: none"> (i) fault levels; (ii) voltage levels; (iii) other power system security requirements; (iv) the quality of supply to other Network Users (where relevant); and (v) ageing and potentially unreliable assets 	<p>3</p>
<p>(c) information on system limitations for sub-transmission lines and zone substations, including at least:</p> <ul style="list-style-type: none"> (1) estimates of the location and timing (month(s) and year) of the system limitation; (2) analysis of any potential for load transfer capacity between supply points that may decrease the impact of the system limitation or defer the requirement for investment; (3) impact of the system limitation, if any, on the capacity at transmission-distribution connection points; (4) a brief discussion of the types of potential solutions that may address the system limitation in the forward planning period, if a solution is required; and (5) where an estimated reduction in forecast load would defer a forecast system for a period of at least 12 months include: <ul style="list-style-type: none"> (i) an estimate of the month and year in which a system limitation is forecast to occur as required under subparagraph (1); (ii) the relevant connection points at which the estimated reduction in forecast load may occur; and (iii) the estimated reduction in forecast load in MW or improvements in power factor needed to defer the forecast system limitation; 	<p>8 (by region)</p>
<p>(d) for any primary distribution feeders for which a Distribution Network Service Provider has prepared forecasts of maximum demands under clause 5.13.1(d)(1)(ii) and which are currently experiencing an overload, or are forecast to experience an overload in the next two years the Distribution Network Service Provider must set out:</p> <ul style="list-style-type: none"> (1) the location of the primary distribution feeder; (2) the extent to which load exceeds, or is forecasted to exceed, 100% (or lower utilisation factor, as appropriate) of the normal cyclic rating under normal conditions (in summer periods or winter periods); (3) the types of potential solutions that may address the overload or forecast overload; and (4) where an estimated reduction in forecast load would defer a forecast overload for a period of 12 months, include: <ul style="list-style-type: none"> (i) estimate of the month and year in which the overload is forecast to occur; (ii) a summary of the location of relevant connection points at 	<p>8 (by region)</p>

<p>which the estimated reduction in forecast load would defer the overload; (iii) the estimated reduction in forecast load in MW needed to defer the forecast system limitation;</p>	
<p>(e) a high level summary of each RIT-D project for which the regulatory investment test for distribution has been completed in the preceding year or is in progress;</p>	<p>8 (by region)</p>
<p>(f) for each identified system limitation which a Distribution Network Service Provider has determined will require a regulatory investment test for distribution, provide an estimate of the month and year when the test is expected to commence;</p>	<p>8 (by region)</p>
<p>(g) a summary of all committed investments to be carried out within the forward planning period with an estimated capital cost of \$2 million or more (as varied by the cost threshold determination) that are to address: (1) a refurbishment or replacement need; or (2) an urgent and unforeseen network issue in clause 5.17.3.(a)(1).</p>	<p>4.3</p>
<p>(h) the results of any joint planning undertaken with a Transmission Network Service Provider in the preceding year, including: (1) a summary of the process and methodology used by the Distribution Network Service Provider and relevant Transmission Network Service Providers to undertake joint planning; (2) a brief description of any investments that have been planned through this process, including the estimated capital costs of the investment and an estimate of the timing (month and year)of the investment; and (3) where additional information on the investments may be obtained;</p>	<p>2.4</p>
<p>(i) the results of any joint planning undertaken with other Distribution Network Service Providers in the preceding year; including: (1) a summary of the process and methodology used by the Distribution Network Service Providers to undertake joint planning; (2) a brief description of any investments that have been planned through this process, including the estimated capital costs of the investment and an estimate of the timing (month and year)of the investment; and (3) where additional information on the investments may be obtained;</p>	<p>NA</p>
<p>(j) information on the performance of the Distribution Network Service Provider’s Network, including: (1) a summary description of reliability measures and standards in applicable regulatory instruments; (2) a summary description of the quality of supply standards that apply, including the relevant codes, standards and guidelines; (3) a summary description of the performance of the distribution network against the measures and standards described under subparagraphs (1) and (2) for the preceding year; (4) where the measures and standards described under subparagraphs (1) and (2) were not met in the preceding year, information on the corrective action taken or planned; (5) a summary description of the Distribution Network Service Provider’s</p>	<p>3</p>

<p>processes to ensure compliance with the measures and standards described under subparagraphs (1) and (2); and</p> <p>(6) an outline of the information contained in the Distribution Network Service Provider’s most recent submission to the AER under the service target performance incentive scheme;</p>	
<p>(k) information on the Distribution Network Service Provider’s asset management approach, including:</p> <ul style="list-style-type: none"> (1) a summary of any asset management strategy employed by the Distribution Network Service Provider; (2) a summary of any issues that may impact on the system limitations identified in the Distribution Annual Planning Report that has been identified through carrying out asset management; and (3) information about where further information on the asset management strategy and methodology adopted by the Distribution Network Service Provider may be obtained; 	4
<p>(l) information on the Distribution Network Service Provider’s demand management activities, including a qualitative summary of:</p> <ul style="list-style-type: none"> (1) non-network options that have been considered in the past year, including generation from embedded generating units; (2) actions taken to promote non-network proposals in the preceding year, including generation from embedded generating units; and (3) the Distribution Network Service Provider’s plans for demand management and generation from embedded generating units over the forward planning period; 	5
<p>(m) information on the Distribution Network Service Provider’s investments in metering or information technology systems which occurred in the preceding year, and planned investments in metering or information technology systems in the forward planning period; and</p>	6
<p>(n) a regional development plan consisting of a map of the Distribution Network Service Provider’s network as a whole, or maps by regions, in accordance with the Distribution Network Service Provider’s planning methodology or as required under any regulatory obligation or requirement, identifying:</p> <ul style="list-style-type: none"> (1) sub-transmission lines, zone substations and transmission-distribution connections points; and (2) any system limitations that have been forecast to occur in the forward planning period, including, where they have been identified, overloaded primary distribution feeders. 	8 (by region)

1. Introduction and Network Overview

1.1 Purpose of this Report

The purpose of this report is to provide information about existing and forecast system limitations on SA Power Networks' Distribution Network, where they are expected to arise within the forward planning period (five years). This report is published annually in accordance with the National Electricity Rules (NER), and provides the information specified in schedule 5.8.

This report includes an overview of SA Power Networks' system, its forecasting and planning methodology, 15 regional development plans as well as a separate plan for metropolitan 66kV lines. Each Regional Development Plan (RDP) includes forecasts for connection points and zone substations within the region for the forward planning period. Where system limitations are identified in the forward planning period, details of the limitation are outlined including the extent and timing as well as potential solutions to address the identified system limitations. A summary of those projects expected to be subject to the Regulatory Investment Test – Distribution (RIT-D) is included within each RDP along with an estimate of the month and year the assessments are expected to commence.

Further detail of SA Power Networks' strategy to engage with third parties who may propose to connect a generator to our network or provide Network System Support Services can be found in our Demand Side Engagement Document (DSED):

http://www.sapowernetworks.com.au/centric/industry/our_network/annual_network_plans/demand_side_engagement_document.jsp

1.2 Description of SA Power Networks' Distribution Network

SA Power Networks is responsible for planning, building and operating the distribution system within South Australia. In general, Distribution system assets commence from the 66kV and 33kV Connection Points shared with ElectraNet. SA Power Networks' assets include 66kV and 33kV buses, sub-transmission lines, zone substations, primary distribution feeders, distribution substations (street transformers), low voltage circuits and services to customers.

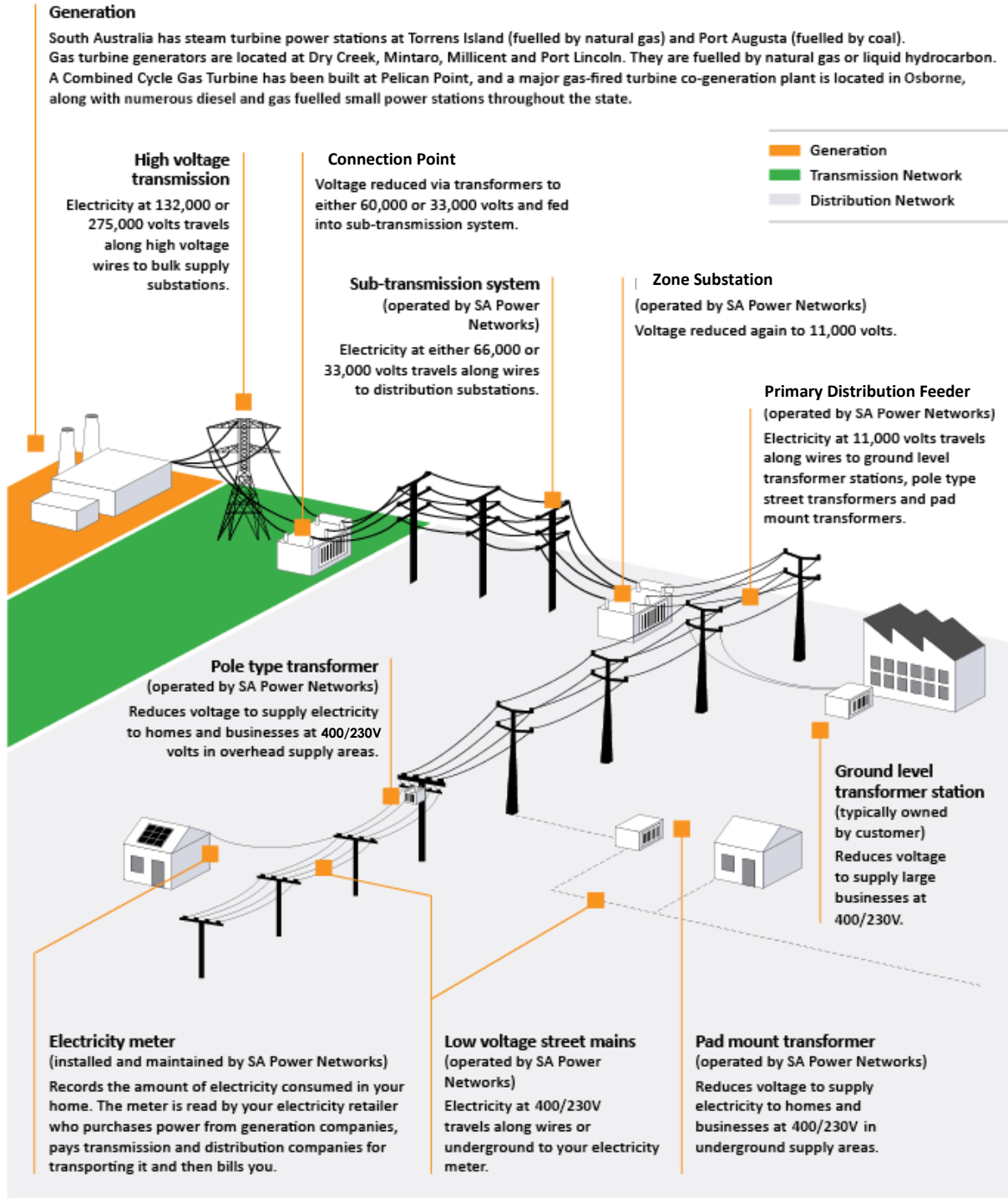


Figure 1: Electricity Supply Chain

SA Power Networks delivers electricity from the transmission network and embedded generators to more than 840,000 residential and business customers. The network has a route length of around 88,000 kilometres, which includes approximately 408 zone substations, more than 74,000 distribution transformers and over 720,000 Stobie poles.

SA Power Networks is the only Distribution Network Service Provider (DNSP) within South Australia and is 51% owned by Cheung Kong Infrastructure Holdings Limited and Power Assets Holdings Ltd, which form part of the Cheung Kong Group of companies. The remaining 49% is owned by ASX-listed Spark Infrastructure.

South Australia is part of the National Electricity Market (NEM) and as such SA Power Networks is bound by the NER as well as the local South Australian Electricity Distribution Code (EDC).



Figure 2: SA Power Networks' network coverage

2. Planning Standards and Procedures

2.1 Load Forecast Methodology

The SA Power Networks load forecast is reviewed annually after each summer peak load period, with the last review completed in 2014. This review considered the impact of any new peak load recordings, system modifications and new large load developments, in accordance with SA Power Networks' Network Forecasting Procedures.

Several hot days were experienced in January and February 2014, with the system demand measured on the 16th of January at 1900hrs (local summer time) approximately in line with that of a 10% Probability of Exceedance (POE).

In 2013, SA Power Networks revised its load forecasting methodology to produce 10% POE and/or 50% POE forecasts for each element of the network. This methodology has been refined in 2014 through the use of a new forecasting tool.

In 2013/14 a new forecasting tool was developed for SA Power Networks by Acil Allen. This tool provides the ability to temperature correct (for different POE levels) and reconcile demand forecasts (Zone Substations to Transmission Connection Points and these CP's to SA Power Networks' total coincident demand. This year, SA Power Networks chose to reconcile its Connection Point forecasts to AEMO's July 2014 National Electricity Forecasting Report (NEFR) forecast for South Australia – in particular the residential and commercial trend (reflecting approximately flat demand from 2014/15 to 2019/20). Through this reconciliation process AEMO's view of State level population growth, energy efficiency and economic development were considered and factored into the forecast. Major customers (and those Connection Points dominated by major customers) were considered outside the model (based on customer advice) and added retrospectively as post model adjustments.

For the Electranet connection point substations 10% POE load forecasts were developed as required by the ElectraNet/SA Power Networks' Transmission Connection Agreement (TCA). For zone substations, both a 10% and 50% POE forecast was developed.

The aggregated impact of customer solar photovoltaic (PV) generation has been considered in the forecasts based on measured performance of typical PV installations, installed PV capacity, time of peak demand, and forecasted PV growth rate.

The rapid growth in PV recorded in the last 5 years has been forecast to continue in the short term with a gradual slow down over the forward planning period. In some locations the rapid uptake in PV and the adoption of energy efficient appliances by customers is offsetting the zone substation's load growth which may even be reflected as a net load *decrease* in the substation forecasts. However, the impact of future PV growth on peak demand is expected to generally be minimal as the time of peak for most substations has shifted past 19:00hrs local summer time (when PV output is approaching zero).

2.2 Network Planning Criteria

SA Power Networks' Network Planning Criteria incorporate the objectives of maintaining compliance with all applicable Statutes, National and International Standards, Codes of Practice, the Electricity Act and NEM obligations. In particular, the criteria embody obligations imposed by legislation including the requirement to adhere to standards and practices generally accepted as appropriate internationally or throughout Australia by the electricity supply industry and to ensure the security of electricity supply to customers.

The forecast load for future years contained within the load forecast is compared against the capacity of the relevant network element to identify overloads or system limitations. This comparison is undertaken for both system normal (N) and contingency (N-1) conditions. For the transmission connection points and meshed sub-transmission system the 10% POE forecast is used. For zone substations, the 10% POE forecast is compared against the substations' normal capacity ('N', i.e. all plant in service) and the 50% POE forecast is compared against the substations' firm delivery capacity ('N-1', i.e. one item of plant out of service).

SA Power Networks plans to implement solutions for those assets that are forecast to be overloaded under normal conditions, prior to the overload occurring. However, the timing for implementation solutions for N-1 forecasted contingency events considers both the likelihood and consequence of such an event and the amount and type of customer load at risk.

Optimum repair times for major equipment categories are:

- Zone Substation Transformer 7 Days
- 66kV Underground Cable 10 Days
- 66kV Circuit Breaker 7 Days
- 66kV Overhead Line 12 Hours

2.3 Summary of Planning Criteria for the Distribution Network

As a DNSP within the NEM, SA Power Networks must comply with technical standards within the NER. In particular, the requirements relating to reliability and system security contained in Schedule 5.1 of the Rules are relevant to planning for future electricity needs. In addition, as a licensed electricity entity in South Australia, SA Power Networks is required to comply with the service obligations imposed by the South Australian EDC. SA Power Networks is required to operate its power system within plant ratings and with acceptable Quality of Supply (QoS) under reasonably expected operating conditions in order to comply with its requirements under the NER and the EDC.

SA Power Networks has developed its Network Planning Criteria to meet and maintain the reliability requirements of the EDC and security of supply obligations of the NER. When the forecast load breaches the planning criteria, a system limitation is established and a suitable solution is sought.

Solutions required to avoid breaching the asset ratings established within the planning criteria are considered where:

- the overload cannot be eliminated by load transfers;
- the conditions at a Transmission Connection Point will not comply with the Electricity Transmission Code (ETC);
- the 10% POE forecast exceeds an asset's normal capacity;
- the 10% POE forecast exceeds an asset's emergency capacity during contingency conditions in the Central Business District (CBD) or Metropolitan 66kV Sub-transmission network.
- the 50% POE forecast exceeds an asset's emergency capacity during contingency conditions at all other locations;
- the overload cannot be technically or economically eliminated by power factor correction;
- the short circuit rating of the network may be exceeded during network faults; or
- voltage cannot be maintained within codified limits.

The Network Planning Criteria for each asset type are defined in the following tables.

The likelihood and consequence of an asset failure affecting the impacted customers have been considered in establishing the planning criteria limits and a risk margin is generally applied to achieve a balance between minimising customer supply risk and capital expenditure.

System	Planning Criteria	Line outage
Interconnected CBD 66kV & 33kV Sub-transmission Lines	N-1 (Continuous)	No supplies interrupted for a single Line outage at 10% POE forecast demand – no impact on System Average Interruption Duration Index (SAIDI), Customer Average Interruption Duration Index (CAIDI) or System Average Interruption Frequency Index (SAIFI). No Sub-transmission Line loaded above emergency rating, and no Transmission Connection Point transformer above normal rating, as a consequence.
Meshed 66kV Sub-transmission Lines	N-1 (Continuous)	No supplies interrupted for a single Line outage at 10% POE forecast demand (excludes Substations teed off a Line and Substations without line circuit breakers) – no impact on SAIDI, CAIDI or SAIFI. No Sub-transmission Line loaded above emergency rating, and no Transmission Connection Point transformer above normal rating (as specified by ElectraNet), as a consequence. Risk limit: maximum 3 years from when threshold breached.
Radial 66kV Sub-transmission Line – Metropolitan Area	N	Supplies may be interrupted for a single line outage, but all should be restorable, at 10% POE forecast demand, within 12 hours. May be achieved by repair, or by transfer of load to adjoining substations, without causing any other Line or transformer to be loaded above emergency rating (Contingency Plans to be prepared if Line contains cable, with preparatory work if required). An alternate supply (e.g. a second line) will be planned when the RIT-D shows a positive net benefit to customers, typically when load exceeds 30MVA. Definite impact on SAIFI, CAIDI and SAIDI due to up to 12 hour outage for customers.
Rural 66kV Sub-transmission Line	N	As above, full supply to be restored within 12 hours. An alternate supply (e.g. a second line) will be planned when the RIT-D shows a positive net benefit to customers, typically when load exceeds 30MVA. Significant impact on SAIFI, CAIDI and SAIDI if outage is longer than 12 hours.
Rural 33kV Sub-transmission Line	N	As above, but full supply to be restored within 12 hours for overhead line faults or 24 hours for 33kV cable faults. An alternate supply (e.g. a second line) will be planned when the RIT-D shows a positive net benefit to customers, typically when load exceeds 30MVA. Significant impact on SAIFI, CAIDI and SAIDI if outage is longer than 12 hours.

Table 2-1 Planning Criteria for Sub-transmission Systems

System	Planning Criteria	Impact of transformer outage
All assets	N	No assets overloaded at 10% POE forecast demand
All City of Adelaide 66/33kV and 66/11kV Substations	N-1 (Continuous)	No supplies interrupted for a single transformer outage at 10% POE forecast demand – no impact on SAIDI, SAIFI or CAIDI. No other transformer loaded above emergency rating as a consequence.
Specific Major Zone Substations, for example: <ul style="list-style-type: none"> Edinburgh LeFevre 	N-1 (Continuous)	No supplies interrupted for a single transformer outage at 50% POE forecast demand – no impact on SAIDI, SAIFI or CAIDI. No other transformer loaded above emergency rating as a consequence.
Zone Substations	N-1 + Feeder transfers + Risk Margin	Supplies may be interrupted for a single transformer outage, however all but the risk margin should be restorable following transfer of load to adjoining Zone Substations, at 50% POE forecast demand, without causing any equipment to be loaded above emergency rating. Risk margin limited to 0MVA for Zone Substation where: a) Critical major industrial or commercial customers exist, for example: <ul style="list-style-type: none"> Elizabeth South Woodville North Adelaide Kilkenny Kent Town Norwood Direk b) Contingency plans cannot be implemented to restore supply within 24 hours, for example 66/7.6kV substations where SA Power Networks mobile plant cannot be used. Risk margin limited to 3MVA of customer load at all other locations.

Table 2-2 Planning Criteria for Substations

System	Transformer outage 'ideal'
Transmission Connection Points	Refer to the Electricity Transmission Code

Table 2-3 Planning Criteria for Transmission Connection Points

Note that Transmission Connection Points designated by the ETC as Category 1 may not have adequate backup capacity under contingency conditions (via ElectraNet or SA Power Networks) to supply the load until ElectraNet’s repairs are complete.

2.4 Joint Planning

Network Planning personnel from SA Power Networks and ElectraNet undertake regular joint planning meetings to discuss system limitations and future projects that affect both the distribution and transmission networks.

These joint planning meetings address the following issues:

- Annual Planning
- Load Forecasts for connection points
- Network replacement projects
- Network augmentation projects
- Major customer (including generator) connections that may impact both the transmission and distribution networks
- Non-network solutions

In addition to regular meetings SA Power Networks and ElectraNet jointly manage an annual Connection Point Management Plan (CPMP) which outlines expected projects that affect connection points within the forward planning period.

In general, works by Electranet at connection points, whether augmentation or asset replacement, will affect SA Power Networks' assets and require expenditure by SA Power Networks.

Investments that have been planned through this process that impact on SA Power Networks' expenditure within the forward planning period include:

Project	Timing	Anticipated Cost (SA Power Networks only)
Neuroodla 132/33kV Rebuild	2014/15	<\$1 million
Mount Gunson 132/33kV Rebuild	2015/16	<\$2 million
Dalrymple 132/33kV Upgrade	2016/17	\$4.6 million
Baroota 132/33kV Rebuild	2017/18	\$5.1 million

Table 2-4 Major joint investments in forward planning period

Further details of ElectraNet's planned projects in the forward planning period can be found in their Transmission Annual Planning Report at:

<http://www.electranet.com.au/network/transmission-planning/transmission-annual-planning-report/>

3. Network Performance

3.1 Measures and standards of Reliability

In accordance with the EDC clause 1.1.3, SA Power Networks must use its best endeavours to achieve the following unplanned interruption Reliability Service Standards (RSS) for each year ending 30 June.

SAIDI and SAIFI Standards	SAIDI* (average minutes off supply per customer per annum)	SAIFI* (average no. of supply Interruptions per customer per annum)
Region		
Adelaide Business Area	25	0.25
Major Metropolitan Areas	130	1.45
Barossa, Mid North, Yorke Peninsula, Riverland, Murraylands	260	1.80
Eastern Hills & Fleurieu Peninsula	295	2.80
Upper North & Eyre Peninsula	425	2.30
South East	295	2.50
Kangaroo Island	450	N/A

Table 3-1 – 2013/14 Unplanned Reliability performance excluding Major Event Days

**Note: These standards reflect unplanned supply interruptions on the low voltage and high voltage distribution networks but exclude any planned supply interruptions and supply interruptions of a duration less than 1 minute.*

The RSS use a number of metrics to measure the performance of a DNSP as defined in Table 3-2.

Indicator	Description
USAIFI (Unplanned System Average Interruption Frequency Index)	The average number of times a customer experiences an unplanned interruption each year.
USAIDI (Unplanned System Average Interruption Duration Index)	The total number of minutes on average that a customer is without electricity in a year, due to an unplanned interruption.

Table 3-2 Reliability measures

Different reliability levels (i.e. the value of the measure) were established for each region specified due to the varying nature of the electricity network (eg interconnectivity¹ and area covered) across

¹ This relates to the ability for the distribution network within a region of being capable to being switched (ie supply route changed) to restore electricity supply to customers without the need to repair the fault that caused the interruption. Such interconnectivity is greater in some regions than others.

the State. The regional reliability target levels (targets) were based on the average historic performance over the period 1 July 2005 to 31 March 2010. This period is known as the Target Setting Period (TSP). It should be noted that SA Power Networks can still achieve the RSS despite the reliability performance being worse than target (e.g. due to the impact of severe weather events) if it has been assessed as having used best endeavours to meet the target.

SA Power Networks' performance against these reliability targets in 2013/14 is outlined in Section 3.3 below.

Additionally, a Guaranteed Service Level (GSL) regime under clause 1.1.4 of the EDC operates in South Australia which requires SA Power Networks to make payments to customers if supply to their supply address is interrupted and such an interruption exceeds certain frequency and duration thresholds. There are two types of GSL payments existing under this regime, which are:

- frequency of interruptions, where a payment is made to a customer who has experienced 10 or more interruptions in the year ending 30 June; and
- duration of an interruption, where a payment is made to a customer who has experienced an interruption to supply of more than 12 hours.

Note: the GSL payment amount is dependent on the number of interruptions and the duration once the initial threshold detailed above is exceeded.

3.2 Quality of supply standards

SA Power Networks is required under the NER and EDC to maintain an acceptable voltage at the customer's point of connection to its network infrastructure. Specifically the following standards apply:

At the customer's supply address:

- (i) *the voltage is as set out in AS 60038;*
- (ii) *the voltage fluctuations that occur are contained within the limits as set out in AS/NZS 61000 Parts 3.3 and 3.5 and AS2279 Part 4; and*
- (iii) *the harmonic voltage distortions do not exceed the values in AS/NZS 61000 Part 3.2 and AS2279 Part 2 and as specified by the distributor.*

SA Power Networks responds to Quality of Supply (QoS) enquiries from customers with follow-up testing and measurement to determine if the distribution network is the cause of the customer's problem. SA Power Networks' internal target for completing and advising customers of the conclusion of the investigation is 75% within 20 business days. Where that investigation determines that remedial works are required, those works are normally completed within 60 business days except where major infrastructure works are required. In those cases customers are provided with a program and a date when the work will be completed².

3.3 SA Power Networks' performance in 2013/14

3.3.1 Reliability Performance

Greater intensity of Major Event Days in 2013/14

In 2013/14 there were eight Major Event Days (**MEDs**) in comparison to an average of 4.6 per annum during the EDC **RSS** TSP. MEDs are days where the daily USAIDI exceeded 5.628 minutes, in

² In most case some initial remedial works will be completed to improve the customer's QoS with any required major infrastructure works completed in full prior to the next peak load, when the customer would otherwise likely experience the QoS issue again.

accordance with the Australian Energy Regulator (AER) criteria.³ These MEDs contributed 119.4 minutes to overall USAIDI in 2013/14 compared to an average of 28.9 minutes during the TSP. The average daily contribution to USAIDI during these MEDs for 2013/14 was 14.9 minutes in comparison to an average of 6.2 minutes during the EDC RSS TSP. This significant increase in average daily contribution to USAIDI indicates the greater intensity of the MEDs in 2013/14 when compared to average MEDs experienced during the EDC RSS TSP.

The greater intensity MEDs experienced in 2013/14 resulted in longer average customer restoration of supply times in comparison to those related to the lower intensity MEDs that occurred during the EDC RSS TSP. The average restoration of supply times increased from 170 minutes during the TSP to 312 minutes during 2013/14, an 84% increase, despite the corresponding intensity of the MEDs, as measured by USAIDI, increasing by 241%.

Response times for 2013/14 were maintained during MEDs

As highlighted above, the Unplanned Customer Average Interruption Duration Index (UCAIDI) during MEDs in 2013/14 of 312 minutes was longer than the average UCAIDI for MEDs of 170 minutes that occurred during the EDC RSS TSP. The average UCAIDI for the two categories⁴ of MED, based on their intensity (ie USAIDI impact), during 2013/14 were:

- 170 minutes for the five Cat1 MEDs, compared to an average of 172 minutes during the TSP;
- 272 minutes for the two Cat2 MEDs, compared to an average of 283 minutes for the previous seven⁵ Cat2 MEDs that have occurred since 29 June 2009; and
- 649 minutes for a new category of MED, Cat4⁶.

Overall SA Power Networks considers that this demonstrates that the average customer restoration of supply times during MEDs in 2013/14 has been maintained when compared to like categories of previous MEDs.

Table 3-3 details the dates, overall USAIDI contribution and the number of regions materially affected by MEDs in 2013/14.

MED #	Dates	Statewide USAIDI (minutes)	MED Category	No. Regions materially affected
1	18/07/2013	9.1	Cat2	2
2	30/09/2013	7.6	Cat1	2
3	20/12/2013	7.2	Cat1	1
4	21/12/2013	13.4	Cat2	1
5	14/01/2014	6.0	Cat1	3
6	17/01/2014	6.7	Cat1	2

³ As calculated in accordance with the AER’s STPIS as amended by the AER in SA Power Networks’ Distribution Determination for the regulatory control period 1 July 2010 to 30 June 2015. The MED USAIDI threshold value is calculated for each year based on the previous five years’ performance.

⁴ A Category 1 (Cat1) MED is a day where the daily SAIDI exceeds the MED USAIDI threshold (determined annually) but is less than 10.5 minutes. A Category 2 (Cat2) MED is a day where the daily USAIDI exceeds 9 minutes.

⁵ The previous Cat2 events occurred on 30/6/2009, 6/04/2010, 10/07/2010, 3-4/09/2010, 7-8/12/2010, 9/11/2011 and 17/12/2011.

⁶ There was a BOM SWE which contributed 62 minutes SAIDI which is a third of the annual historic USAIDI. The damage to trees and infrastructure was described by the media as “like a war zone”. The extended average restoration of supply times (UCAIDI) were similar to previous more localised SWE with extensive damage to powerlines (eg multiple poles down) which required the rebuilding prior to supply being restored to customers.

MED #	Dates	Statewide USAIDI (minutes)	MED Category	No. Regions materially affected
7	04/02/2014	62.3	Cat4	2
8	23/06/2014	7.1	Cat1	3
Total Duration and Impact	8 days	119.4		

Table 3-3 - 2013/14 MEDs (USAIDI contribution and dates)

Achieved 8 of the 13 equivalent reliability targets once MED impacts are excluded

SA Power Networks achieved eight of the 13 equivalent regional reliability targets for the year ending 30 June 2014. The equivalent average reliability targets exclude the contribution from interruptions that accrue to MEDs.⁷

SA Power Networks' performance against the equivalent reliability targets for 2013/14 is summarised in Table 3.4 below.

Indicator (excluding Major Event Days)	USAIDI (minutes)		USAIFI (No. of Interruptions)	
	Target	Result	Target	Result
Statewide (implied target / performance)	150	168	1.51	1.45
Adelaide Business Area	25	9	0.24	0.12
Barossa, Mid North, Yorke Peninsula, Riverland, Murraylands	219	161	1.62	1.29
Eastern Hills & Fleurieu Peninsula	238	323	2.46	2.51
Major Metropolitan Area	112	127	1.33	1.30
South East	271	373	2.36	2.21
Upper North & Eyre Peninsula	330	345	1.89	1.57
Kangaroo Island	371	358	N/A	2.59

Table 3-4 – 2013/14 Unplanned Reliability performance excluding Major Event Days

When the performance on MEDs is included SA Power Networks achieved eight of the 13 EDC regional RSS targets for the year ending 30 June 2014. As the targets are based on historic average reliability performance it is expected that on average 6.5 targets (i.e. half) would be achieved each

⁷ As calculated in accordance with the AER's STPIS as amended by the Australian Energy Regulator in SA Power Networks Distribution Determination for the regulatory control period from 1 July 2010 to 30 June 2015.

year. However, on average 7.4 targets were achieved during the TSP with the minimum being four in 2006/07 and the maximum of 12 in 2007/08.

Table 3-5 below details the RSS targets and the actual performance in 2013/14 including MED performance

Table 3-5 below details the RSS targets and the actual performance in 2013/14 including MED performance

Indicator (including Major Event Days)	USAIDI (minutes)		USAIFI (No. of Interruptions)	
	Target	Result	Target	Result
Statewide (implied target / performance)	179	287	1.68	1.83
Adelaide Business Area	25	9	0.25	0.12
Barossa, Mid North, Yorke Peninsula, Riverland, Murraylands	260	242	1.80	1.59
Eastern Hills & Fleurieu Peninsula	295	425	2.80	2.90
Major Metropolitan Area	130	265	1.45	1.72
South East	295	427	2.50	2.45
Upper North & Eyre Peninsula	425	390	2.30	1.69
Kangaroo Island	450	385	N/A	2.85

Table 3-5 2013/14 Overall Unplanned Reliability performance

Note: a cell highlighted in yellow indicates that the reliability target was not achieved but in all cases SA Power Networks has reported to the Essential Services Commission of South Australia (ESCOSA) that it has used best endeavours to achieve the specified target⁸.

3.3.2 GSL Performance

The results for 2013/14 GSL payments are summarised in Table 3.6 below

	Frequency GSLs	Duration GSLs
No. of payments	3,629	51,286 ¹
Amount paid	\$0.35m	\$9.4m

Table 3-6 GSL Performance

¹ Our performance was adversely impacted by eight (8) severe storms classified as Major Event Days (MEDs) in 2013/14, which accounted for approximately 89% of GSL duration payments

⁸ As reported in our Annual Operational Performance Report to ESCoSA for the year ending 30 June 2014.

3.3.3 Quality of Supply Performance

SA Power Networks utilises the following measures to determine compliance with the QoS standards, with the measures being:

- how quickly a customer’s QoS enquiry is investigated and a response provided, with the target for a response⁹ being 75% within 20 business days;
- how quickly the works are completed that remedies the customer QoS problem, with the target being within 60 business days¹⁰; and
- the number of instances where the distribution network required works to remedy the customer’s QoS problem per thousand customers.

SA Power Networks’ performance during 2013/14 in accordance with these measures was that:

- 92% of customers were advised on the outcome of the investigation within 20 business days;
- 88% of works were completed within 60 business days; and
- There were 0.4 customers per 1,000 customers who raised a query about QoS and for which it was determined that the distribution network (ie network required works to remedy) was the cause.

In addition, the number of customer complaints that are related to their QoS, was 15 complaints in 2013/14 which is slightly more than half the historic average of 26 since 1 July 2005.

	Customer Enquiries		Changes required to distribution system	
	No. per 1,000 customers	% advised in 20 business days	No. per 1,000 customers	% completed in 60 business days
2005/06	1.9	87%	1.0	65%
2006/07	1.8	88%	0.7	70%
2007/08	1.7	86%	0.7	76%
2008/09	2.4	85%	0.6	72%
2009/10	2.7	89%	0.8	82%
2010/11	2.6	93%	0.5	95%
2011/12	2.5	90%	0.5	94%
2012/13	2.7	88%	0.7	89%
2013/14	2.6	92%	0.4	88%

Table 3-7 QoS statistics

The Table above indicates the increase in the number of QoS enquiries from 2005/06 to 2013/14 that has largely been the result of the rapid up-take in residential solar PV systems.

⁹ A response includes advising the customer of the findings of the investigation and the proposed remedy.

¹⁰ The 60 business days are in addition to the 20 business days allowed to determine what work is required.

3.4 SA Power Networks' Reliability and Quality of Supply Monitoring

Once SA Power Networks has identified distribution service reliability or QoS issues, a range of potential solutions will typically be identified, analysed and then a preferred solution selected. Depending on the cause of the reliability or QoS issue, the solution may be able to be implemented immediately or, if the project requires significant planning, design, or consultation with other stakeholders, it will take longer to implement.

Possible solutions considered include:

- Additional protective devices on the network to reduce the number of customers affected by a fault.
- Installation of voltage regulators to bring voltage levels at customer connection points within the QoS standards specified in the EDC. These regulators can be required where localised generation exists, such as solar photovoltaic generators.
- The upgrade of existing distribution transformers, or the installation of new distribution transformers, to increase the ability of the network to meet customers' demand for electricity.
- Vegetation management which reduces the probability of significant damage or an interruption from tree limbs making contact with our assets.
- Powerline and substation inspections identifying aging or defective equipment, so that those defects can be preventatively repaired prior to failure, which helps prevent an unplanned interruption.

Actions taken or planned to be taken to meet the RSS, which aim to ensure compliance, are detailed in our Reliability Management Plan, which is reviewed and implemented annually.

3.5 Annual AER submission on Service Target Performance Incentive Scheme (STPIS)

3.5.1 Outline of Information Provided to AER on the STPIS

Information is provided to the AER regarding STPIS performance each year in the annual response to the AER's Regulatory Information Notice (RIN). Our submission to the AER under the STPIS regime includes:

- STPIS feeder category performance;
- Telephone call responsiveness expressed as the percentage of calls answered in 30 seconds;
- Daily STPIS feeder category performance;
- MED threshold data;
- STPIS exclusions, which include:
 - Transmission failures;
 - Police, Fire, Emergency Services isolations;
 - Generation failures;
 - Emergency disconnections; and
 - Single customer faults (where fault is in customer's electrical installation).

3.5.2 2013/14 STPIS Feeder Category Performance

The following Table details the submission to the AER on the STPIS feeder category performance for the regulatory year ending 30 June 2014 (ie 2013/14).

	CBD	Urban	Short Rural	Long Rural	Whole Network
<i>SAIDI (minutes)</i>					
Total	9.0	268.9	264.9	410.1	289.8
Total (less excluded events)	9.0	128.7	197.0	314.1	167.6
<i>SAIFI (no. of interruptions)</i>					
Total	0.116	1.811	1.915	2.819	1.979
Total (less excluded events)	0.115	1.304	1.596	1.973	1.446

Table 3-8 2013/14 STPIS Feeder Category Performance

3.5.3 Forecasts for Performance against STPIS

SA Power Networks implements improvements to reliability performance under the STPIS regime where those improvements are considered cost effective. However, even with the exclusion of MEDs under the STPIS, reliability performance can still be volatile due to the significant impacts of weather related interruptions. Consequently, it is not possible to forecast the reliability performance for any specific year (eg 2014/15).

4. Asset Management

4.1 Introduction

SA Power Networks' Asset Management Policy states that the organisation is committed to managing its assets to provide valued services to our customers; comply with Licence and Regulatory obligations; provide a safe environment for employees, contractors and the community; and deliver optimal returns to shareholders.

SA Power Networks will employ good asset management practice to deliver value from its assets, to manage the life cycle of assets prudently and efficiently, and to ensure the long term sustainable performance and condition of the assets.

The Asset Management Strategies, Objectives and Plans will be founded on provision of the levels of service that our customers and the community seek and are prepared to pay for, delivered the most cost effective way, whilst also meeting Regulatory obligations and Corporate Strategic Objectives.

SA Power Networks shall establish, implement and maintain processes and procedures for identifying opportunities and assessing, prioritising and implementing actions to achieve continual improvement in asset management.

SA Power Networks' Asset Management includes risk management for the whole of life consideration of procurement, operation, maintenance, condition and performance monitoring, disposal or replacement and legal compliance. It includes assets, tangible or intellectual property, owned or leased and those owned by clients if part of an asset management contract. It also includes long term planning and provision of assets for current and future services.

4.2 Asset Management Strategy

Effective implementation of asset management requires a disciplined approach which enables SA Power Networks to maximise value and deliver its strategic objectives through consideration and management of its assets over their whole life cycle including procurement, operation, maintenance, condition and performance monitoring, and disposal or replacement.

The key principles and attributes of good asset management practice are an integrated approach with attributes which are holistic, systematic, systemic, risk based, optimal and sustainable.

There are different models for organising roles and responsibilities to achieve this objective.

The overall asset management strategy is to strive to optimise capital expenditure investment through targeted replacement and refurbishment of assets, based on an assessment of asset condition and risk. This Asset Management Strategy also seeks to provide sustainable lifecycle management of assets through use of condition monitoring and life assessment techniques.

The work undertaken in delivery of this strategy is as follows:

- Long term planning for the management of assets considering expected end of life of each asset, asset class or sub-class, performance history, condition information, age and also industry experience.
- Management of each distribution network asset at the optimum class and sub-class level to deliver long term sustainable performance and optimum return to shareholders;
- Design and implementation of a maintenance and replacement strategy for each asset sub-class that enables delivery of known regulated performance standards and the business' accepted level of risk;

- Development and maintenance of the asset information systems and standards to ensure compliance with Regulations, Industry standards and enable effective asset management decision making;
- Selection of the optimum maintenance and replacement strategy for each asset sub-class that is technically feasible, economically viable (lowest NPV over life of asset), and delivers a “low” residual risk against SA Power Networks’ risk strategy measure;
- Determination of the optimum spares holdings required to deliver the regulated standards and customer expectations;
- Integration with the Capacity and Customer Connect asset management strategies; and
- Documenting a detailed asset management plan to meet the selected strategy with a 20 year horizon and a 10 year detailed task and expenditure forecast.

There is a common profile to asset life-cycles. The life-cycle commences in its concept/design and culminates in its disposal or demolition. Each of the phases of asset life will attract a type of activity which is cognisant of the phase and which should be reflected in the budget.

The schedule of tasks undertaken during each phase will be dependent on the specific failure modes which are common to each. For example, asset replacement cycles will be driven by asset condition, size, maintainability, utilisation and functionality assessments.

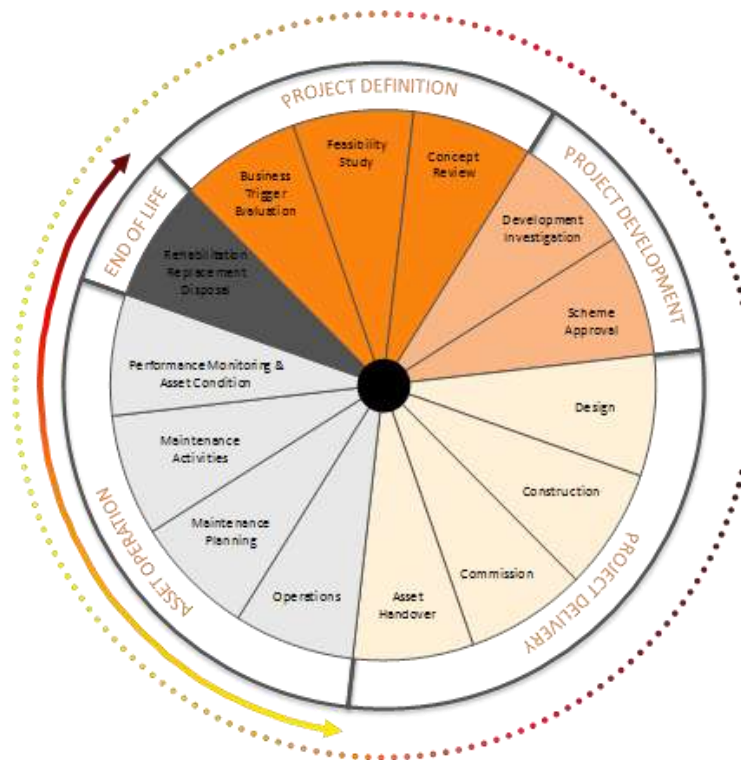


Figure 3: Asset Life-Cycle

An important consideration in determining the management strategy for an asset is to understand the principle failure mode(s) of the asset. Nominally there are four predominant failure modes feasible, each with their own distinct characteristics. For each failure mode there is generally a corresponding optimal strategy to manage the asset.

4.3 Committed Asset Refurbishment or Replacement Projects

The following asset refurbishment/replacement projects with an estimated capital cost greater than \$2 million are committed for the forward planning period:

Port Pirie 6.6kV switchboard replacement

The Port Pirie 6.6kV switchboard and switch room were constructed in the early 1950's. The switch room is suffering from subsidence and the switchboard has been damaged as a result with imminent catastrophic failure forecasted (confirmed by external independent expert). It is proposed to construct a new switch room and install a new 6.6kV switchboard in 2015 at an estimated capital cost in the order of \$5M.

The augmentation impact of this project is nil (i.e. no increase in capacity of the network). There are no demand side participation options that would allow the replacement of the switchboard to be deferred.

Mannum Town 33/7.6kV Transformer replacement

Mannum Town 33/7.6kV Substation has two 2.5MVA transformers aged 61 & 65 years. Remediation of the site is required to prevent contamination of ground water due to oil leaks, near the River Murray. It is proposed to construct a new substation in 2016 adjacent to the existing site, prior to demolition and remediation of the old site at an estimated capital cost in the order of \$4 million.

The new substation is proposed to consist of two 3MVA 33/7.6kV standard transformers and associated switchgear. The project will marginally increase the capacity of the substation (nameplate increase from 5MVA to 6MVA). There are no demand side participation options that would address the driver for this augmentation and allow for the deferral of the works proposed.

5. Demand Management Activities

5.1 SA Power Networks Demand Management activities

SA Power Networks’ Network Investment and Strategy group has been formed to, amongst other things, trial and evaluate emerging demand management technologies. The group is charged with identifying economically viable opportunities to improve the levels of network security and reliability provided to customers and to reduce the costs of providing standard control services. The technologies investigated range from metering, transformer monitoring, energy storage and direct load control of customer appliances such as air conditioners to customer based technology such as In Home Displays.

Aside from consideration of specific demand management opportunities, the team has facilitated development of SA Power Networks’ Demand Side Participation Strategy which seeks to provide knowledge, incentives and tools to enable customers to optimise their own energy costs and those of the community. It comprises the key components outlined in figure 4 below.



Figure 4: Demand Side Participation Initiatives

These initiatives are described fully within our *Tariff and Metering Business Case* and *Flexible Load Strategy*, which are available as attachments to SA Power Networks’ 2015 – 2020 regulatory proposal.

5.2 Non-network options considered in the past year

Prior to 2014, as part of ESCOSA’s Guideline 12, SA Power Networks was required to consider non-network solutions for system limitations that require a network solution in excess of \$2 million. This process has been replaced by the RIT-D process from January 2014.

In the past year, a non-network solution was implemented at Bordertown Substation in the South East region. This third party generation solution was identified through the Request For Proposals process which showed that a non-network solution may be a viable alternative to a series of network augmentations.

Further detail of this project is available at:

http://www.sapowernetworks.com.au/centric/industry/our_network/annual_network_plans/final_project_assessment_reports.jsp

Still under consideration is a system limitation on the Fleurieu Peninsula and possible third party generator connection.

5.3 Actions taken to promote non-network proposals

SA Power Networks has developed and published its Demand Side Engagement Document (DSED). This document provides a guide to third parties of how SA Power Networks will consider and assess the viability of any non-network solutions. This document is subject to review and revision at least once every three years.

All past investments in excess of \$2 million underwent a Reasonableness Test (in accordance with ESCOSA's former Guideline 12) to determine whether a non-network solution may be viable. For those projects where a non-network solution was potentially viable based on outcome of this test a Request for Proposals was published and a notification sent to registered interested parties.

This process has been replaced by the RIT-D, requiring augmentation investments in excess of \$5 million to undergo a Screening Test. Further details of our engagement strategy can be found on our website at:

http://www.sapowernetworks.com.au/centric/industry/our_network/annual_network_plans/demand_side_engagement_register.jsp

5.4 Plans for future Demand Management and embedded generation

SA Power Networks recognises that alternatives to network solutions may exist which deliver either a lower cost solution or provide greater benefits to the electricity market (including electricity consumers) as a whole. The methods by which non-network solutions may achieve this include, but are not limited to:

- the use of embedded generation to reduce demand on the network;
- shifting consumption to a period outside the peak period;
- increasing customers' energy efficiency; or
- curtailing demand at peak periods, with the agreement of the relevant customer(s).

SA Power Networks evaluate all options, both network and non-network, using identical criteria that reflect both the regulatory requirements under the NER and our desire to implement the least cost solution to resolve the identified need.

Two system limitations forecast in the next five years may have a potentially viable non-network solution (generation) which will be evaluated via the NER process. In addition two smaller network constraints may have potentially viable non-network deferral solutions which will be explored via the NER process during the evaluation period.

This process is set out in more detail in section 6.6 of the DSED. A copy of the DSED can be found on our website at:

http://www.sapowernetworks.com.au/centric/industry/our_network/annual_network_plans/demand_side_engagement_document.jsp

Further to the initiatives identified through the RIT-D process, SA Power Networks is also proactively continuing trials of direct load control and cost reflective tariffs.

6. Metering and information technology systems

SA Power Networks is continuing its implementation of an Advanced Distribution Management System (ADMS). The system provides for distribution network monitoring, analysis, operations and supply restoration functions. The project implementation will take more than three years and replaces an aging system that is reaching the end of its effective working life.

Over the past year, SA Power Networks has also continued to undertake trials utilising smart metering in North Adelaide to support our ongoing investigation into direct load control and capacity based tariffs. We have also established a second trial area south of Greenhill Road to test an alternative communication technology for advanced meters and to gather representative data on the demand profiles of a statistically valid subset of residential customers within various energy consumption bands..

7. Metropolitan 66kV Sub-transmission Network

SA Power Networks' metropolitan 66kV supply network consists of four 66kV meshed systems that distribute the customer demand from ElectraNet connection points to SA Power Networks' metropolitan zone substations.

The supply capacity of the meshed 66kV network is dependent on the individual lines and circuit breakers comprising the network. The ElectraNet connection point substations supplying these meshed 66kV networks are defined in the ETC generally as category 4 or 5, requiring firm delivery capacity to be continuously available.

The connection agreement between ElectraNet and SA Power Networks requires that the 10% POE demand forecast is used for planning category 4 and 5 networks.

The network planning criteria identifies a network system limitation if the 10% POE forecast exceeds the emergency rating of a 66kV line or the agreed maximum emergency capability of an ElectraNet Connection Point during an outage of a single 66kV line or a single ElectraNet connection point transformer.

The ETC specifies the planning limits for ElectraNet Connection Points but does not provide specific planning limits for the 66kV meshed networks. However, the EDC does specify the reliability targets for each region and SA Power Networks' planning criteria are designed to maintain the average levels of reliability specified in the EDC and meet the NER's requirement to maintain loads within the rating of the DNSP's plant and equipment.

7.1 Need for Reinforcement of Sub-transmission System Security

Reinforcement of the meshed sub-transmission networks is designed to prevent overload of 66kV lines at peak load times during certain single contingency events. This avoids the need for load shedding and the possibility of cascade tripping of the entire affected 66kV network which could otherwise occur during contingency events.

7.2 Rating Limits of 66kV Lines

This report has considered line overloads that are the result of circuit breaker, line conductor, or underground cable limits. ElectraNet transformer overloads have been based on the agreed maximum demand capability of each connection point transformer as published by ElectraNet.

When circuit breakers are required to operate outside their design capabilities (current ratings and/or fault ratings) there is a risk of catastrophic failure. Failure of a breaker would require the upstream breaker to operate resulting in loss of supply to large parts of the network. Depending on the extent of the damage to the circuit breaker, restoration could take from several days to two weeks.

Overhead line conductor deteriorates gradually depending on the temperature at which it is operated. Currently, SA Power Networks' 66kV lines are designed and operated for a maximum line conductor temperature of 100 degrees Celsius, with some older lines built to lower temperature limits. The typical outage duration for a metropolitan 66kV line outage due to an overhead line fault is 12 hours.

Underground cable faults can occur in two ways. Cables can fail in either specific locations due to site conditions such as termites or being struck during digging, or they can fail due to general deterioration caused by prolonged overload. In the first case, the typical duration of a 66kV cable outage is ten to fourteen days to allow for fault location and repair. In the second case, the cable may remain out of service for six to nine months (depending on cable delivery time) while it is replaced.

8. Regional Development Plans

- 8.1 Metropolitan 66kV lines
- 8.2 Eastern Suburbs
- 8.3 Western Suburbs
- 8.4 Northern Suburbs
- 8.5 Southern Suburbs
- 8.6 Adelaide Central Region (CBD)
- 8.7 Eyre Peninsula
- 8.8 Upper North
- 8.9 Barossa Region
- 8.10 Eastern Hills
- 8.11 Mid North and Yorke Peninsula
- 8.12 Murraylands
- 8.13 South East
- 8.14 Fleurieu Peninsula
- 8.15 Riverland

8.1 Metropolitan 66kV Line Regional Development Plan

Metropolitan 66kV Sub-transmission Lines

The SA Power Networks' 66kV Sub-transmission system is a meshed system of 66kV lines and cables designed to carry 10% POE loads under single contingency (N -1) conditions utilising emergency ratings. There are four such meshed systems (North, South, East, and West). A map of these regions can be found at the end of each section, and the 66kV lines are shown on each of these regional maps.

Details of the forecast 'N-1' loads are contained within section 8.2. Further detail is provided for those lines that have a forecasted system limitation in the forward planning period and require a major project.

System Limitations

Morphett Vale East-McLaren Flat, Port Noarlunga-Seaford and Seaford-Aldinga

8.2 Metropolitan 66kV Sub-transmission line forecast (N-1 conditions)

LINE NAME "FROM"	LINE NAME "TO"	AREA	Emergency Capacity (MVA)	MAX 'N-1' LOAD 2014/15	MAX 'N-1' LOAD 2015/16	MAX 'N-1' LOAD 2016/17	MAX 'N-1' LOAD 2017/18	MAX 'N-1' LOAD 2018/19
CAMPBELLTOWN	MAGILL	East	142	53	53	65	65	65
CITY WEST	WHITMORE SQ	East	360	197	194	192	192	193
COROMANDEL PL	WHITMORE SQ	East	179	109	108	103	104	103
CROY/PROSP TEE	HINDLEY ST TEE	East	144	71	72	73	74	75
CROYDON	CROY/PROSP TEE	East	137	120	120	120	120	120
DRY CREEK	KILBURN SOUTH TEE	East	144	115	113	112	112	112
EAST TCE	COROMANDEL PLACE	East	179	104	101	105	103	104
EAST TCE	NORTH ADELAIDE	East	89	59	59	63	62	61
GOLDEN GROVE	INGLE FARM	East	142	73	73	73	73	73
HILLCREST	HOLDEN HILL	East	142	73	73	71	72	72
HINDLEY ST	WHITMORE SQ	East	139	100	99	96	97	97
HINDLEY ST TEE	HINDLEY ST	East	89	52	54	54	54	54
HOLDEN HILL	CAMPBELLTOWN	East	142	53	53	45	46	46
HOLDEN HILL	HOPE VALLEY	East	142	85	85	84	84	84
HOPE VALLEY	TEA TREE GULLY	East	142	74	74	73	74	73
KENT TOWN	KENT TOWN TEE	East	75	41	41	41	41	42
KILBURN SOUTH TEE	KILBURN SOUTH	East	137	13	13	13	13	13
KILBURN SOUTH TEE	PROSPECT	East	144	102	99	98	99	99
MAGILL	BURNSIDE	East	55	14	15	15	15	15
MAGILL	KENT TOWN TEE	East	144	65	65	65	65	65
MAGILL	NORWOOD	East	144	121	119	119	118	118
NORTH ADELAIDE	HINDLEY ST TEE	East	100	65	63	57	58	59
NORTHFIELD	CLEARVIEW	East	60	23	23	23	23	23
NORTHFIELD	DRY CREEK	East	142	91	89	88	89	89
NORTHFIELD	HARROW	East	60	21	21	21	21	21
NORTHFIELD	HILLCREST	East	142	108	107	105	106	105

LINE NAME "FROM"	LINE NAME "TO"	AREA	Emergency Capacity (MVA)	MAX 'N-1' LOAD 2014/15	MAX 'N-1' LOAD 2015/16	MAX 'N-1' LOAD 2016/17	MAX 'N-1' LOAD 2017/18	MAX 'N-1' LOAD 2018/19
NORTHFIELD	HOLDEN HILL	East	144	117	117	115	115	115
NORTHFIELD	INGLE FARM #1	East	139	74	73	73	73	72
NORTHFIELD	INGLE FARM #2	East	153	74	74	73	73	73
NORWOOD	EAST TCE	East	100	99	99	98	93	93
NORWOOD	KENT TOWN	East	49	41	41	41	41	42
NORWOOD	LINDEN PARK	East	65	44	44	44	44	44
PROSPECT	CROY/PROSP TEE	East	137	85	80	78	78	79
TEA TREE GULLY	GOLDEN GROVE	East	142	58	58	58	58	58
WHITMORE SQ	KENT TOWN TEE	East	90	41	41	41	41	41
WHITMORE SQ	KESW/NUNL TEE	East	77	0	0	0	0	0
ANGLE VALE	EVANSTON	North	67	36	37	38	39	41
BOLIVAR	VIRGINIA	North	77	11	11	11	11	11
DIREK	HNA ISS2 (Pole 10A)	North	142	16	16	16	17	17
DIREK	PARALOWIE	North	142	108	77	78	75	77
EDINBURGH	SALISBURY	North	137	78	79	80	81	87
ELIZ DOWNS	EVANSTON	North	92	52	N/A	N/A	N/A	N/A
ELIZ DOWNS	PENFIELD	North	153	126	37	37	35	36
ELIZ DOWNS	SMITHFIELD WEST	North	92	72	73	74	76	79
ELIZ HEIGHTS	ELIZ DOWNS	North	137	108	74	76	76	77
ELIZ SOUTH	EDINBURGH	North	142	98	99	100	96	100
MUNNO PARA (FUTURE)	ELIZ DOWNS	North	92	N/A	71	71	72	72
MUNNO PARA (FUTURE)	EVANSTON	North	92	N/A	71	73	75	78
PARA	ELIZ HEIGHTS	North	144	131	96	97	99	100
PARA	ELIZ SOUTH	North	144	122	83	83	79	81
PARAFIELD GDNS	CAVAN	North	77	46	47	48	49	43
PARAFIELD GDNS	SALISBURY	North	137	120	89	89	85	83
PARAFIELD GDNS WEST	BOLIVAR	North	142	15	15	15	15	15
PARAFIELD GDNS WEST	PARAFIELD GDNS	North	142	139	108	109	105	109

LINE NAME "FROM"	LINE NAME "TO"	AREA	Emergency Capacity (MVA)	MAX 'N-1' LOAD 2014/15	MAX 'N-1' LOAD 2015/16	MAX 'N-1' LOAD 2016/17	MAX 'N-1' LOAD 2017/18	MAX 'N-1' LOAD 2018/19
PARAFIELD GDNS WEST	PARALOWIE	North	142	125	94	95	93	95
PENFIELD	DIREK	North	142	77	51	52	53	53
PENFIELD	ELIZ SOUTH	North	153	104	52	52	57	57
PENFIELD	HNA ISS1 (Pole 12A)	North	142	16	16	16	17	17
SMITHFIELD WEST	ANGLE VALE	North	93	53	54	55	57	59
ALDINGA	WILLUNGA	South	93	77	77	78	78	79
CITY WEST	KESWICK	South	360	191	185	186	186	186
GLENELG NORTH TEE	GLENELG NORTH	South	70	18	18	18	18	18
GLENELG NORTH TEE	PLYMPTON	South	142	79	76	76	76	77
HACKHAM	PT NOARLUNGA	South	142	69	68	68	69	69
HAPPY VALLEY	HV/SA WATER TEE	South	144	70	62	62	63	64
HAPPY VALLEY	PANORAMA No 1	South	139	72	73	74	73	73
HAPPY VALLEY	PANORAMA No 2	South	142	73	74	74	74	74
HAPPY VALLEY	SEACOMBE No 1	South	139	78	74	75	75	75
HAPPY VALLEY	SEACOMBE No 2	South	137	68	64	64	64	64
HV/SA WATER TEE	HV/SA WATER	South	142	4	4	4	4	4
HV/SA WATER TEE	MORPHETT VALE EAST	South	142	69	60	61	62	62
KESWICK	CLARENCE GDNS	South	65	20	20	20	20	20
KESWICK	NEW RICHMOND TEE	South	142	114	110	111	111	111
KESWICK	WHIT SQ TEE	South	142	97	94	94	94	94
KINGSWOOD	NORTH UNLEY	South	137	82	79	79	79	79
LINDEN PARK	LINDEN PARK TEE	South	49	44	44	44	44	44
LOWER MITCHAM	KINGSWOOD	South	137	79	81	81	81	81
MAGILL	URAILDA TEE	South	144	80	76	76	77	77
MCLAREN FLAT	WILLUNGA	South	92	85	85	85	86	86
MORPHETTVILLE	ASCOT PARK	South	144	42	40	40	40	40
MORPHETTVILLE	OAKLANDS	South	139	47	47	47	47	47
MORPHETTVILLE	GLENELG NORTH TEE	South	144	79	76	76	76	77

LINE NAME "FROM"	LINE NAME "TO"	AREA	Emergency Capacity (MVA)	MAX 'N-1' LOAD 2014/15	MAX 'N-1' LOAD 2015/16	MAX 'N-1' LOAD 2016/17	MAX 'N-1' LOAD 2017/18	MAX 'N-1' LOAD 2018/19
MORPHETT VALE EAST	CLARENDON	South	49	3	3	3	3	3
MORPHETT VALE EAST	HACKHAM	South	142	82	80	81	81	82
MORPHETT VALE EAST	MCLAREN FLAT	South	92	93	93	93	94	94
MORPHETT VALE EAST	PT STANVAC #1	South	144	77	62	63	63	63
MORPHETT VALE EAST	PT STANVAC #2	South	142	80	65	65	65	66
NEW RICHMOND TEE	NEW RICHMOND	South	137	120	120	120	120	120
NEW RICHMOND TEE	PLYMPTON	South	144	114	110	111	110	111
NOARLUNGA CENTRE	PT NOARLUNGA	South	91	66	69	69	69	70
NORTH UNLEY	WHIT SQ TEE	South	144	97	94	94	94	94
PANORAMA	ASCOT PARK	South	144	60	59	58	59	59
PANORAMA	BLACKWOOD	South	49	27	27	27	27	27
PANORAMA	CUDMORE PARK	South	77	18	18	18	18	17
PANORAMA	LINDEN PARK TEE	South	144	80	76	76	76	77
PANORAMA	LOWER MITCHAM	South	142	98	100	100	100	100
PANORAMA	TONSLEY PARK	South	89	31	28	28	28	28
PLYMPTON	GLENELG NORTH	South	70	18	18	18	18	19
PT NOARLUNGA	SEAFORD	South	93	100	100	101	101	102
PT STANVAC	LONSDALE	South	153	73	51	52	52	51
PT STANVAC	NOARLUNGA CENTRE	South	92	81	85	85	86	85
SEACOMBE	OAKLANDS	South	139	81	85	85	86	85
SEACOMBE	SHEIDOW PARK	South	153	68	46	47	47	48
SEAFORD	ALDINGA	South	93	96	96	94	95	95
SHEIDOW PARK	LONSDALE	South	153	48	43	42	42	42
TONSLEY PK	SEACOMBE	South	137	23	25	25	26	25
URAILDA TEE	LINDEN PARK TEE	South	144	80	76	76	77	77
URAILDA TEE	URAILDA	South	50	48	48	48	48	48
ABC	PT ADELAIDE	West	137	100	99	101	100	100
ATHOL PARK	ATHOL PARK TEE	West	67	19	18	18	17	17

LINE NAME "FROM"	LINE NAME "TO"	AREA	Emergency Capacity (MVA)	MAX 'N-1' LOAD 2014/15	MAX 'N-1' LOAD 2015/16	MAX 'N-1' LOAD 2016/17	MAX 'N-1' LOAD 2017/18	MAX 'N-1' LOAD 2018/19
BLACKPOOL	FULHAM GDNS	West	142	112	111	112	111	110
CHELTENHAM	CROYDON PARK TEE	West	144	76	76	74	74	72
CROYDON	KILBURN	West	142	79	77	78	77	77
CROYDON	KILKENNY	West	142	71	71	70	70	69
CROYDON PARK	CROYDON PARK TEE	West	70	20	20	19	19	18
CROYDON PARK TEE	CROYDON	West	144	73	73	73	72	72
FINDON	FINDON TEE	West	153	65	65	62	62	61
FINDON TEE	FLINDERS PK	West	144	77	76	75	74	74
FLINDERS PK	NEW RICHMOND	West	137	60	60	59	59	58
FULHAM GDNS	FINDON TEE	West	144	65	64	57	56	56
FULHAM GDNS	HENLEY SOUTH #1	West	67	29	29	28	28	28
FULHAM GDNS	HENLEY SOUTH #2	West	67	29	29	28	28	28
KILBURN	CAVAN	West	153	46	47	48	49	43
KILKENNY	WOODVILLE	West	142	81	81	80	79	78
LARGS NORTH	ABC	West	137	116	115	116	116	115
LEFEVRE	BLACKPOOL	West	153	78	77	77	76	75
NEW OSBORNE	BLACKPOOL	West	142	93	92	91	91	90
NEW OSBORNE	GLANVILLE	West	144	131	130	131	130	128
NEW OSBORNE	LARGS NORTH	West	142	126	125	126	125	124
NEW OSBORNE	SMORGON STEEL	West	144	51	52	50	49	49
NEW RICHMOND	THEBARTON	West	139	48	48	47	47	47
PT ADELAIDE	CHELTENHAM	West	142	92	91	95	94	93
PT ADELAIDE NTH	ATHOL PARK TEE	West	144	61	61	60	59	59
QUEENSTOWN	GLANVILLE	West	142	120	119	121	120	119
SMORGON STEEL	PT ADELAIDE NTH	West	144	52	52	50	50	50
THEBARTON	CROYDON	West	139	76	75	75	74	73
TIPS	ATHOL PARK TEE	West	142	77	76	75	74	74
TIPS	KILBURN	West	142	89	88	89	88	87

LINE NAME "FROM"	LINE NAME "TO"	AREA	Emergency Capacity (MVA)	MAX 'N-1' LOAD 2014/15	MAX 'N-1' LOAD 2015/16	MAX 'N-1' LOAD 2016/17	MAX 'N-1' LOAD 2017/18	MAX 'N-1' LOAD 2018/19
WOODVILLE	FINDON	West	139	83	82	77	77	76
WOODVILLE	QUEENSTOWN	West	142	105	104	104	104	103

System Limitations: Morphett Vale East – McLaren Flat, Port Noarlunga – Seaford & Seaford - Aldinga from 2014/15

Morphett Vale East – McLaren Flat 66kV
Port Noarlunga – Seaford 66kV
Seaford – Aldinga 66kV

System Limitation

The Morphett Vale East – McLaren Flat 66kV sub-transmission line, Port Noarlunga – Seaford 66kV sub-transmission line and Seaford – Aldinga 66kV sub-transmission line form either side of the Southern Suburbs 66kV loop which are both subject to a system limitation in the forward planning period, should either line fail/become faulted.

From the summer of 2014/15, the 66kV network from Morphett Vale East to Willunga is forecasted to be overloaded at peak load times during 66kV network contingencies.

Potential solutions considered to address the system limitation include:

- Construction of new 66kV sub-transmission lines in the Southern Suburbs to provide alternate supply paths during a contingent event;
- Non-network options to reduce the load in the Fleurieu region supplied by the 66kV sub-transmission system; or
- Combination of network and non-network solutions.

Due to the extent of the overloads involved, power factor correction would not defer the system limitation. A load reduction of at least 2MVA would be required to defer this system limitation for a 12 month period.

A Request for Proposals has been published for this system limitation and further information can be found at:

<http://www.sapowernetworks.com.au/public/download.jsp?id=11540>

and negotiations are continuing with a non-network solution provider regarding this constraint.

8.3 Eastern Suburbs Regional Development Plan

The Eastern Suburbs

The SA Power Networks’ Eastern Suburbs includes the area from Golden Grove in the North to Linden Park in the south and extends westwards to Prospect and North Adelaide and eastwards to the Adelaide Hills. There are two main connection points in the Eastern Suburbs, being Northfield and Magill, with connections to the associated CBD system (East Tce and City West connection points) and Dry Creek power station. The forecast and loads for the Eastern Suburbs’ connection point includes the Adelaide Central Region (ACR) which covers the Adelaide CBD. The CBD system is an integral part of the Eastern Suburbs system.

SA Power Network’s Distribution Network

Electricity is supplied throughout the Eastern Suburbs from distribution substations supplied directly from the 66kV sub-transmission network. These substations are operated at 66,000 volts stepped down to 11,000 volts and upgraded when load exceeds capacity.

Customers are supplied from SA Power Networks’ distribution system via 11kV primary distribution feeders, which are connected to distribution substations. These feeders are extended and upgraded as required to meet customer demand, customer connection requests and to maintain QoS. Large customer projects may require a distribution substation upgrade as well as 11kV feeder or 66kV line modifications. Therefore, SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Eastern Suburbs in the next two years.

8.3.1 Eastern Suburbs SCADA Substations

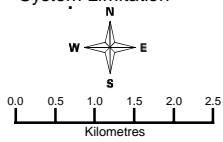
Source Connection Point	Associated SCADA Substations
Eastern Suburbs Meshed 66kV Network: <ul style="list-style-type: none"> • City West – ACR • Dry Creek – Central and East • East Tce • Magill – Transformers 2 and 3 • Northfield 	<ul style="list-style-type: none"> • Burnside • Campbelltown • Clearview • Glynde • Golden Grove • Harrow • Hillcrest • Holden Hill • Hope Valley • Ingle Farm • Kent Town • Kilburn South • Linden Park • North Adelaide • Northfield • Norwood • Prospect • Tea Tree Gully • Woodforde



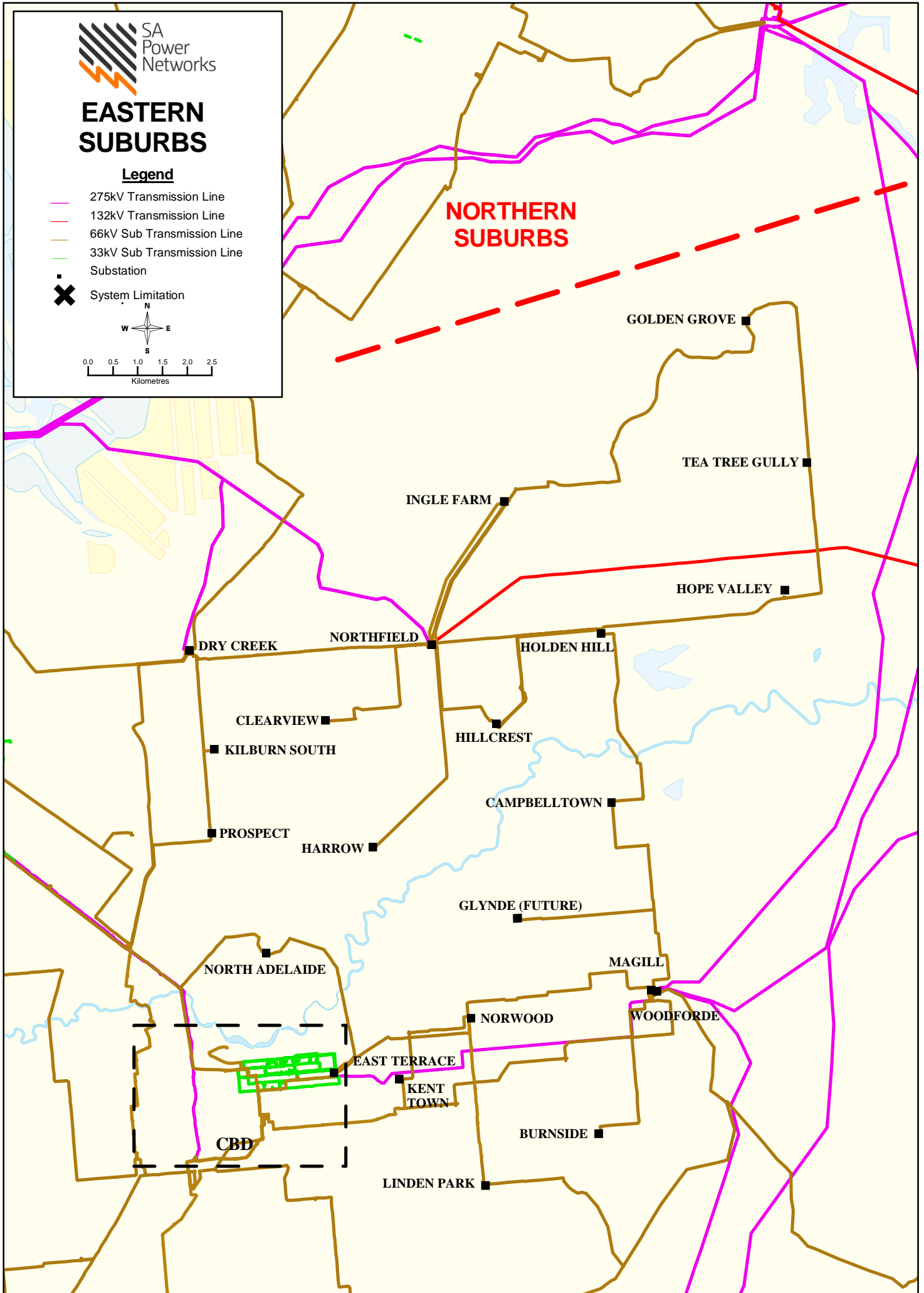
EASTERN SUBURBS

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- System Limitation



NORTHERN SUBURBS



Substation: Metro East 275/66kV

Region: Metro East

(ETC) Transmission Category: 4

Number of Transformers: 5

Total Nameplate Rating (MVA): 1650 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	717	720	620	649	672
	MVAr	107	70	92	140	76
	MVA	725	724	627	664	676
	PF	0.99	1.00	0.99	0.98	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	456	478	453	439	433
	MVAr	57	22	34	86	102
	MVA	460	478	454	447	445
	PF	0.99	1.00	1.00	0.98	1.00

Forecast^

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	721	719	717	714	712
	MVAr	82	82	82	81	81
	MVA	726	724	721	719	717
	PF	0.99	0.99	0.99	0.99	0.99
	Firm Delivery Capacity (MVA)	1350	1350	1350	1350	1350
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	+43.5MW from Southern Suburbs due to Linden Park transfer

* Potential impact of below embedded generation has been removed from the above Actuals: (ie. generation output = 0)

- 2MW of dump export generation at 11kV
- 1.86MW of hydro export generation at 11kV
- 4.4MW of customer non export generation at 11kV

^Impact of below embedded generation excluded from Forecast: (i.e. generation output = 0)

- 2MW of dump export generation at 11kV
- 1.86MW of hydro export generation at 11kV

^Impact of below embedded generation included in the Forecast: (i.e. generation output = up to 4.4MW)

- 4.4MW of customer non export generation at 11kV

Substation: Burnside 66/11kV

Region: Metro East

Number of Feeders: 4

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	11.0	12.4	9.7	12.1	13.4
	MVAr	5.3	5.8	4.4	4.0	4.0
	MVA	12.3	13.7	10.6	12.8	13.9
	PF	0.90	0.91	0.91	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	8.7	9.4	8.7	9.3	9.7
	MVAr	3.7	3.8	3.7	2.7	2.4
	MVA	9.5	10.1	9.4	9.7	10.0
	PF	0.92	0.93	0.92	0.96	0.97

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	12.9	13.0	13.0	13.1	13.1	
	MVAr	4.7	4.7	4.8	4.8	4.8	
	MVA	13.8	13.8	13.9	13.9	14.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	31.2	31.2	31.2	31.2	31.2	
	50% POE Forecast						
	MW	11.2	11.2	11.3	11.3	11.3	
	MVAr	4.1	4.1	4.1	4.1	4.1	
	MVA	12.0	12.0	12.0	12.0	12.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	13.7	13.6	13.4	13.3	13.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2012/13	+0.9MVA Customer Load Increase
	+1.8MVA from Woodforde

Year	Future Step Change (10% POE MVA)

Substation: Campbelltown 66/11kV

Region: Metro East

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 48 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	46.8	52.6	42.6	44.7	47.1
	MVAr	19.3	21.1	15.0	15.4	14.6
	MVA	50.6	56.7	45.1	47.3	49.3
	PF	0.93	0.93	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	30.5	31.7	26.7	32.0	30.1
	MVAr	9.0	8.9	8.2	7.6	6.5
	MVA	31.8	33.0	27.9	32.9	30.8
	PF	0.96	0.96	0.96	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	49.3	50.0	50.7	44.4	45.0	
	MVAr	16.6	16.8	17.1	12.9	13.1	
	MVA	52.0	52.8	53.5	46.2	46.9	
	PF	0.95	0.95	0.95	0.96	0.96	
	Total Capacity (MVA)	49.3	50.0	50.7	57.8	57.8	
	50% POE Forecast						
	MW	43.1	43.7	44.4	38.2	38.9	
	MVAr	14.5	14.7	14.9	11.1	11.3	
	MVA	45.5	46.1	46.9	39.8	40.5	
	PF	0.95	0.95	0.95	0.96	0.96	
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5	
	Transfer Capacity (MVA)	13.2	13.0	12.8	12.6	12.4	
	System Limitation (Y/N)	Y*	Y*	Y^	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	+1.4MVA from Woodforde
2013/14	-0.9MVA to Woodforde

Year	Future Step Change (10% POE MVA)
2017/18	-8.0MVA to Glynde

*Within planning criteria risk margin

^Solved by transfer to Glynde in 2017/18

Substation: Clearview 66/11kV

Region: Metro East

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	24.1	21.2	17.7	18.5	21.0
	MVAr	8.8	7.2	5.7	5.8	6.2
	MVA	25.7	22.4	18.6	19.4	21.9
	PF	0.94	0.95	0.95	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	17.6	16.5	15.0	14.7	13.6
	MVAr	4.9	3.8	3.4	2.9	2.6
	MVA	18.3	16.9	15.4	15.0	13.8
	PF	0.96	0.98	0.98	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	21.1	21.2	21.3	21.4	21.5	
	MVAr	6.6	6.6	6.6	6.6	6.7	
	MVA	22.1	22.2	22.3	22.4	22.5	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	26.6	26.6	26.6	26.6	26.6	
	50% POE Forecast						
	MW	18.3	18.4	18.5	18.6	18.7	
	MVAr	5.7	5.7	5.8	5.8	5.8	
	MVA	19.2	19.3	19.4	19.5	19.6	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	17.2	17.0	16.9	16.7	16.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	-1.5MVA to Northfield
2010/11	-2.4MVA to Hillcrest

Year	Future Step Change (10% POE MVA)

Substation: Glynde 66/11kV

Region: Metro East

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 32 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	N/A	N/A	N/A	18.2	18.4	
	MVAr	N/A	N/A	N/A	6.0	6.0	
	MVA	N/A	N/A	N/A	19.2	19.4	
	PF	N/A	N/A	N/A	0.95	0.95	
	Total Capacity (MVA)	N/A	N/A	N/A	36.2	36.2	
	50% POE Forecast						
	MW	N/A	N/A	N/A	17.3	17.4	
	MVAr	N/A	N/A	N/A	5.7	5.7	
	MVA	N/A	N/A	N/A	18.2	18.4	
	PF	N/A	N/A	N/A	0.95	0.95	
	Firm Delivery Capacity (MVA)	N/A	N/A	N/A	0	0	
	Transfer Capacity (MVA)	N/A	N/A	N/A	20.0	19.8	
	System Limitation (Y/N)	N/A	N/A	N/A	N	N	
	Hrs per annum > 95% of Peak Load (hrs)			7			

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2017/18	+6.2MVA from Norwood
	+8.0MVA from Campbelltown
	+5.0MVA from Woodforde

*Within planning criteria risk margin

Substation: Golden Grove 66/11kV

Region: Metro East

Number of Feeders: 9

Number of Transformers: 3

Total Nameplate Rating (MVA): 75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	44.1	44.2	40.1	40.9	44.5
	MVAr	16.8	15.5	13.7	16.2	13.3
	MVA	47.2	46.9	42.4	44.0	46.4
	PF	0.94	0.94	0.95	0.93	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	32.4	34.9	32.4	33.5	31.9
	MVAr	8.7	9.2	8.2	7.6	6.9
	MVA	33.5	36.1	33.4	34.4	32.6
	PF	0.97	0.97	0.97	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	46.1	46.1	46.1	46.1	46.2	
	MVAr	15.0	15.0	15.0	15.0	15.0	
	MVA	48.5	48.5	48.5	48.5	48.6	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	84.6	84.6	84.6	84.6	84.6	
	50% POE Forecast						
	MW	41.1	41.1	41.1	41.2	41.2	
	MVAr	13.4	13.4	13.4	13.4	13.4	
	MVA	43.2	43.3	43.3	43.3	43.4	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	59.6	59.6	59.6	59.6	59.6	
	Transfer Capacity (MVA)	11.5	11.4	11.3	11.3	11.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)
2009/10	+0.7MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Harrow 66/11kV

Region: Metro East

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	22.6	23.0	19.3	16.4	19.3
	MVAr	10.3	9.2	7.6	6.2	6.7
	MVA	24.8	24.7	20.8	17.5	20.4
	PF	0.91	0.93	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	19.4	17.3	17.2	15.4	13.5
	MVAr	6.6	5.3	5.0	4.5	3.0
	MVA	20.5	18.1	17.9	16.1	13.8
	PF	0.95	0.96	0.96	0.96	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	18.6	18.7	18.8	18.8	18.9	
	MVAr	6.9	6.9	6.9	7.0	7.0	
	MVA	19.9	19.9	20.0	20.1	20.1	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	28.3	28.3	28.3	28.3	28.3	
	50% POE Forecast						
	MW	16.3	16.4	16.5	16.6	16.7	
	MVAr	6.0	6.0	6.1	6.1	6.2	
	MVA	17.4	17.5	17.6	17.7	17.8	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	12.5	12.3	12.2	12.1	11.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	-1.9MVA to Norwood
	+2.0MVA from North Adelaide
	+0.5MVA from Norwood
	-0.7MVA to Hillcrest
	+0.5MVA Customer load increase
2010/11	-1.5MVA to Norwood
2012/13	-2.0MVA to North Adelaide
	-1.1MVA to Hillcrest

Year	Future Step Change (10% POE MVA)

Substation: Hillcrest 66/11kV

Region: Metro East

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	30.5	32.7	28.1	31.0	33.8
	MVAr	12.0	10.8	11.3	10.5	10.8
	MVA	32.8	34.5	30.3	32.7	35.5
	PF	0.93	0.95	0.93	0.95	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	17.8	21.9	27.8	22.2	22.5
	MVAr	6.6	6.6	7.4	6.0	5.3
	MVA	19.0	22.9	28.7	23.0	23.1
	PF	0.94	0.96	0.97	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	35.3	35.4	35.5	35.6	35.7	
	MVAr	11.9	11.9	12.0	12.0	12.0	
	MVA	37.2	37.3	37.4	37.5	37.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	61.7	61.7	61.7	61.7	61.7	
	50% POE Forecast						
	MW	31.5	31.5	31.6	31.7	31.7	
	MVAr	10.6	10.6	10.7	10.7	10.7	
	MVA	33.2	33.3	33.4	33.4	33.5	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	36.8	36.8	36.8	36.8	36.8	
	Transfer Capacity (MVA)	7.1	7.1	7.0	7.0	6.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+0.7MVA from Harrow
	+4.0MVA from Northfield
	+0.4MVA Customer load increase
2010/11	+1.4MVA from Northfield
	+2.4MVA from Clearview
2012/13	+1.1 from Harrow

Year	Future Step Change (10% POE MVA)

Substation: Holden Hill 66/11kV

Region: Metro East

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.7	38.6	32.0	34.4	36.1
	MVAr	15.4	13.9	12.4	11.9	11.0
	MVA	40.8	41.1	34.3	36.4	37.8
	PF	0.93	0.94	0.93	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	27.3	25.9	27.7	26.0	22.5
	MVAr	9.6	7.1	6.7	6.0	5.9
	MVA	28.9	26.8	28.5	26.6	23.3
	PF	0.94	0.96	0.97	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	37.1	37.2	37.4	37.5	37.6	
	MVAr	12.9	12.9	13.0	13.0	13.0	
	MVA	39.3	39.4	39.5	39.7	39.8	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	46.7	46.7	46.7	46.7	46.7	
	50% POE Forecast						
	MW	33.3	33.3	33.4	33.5	33.6	
	MVAr	11.5	11.6	11.6	11.6	11.7	
	MVA	35.2	35.3	35.4	35.5	35.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	25.0	25.0	25.0	25.0	25.0	
	Transfer Capacity (MVA)	20.2	20.0	19.8	19.6	19.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	+1.0MVA from Hope Valley

Year	Future Step Change (10% POE MVA)

Substation: Hope Valley 66/11kV

Region: Metro East

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	18.7	20.2	16.2	16.5	18.5
	MVAr	6.9	8.0	5.8	6.3	5.8
	MVA	19.9	21.8	17.2	17.7	19.4
	PF	0.94	0.93	0.94	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	12.4	13.9	14.2	13.2	13.0
	MVAr	3.1	3.9	3.4	2.7	2.9
	MVA	12.8	14.5	14.6	13.4	13.4
	PF	0.97	0.96	0.97	0.98	0.98

Forecast*

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.0	18.9	18.8	18.6	18.5	
	MVAr	6.5	6.4	6.4	6.4	6.3	
	MVA	20.1	20.0	19.8	19.7	19.6	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	31.2	31.2	31.2	31.2	31.2	
	50% POE Forecast						
	MW	16.6	16.5	16.4	16.3	16.2	
	MVAr	5.7	5.6	5.6	5.6	5.5	
	MVA	17.5	17.4	17.3	17.2	17.1	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	16.0	16.0	16.0	16.1	16.1	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

* Potential impact of below embedded generation has been removed from the above Actuals & excluded from Forecast: (ie. generation output = 0)

- 2MW of dump export generation at 11kV
- 1.86MW of hydro export generation at 11kV

Substation: Ingle Farm 66/11kV

Region: Metro East

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	38.9	40.1	33.0	33.7	35.3
	MVAr	15.8	16.2	14.2	12.0	11.2
	MVA	42.0	43.2	36.0	35.8	37.0
	PF	0.93	0.93	0.92	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	26.5	26.9	25.0	23.0	23.2
	MVAr	8.0	6.9	6.6	5.3	4.6
	MVA	27.7	27.8	25.8	23.6	23.6
	PF	0.96	0.97	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	36.0	36.1	36.1	36.1	36.2	
	MVAr	13.4	13.4	13.4	13.4	13.4	
	MVA	38.4	38.5	38.5	38.5	38.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	51.7	51.7	51.7	51.7	51.7	
	50% POE Forecast						
	MW	32.4	32.5	32.5	32.6	32.7	
	MVAr	12.0	12.1	12.1	12.1	12.1	
	MVA	34.6	34.6	34.7	34.8	34.8	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	26.0	26.0	26.0	26.0	26.0	
	Transfer Capacity (MVA)	14.4	14.3	14.2	14.0	13.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	-1.9MVA to Salisbury

Year	Future Step Change (10% POE MVA)

Substation: Kent Town 66/11kV

Region: Metro East

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.1	37.2	30.7	32.8	32.2
	MVAr	16.1	16.5	15.1	14.8	14.0
	MVA	40.4	40.7	34.2	36.0	35.1
	PF	0.92	0.91	0.90	0.91	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	22.6	23.7	24.8	21.1	21.6
	MVAr	7.8	8.4	9.9	8.6	7.9
	MVA	23.9	25.2	26.7	22.8	23.0
	PF	0.95	0.94	0.93	0.93	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	33.9	34.1	34.3	34.6	34.8	
	MVAr	15.6	15.7	15.8	15.9	16.0	
	MVA	37.3	37.5	37.8	38.1	38.3	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	59.0	59.0	59.0	59.0	59.0	
	50% POE Forecast						
	MW	30.1	30.2	30.2	30.3	30.4	
	MVAr	13.8	13.9	13.9	13.9	14.0	
	MVA	33.1	33.2	33.3	33.3	33.4	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	29.8	29.8	29.8	29.8	29.8	
	Transfer Capacity (MVA)	21.7	21.6	21.4	21.2	21.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2011/12	-1.4MVA to Linden Park
2013/14	-1.3MVA to Norwood

Year	Future Step Change (10% POE MVA)

Substation: Kilburn South 66/11kV

Region: Metro East

Number of Feeders: 4

Number of Transformers: 1

Total Nameplate Rating (MVA): 32 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	12.5	12.8	10.5	11.1	11.6
	MVAr	5.4	5.4	4.5	1.2	1.2
	MVA	13.6	13.9	11.4	11.2	11.7
	PF	0.92	0.92	0.92	1.00	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	8.8	9.5	8.8	8.4	8.5
	MVAr	3.4	2.7	2.7	2.5	0.8
	MVA	9.5	9.8	9.2	8.8	8.5
	PF	0.93	0.96	0.96	0.96	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	12.5	12.4	12.4	12.3	12.2	
	MVAr	1.3	1.3	1.3	1.3	1.3	
	MVA	12.5	12.5	12.4	12.4	12.3	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	36.4	36.4	36.4	36.4	36.4	
	50% POE Forecast						
	MW	11.3	11.2	11.1	11.1	11.0	
	MVAr	1.2	1.2	1.2	1.2	1.2	
	MVA	11.3	11.3	11.2	11.1	11.1	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	10.1	10.2	10.2	10.3	10.3	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+1.2MVA from Prospect
2012/13	6.0MVAr Capacitor bank installed
2013/14	+1.4MVA customer load increase

Year	Future Step Change (10% POE MVA)
2014/15	+1.7MVA from Prospect

*Within planning criteria risk margin

Substation: Linden Park 66/11kV

Region: Metro East

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.5	37.2	34.9	36.6	38.9
	MVAr	16.6	15.2	13.4	14.5	14.2
	MVA	41.0	40.2	37.4	39.4	41.4
	PF	0.92	0.93	0.93	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	25.7	33.1	24.2	28.3	26.9
	MVAr	9.1	11.0	7.7	8.4	7.0
	MVA	27.2	34.9	25.4	29.5	27.8
	PF	0.94	0.95	0.95	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	38.0	38.0	38.0	37.9	37.8	
	MVAr	14.6	14.6	14.6	14.6	14.5	
	MVA	40.7	40.7	40.7	40.6	40.5	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	55.7	55.7	55.7	55.7	55.7	
	50% POE Forecast						
	MW	32.7	32.6	32.5	32.3	32.2	
	MVAr	12.6	12.5	12.5	12.4	12.4	
	MVA	35.0	34.9	34.8	34.6	34.5	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5	
	Transfer Capacity (MVA)	15.0	15.2	15.5	15.7	15.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	+1.6MVA Customer load increase
	+1.4MVA from Kent Town
	+2.9MVA from Kingswood

Year	Future Step Change (10% POE MVA)

Substation: North Adelaide 66/11kV

Region: Metro East

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 64 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.8	21.7	20.4	23.7	23.7
	MVAr	13.1	4.1	2.9	1.0	1.5
	MVA	24.6	22.1	20.6	23.7	23.7
	PF	0.85	0.98	0.99	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	14.2	14.2	12.6	13.5	16.2
	MVAr	6.0	5.9	5.1	4.7	5.2
	MVA	15.5	15.4	13.6	14.2	17.0
	PF	0.92	0.92	0.93	0.94	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	24.8	24.6	24.5	24.3	24.2	
	MVAr	1.6	1.6	1.5	1.5	1.5	
	MVA	24.8	24.7	24.5	24.4	24.2	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	71.9	71.9	71.9	71.9	71.9	
	50% POE Forecast						
	MW	22.3	22.2	22.0	21.9	21.8	
	MVAr	1.4	1.4	1.4	1.4	1.4	
	MVA	22.3	22.2	22.1	21.9	21.8	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	38.1	38.1	38.1	38.1	38.1	
	Transfer Capacity (MVA)	4.5	4.5	4.6	4.6	4.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	-2.0MVA to Harrow
2011/12	9.0MVAr Capacitor bank installed
2012/13	+2.0MVA from Harrow
	+4.7MVA from Prospect

Year	Future Step Change (10% POE MVA)

Substation: Northfield 66/11kV

Region: Metro East

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.0	19.0	16.1	16.8	18.5
	MVAr	6.6	7.6	7.0	7.0	7.1
	MVA	18.2	20.4	17.6	18.2	19.8
	PF	0.93	0.93	0.92	0.92	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	18.6	12.8	12.3	13.0	12.5
	MVAr	6.4	4.4	3.8	4.1	3.0
	MVA	19.6	13.5	12.9	13.6	12.9
	PF	0.95	0.95	0.96	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	18.8	18.5	18.3	18.1	17.9	
	MVAr	7.7	7.6	7.5	7.5	7.4	
	MVA	20.3	20.1	19.8	19.6	19.3	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	26.5	26.5	26.5	26.5	26.5	
	50% POE Forecast						
	MW	16.6	16.4	16.2	16.0	15.9	
	MVAr	6.8	6.8	6.7	6.6	6.5	
	MVA	17.9	17.8	17.5	17.3	17.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	19.0	19.1	19.2	19.3	19.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+1.5MVA from Clearview
	-4.0MVA to Hillcrest
2010/11	+2.3MVA from Cavan
	-1.4MVA to Hillcrest
2011/12	+1.0MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Norwood 66/11kV

Region: Metro East

Number of Feeders: 10

Number of Transformers: 3

Total Nameplate Rating (MVA): 63 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	57.6	58.2	47.3	52.0	55.8
	MVAr	11.9	11.1	5.8	8.0	7.6
	MVA	58.8	59.3	47.7	52.6	56.3
	PF	0.98	0.98	0.99	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	38.9	42.1	38.4	39.4	38.5
	MVAr	5.7	6.6	4.6	5.0	4.4
	MVA	39.3	42.6	38.7	39.7	38.7
	PF	0.99	0.99	0.99	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	57.2	57.0	56.8	50.5	50.4	
	MVAr	8.0	8.0	8.0	6.9	6.9	
	MVA	57.8	57.6	57.4	51.0	50.8	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	73.8	73.8	73.8	73.8	73.8	
	50% POE Forecast						
	MW	50.1	49.9	49.7	43.9	43.8	
	MVAr	7.0	7.0	7.0	6.0	6.0	
	MVA	50.6	50.4	50.2	44.3	44.2	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	51.4	51.4	51.4	51.4	51.4	
	Transfer Capacity (MVA)	24.2	24.2	24.2	24.2	24.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+1.9MVA from Harrow
	-0.5MVA to Harrow
2010/11	+1.5MVA from Harrow
2013/14	+1.3MVA from Kent Town

Year	Future Step Change (10% POE MVA)
2017/18	-6.2MVA to Glyde

Substation: Prospect 66/11kV

Region: Metro East

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	38.2	38.5	32.7	29.6	33.2
	MVAr	19.3	18.8	15.6	16.1	13.0
	MVA	42.8	42.9	36.2	33.7	33.6
	PF	0.89	0.90	0.90	0.88	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	24.7	26.1	25.3	25.8	23.0
	MVAr	9.0	11.5	10.7	8.4	6.9
	MVA	26.3	28.5	27.4	27.1	24.0
	PF	0.94	0.92	0.92	0.95	0.96

Forecast^

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	29.8	29.4	29.0	28.6	28.2	
	MVAr	13.7	13.5	13.3	13.1	13.0	
	MVA	32.8	32.4	31.9	31.5	31.0	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	49.4	49.4	49.4	49.4	49.4	
	50% POE Forecast						
	MW	26.7	26.5	26.2	26.0	25.9	
	MVAr	12.2	12.2	12.0	12.0	11.9	
	MVA	29.3	29.1	28.9	28.7	28.5	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	26.2	26.2	26.2	26.2	26.2	
	Transfer Capacity (MVA)	12.6	12.7	12.8	12.9	13.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	-1.2MVA to Kilburn South
2012/13	-4.7MVA to North Adelaide

Year	Future Step Change (10% POE MVA)
2014/15	-1.7MVA to Kilburn South

* Impact of below embedded generation removed from Actuals: (i.e. generation output = 0)

- 4.4MW of customer non export embedded generation

^Impact of below embedded generation included in the Forecast: (i.e. generation output = up to 4.4MW)

- 4.4MW of customer non export embedded generation

Substation: Tea Tree Gully 66/11kV

Region: Metro East

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	33.0	33.4	27.6	31.4	33.0
	MVAr	12.3	11.8	10.0	9.9	9.9
	MVA	35.2	35.4	29.4	33.0	34.5
	PF	0.94	0.94	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	23.8	24.8	23.5	22.5	21.7
	MVAr	6.3	6.7	5.7	5.1	4.7
	MVA	24.7	25.7	24.2	23.1	22.2
	PF	0.97	0.97	0.97	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	33.3	33.5	33.7	33.9	34.0	
	MVAr	10.9	10.9	11.0	11.0	11.1	
	MVA	35.0	35.2	35.4	35.6	35.8	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	49.1	49.1	49.1	49.1	49.1	
	50% POE Forecast						
	MW	29.5	29.7	30.0	30.2	30.4	
	MVAr	9.6	9.7	9.8	9.8	9.9	
	MVA	31.1	31.3	31.5	31.8	32.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	26.4	26.4	26.4	26.4	26.4	
	Transfer Capacity (MVA)	18.9	18.7	18.5	18.2	18.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Woodforde 66/11kV

Region: Metro East

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	40.3	40.9	34.1	33.5	38.2
	MVAr	16.1	16.4	12.1	12.2	12.5
	MVA	43.4	44.0	36.2	35.7	40.2
	PF	0.93	0.93	0.94	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	27.9	33.5	24.9	24.9	23.6
	MVAr	9.1	9.9	7.1	6.9	6.2
	MVA	29.4	34.9	25.9	25.8	24.4
	PF	0.95	0.96	0.96	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	38.7	38.8	38.9	34.1	34.2	
	MVAr	13.5	13.5	13.6	11.9	11.9	
	MVA	41.0	41.1	41.2	36.2	36.3	
	PF	0.94	0.94	0.94	0.95	0.95	
	Total Capacity (MVA)	50.5	50.5	50.5	50.5	50.5	
	50% POE Forecast						
	MW	33.3	33.4	33.6	29.3	29.5	
	MVAr	11.6	11.7	11.7	10.2	10.3	
	MVA	35.2	35.4	35.6	31.1	31.2	
	PF	0.94	0.94	0.94	0.95	0.95	
	Firm Delivery Capacity (MVA)	27.0	27.0	27.0	27.0	27.0	
	Transfer Capacity (MVA)	20.1	19.9	19.7	19.5	19.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)
2010/11	-1.4MVA to Campbelltown
2012/13	-1.8MVA to Burnside
2013/14	+0.9MVA from Campbelltown

Year	Future Step Change (10% POE MVA)
2017/18	-5.0MVA to Glyde

8.4 Western Suburbs Regional Development Plan

The Western Suburbs

SA Power Networks' Western Suburbs Region includes the region from the Adelaide Metropolitan coast, south to West Beach, extending south-east to Richmond, north-east to Kilburn, and north-west to the LeFevre Peninsula. There are four main connection points in the Western Suburbs, being Torrens Island Power Station, LeFevre, New Osborne and Kilburn. The region contains a significant amount of generation sources which greatly influence the 66kV Sub-transmission network, although these are not classified as embedded generators as they are connected to 66kV buses owned by ElectraNet.

SA Power Networks Distribution Network

Electricity is supplied throughout the Western Suburbs via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 7,600 Volts, 11,000 Volts or 33,000 Volts.

Customers are supplied from SA Power Networks distribution system via 33kV, 11kV and 7.6kV primary distribution feeders, which emanate from Zone Substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a Zone Substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are system limitations forecast for the primary distribution feeders under normal conditions in the Western Suburbs in the next two years. Refer to Section 8.4.4 for more details.

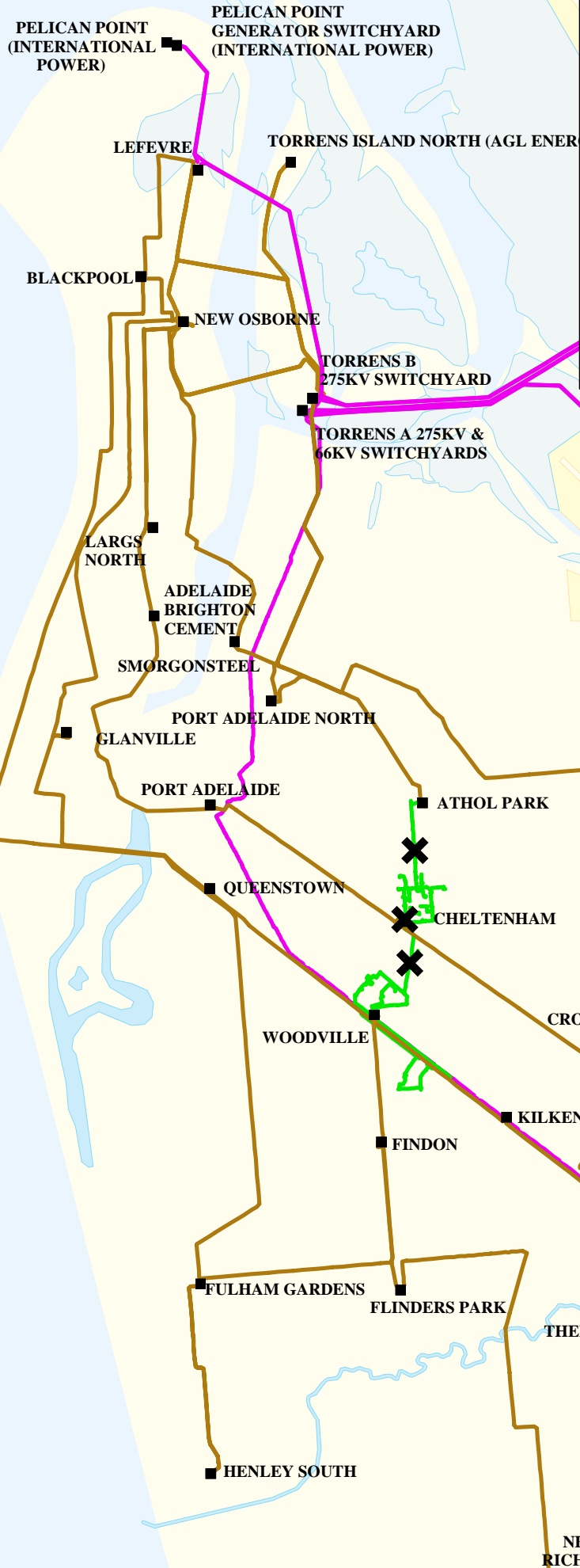
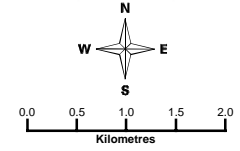
8.4.1 Western Suburbs SCADA Substations

Source Connection Point	Associated SCADA Substations
Western Suburbs Meshed 66kV Network: <ul style="list-style-type: none"> • Dry Creek – West • Kilburn • LeFevre • New Osborne • Torrens Island 	<ul style="list-style-type: none"> • Athol Park • Blackpool • Cavan • Cheltenham 33kV • Cheltenham 11kV • Cheltenham 7.6kV • Croydon • Croydon Park • Findon • Flinders Park • Fulham Gardens • Glanville • Henley South • Kilburn • Kilkenny • Largs North • LeFevre 11kV • New Osborne 11kV • New Richmond • Port Adelaide • Port Adelaide North • Queenstown • Thebarton • Woodville 7.6kV • Woodville 33kV

WESTERN SUBURBS

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- ✕ System Limitation



Substation: Metro West 275/66kV

Region: Metro West

(ETC) Transmission Category: 4

Number of Transformers: 5

Total Nameplate Rating (MVA): 845 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	449	454	407	408	438
	MVAr	31	19	24	50	53
	MVA	450	454	407	411	441
	PF	1.00	1.00	1.00	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	308	327	308	300	319
	MVAr	39	45	30	58	37
	MVA	311	330	310	306	321
	PF	0.99	0.99	1.00	0.98	0.99

Forecast^

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	421	418	415	412	405
	MVAr	47	47	47	46	45
	MVA	423	420	417	415	407
	PF	1.0	1.0	1.0	1.0	1.0
	Firm Delivery Capacity (MVA)	660	660	660	660	660
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)					

Year	Former Step Change (MVA)
2013/14	+43.5MW from Northern Suburbs due to Cavan transfer

Year	Future Step Change (10% POE MVA)

*Potential impact of below embedded generation has been removed from the above Actuals: (i.e. generation output = 0)

- 8MW of dump export generation (2009/10 to 2012/13)
- 4MW of dump export generation (2013/14)

^Impact of below embedded generation included in the Forecast: (i.e. generation output = up to 4MW)

- 4MW of dump export generation

Substation: Athol Park 66/11kV

Region: Metro West

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	19.0	22.3	20.2	19.9	18.3
	MVAr	4.8	4.7	5.4	4.6	2.8
	MVA	19.6	22.8	20.9	20.4	18.5
	PF	0.97	0.98	0.97	0.98	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	18.2	18.2	16.2	15.7	14.7
	MVAr	2.3	2.0	6.6	7.5	6.9
	MVA	18.3	18.3	17.5	17.4	16.3
	PF	0.99	0.99	0.93	0.90	0.91

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.7	17.3	17.0	16.7	16.4	
	MVAr	4.0	3.9	3.8	3.8	3.7	
	MVA	18.1	17.8	17.4	17.1	16.8	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	26.5	26.5	26.5	26.5	26.5	
	50% POE Forecast						
	MW	16.3	15.9	15.6	15.3	15.0	
	MVAr	3.7	3.6	3.5	3.4	3.4	
	MVA	16.7	16.4	16	15.7	15.3	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	14.3	14.3	14.3	14.3	14.3	
	Transfer Capacity (MVA)	12.1	12.4	12.7	12.9	13.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	+0.9MVA from Port Adelaide North

Year	Future Step Change (10% POE MVA)

Substation: Blackpool 66/7.6kV

Region: Metro West

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 16 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	14.6	14.9	12.5	12.8	14.7
	MVAr	4.9	5.3	4.5	4.4	4.2
	MVA	15.4	15.8	13.3	13.5	15.3
	PF	0.95	0.94	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	10.9	10.7	10.0	10.1	10.1
	MVAr	3.4	2.9	2.5	2.4	2.1
	MVA	11.4	11.1	10.3	10.4	10.3
	PF	0.95	0.97	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	13.6	13.5	13.3	13.2	13.0	
	MVAr	4.4	4.4	4.4	4.3	4.3	
	MVA	14.3	14.2	14.0	13.9	13.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	19.9	19.9	19.9	19.9	19.9	
	50% POE Forecast						
	MW	12.2	12.0	11.9	11.8	11.6	
	MVAr	4.0	3.9	3.9	3.8	3.8	
	MVA	12.8	12.7	12.5	12.4	12.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	10.5	10.5	10.5	10.5	10.5	
	Transfer Capacity (MVA)	5.6	5.7	5.8	5.9	5.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Cavan 66/11kV

Region: Metro West

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.4	43.9	40.4	42.2	43.2
	MVAr	16.0	17.3	16.3	17.4	17.5
	MVA	40.7	47.2	43.5	45.7	46.6
	PF	0.92	0.93	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	22.6	26.7	26.5	30.1	25.9
	MVAr	8.7	10.1	9.2	9.1	8.0
	MVA	24.2	28.6	28.1	31.4	27.1
	PF	0.93	0.94	0.94	0.96	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	38.7	39.5	40.3	41.4	37.0	
	MVAr	15.6	15.9	16.2	16.6	14.9	
	MVA	41.8	42.6	43.4	44.6	39.9	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	58.2	58.2	58.2	58.2	58.2	
	50% POE Forecast						
	MW	35.3	36.0	36.7	37.7	33.2	
	MVAr	14.2	14.5	14.8	15.2	13.4	
	MVA	38.0	38.8	39.5	40.6	35.8	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	31.6	31.6	31.6	31.6	31.6	
	Transfer Capacity (MVA)	17.9	17.5	17.0	16.6	16.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	-2.3MVA to Northfield
	+5.0MVA from Kilburn

Year	Future Step Change (10% POE MVA)
2014/15	-4.6MVA to Parafield Gardens

Substation: Cheltenham 66/7.6kV

Region: Metro West

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.9	4.6	3.6	3.6	4.1
	MVAr	1.8	2.2	1.2	1.5	1.3
	MVA	4.3	5.1	3.8	3.9	4.3
	PF	0.91	0.90	0.95	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	3.0	2.2	3.1	2.8	2.8
	MVAr	1.0	1.1	0.8	0.8	0.7
	MVA	3.1	2.5	3.2	2.9	2.9
	PF	0.95	0.90	0.97	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.8	3.7	3.7	3.7	3.6	
	MVAr	1.4	1.4	1.4	1.3	1.3	
	MVA	4.0	4.0	3.9	3.9	3.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	4.8	4.8	4.8	4.8	4.8	
	50% POE Forecast						
	MW	3.3	3.3	3.3	3.3	3.2	
	MVAr	1.2	1.2	1.2	1.2	1.2	
	MVA	3.5	3.5	3.5	3.5	3.4	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.9	0.9	0.9	0.9	1.0	
	System Limitation (Y/N)	Y	Y	Y	Y	Y	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	-1.2MVA to Cheltenham 11kV +0.6MVA from Woodville 7.6kV

Year	Future Step Change (10% POE MVA)
2016/17	-3.9MVA to Cheltenham 11kV

Cheltenham 66/7.6kV Substation

System Limitation

Cheltenham 66/7.6kV Substation has one 5MVA 66/7.6kV transformer and is located in the City Council of Charles Sturt.

In the summer of 2014/15, up to 2.6MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions that address the system limitation include:

- Convert the remaining 7.6kV feeders at Cheltenham Substation to 11kV;

1.5MVAR of power factor correction or a load reduction of 0.1MVA would not defer this system limitation for at least a 12 month period.

A RIT-D is not expected to be required for this system limitation.

Substation: Cheltenham 66/33kV

Region: Metro West

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.0	5.6	3.8	3.9	3.4
	MVAr	4.2	4.2	2.4	3.0	1.9
	MVA	7.3	7.0	4.5	4.9	3.9
	PF	0.82	0.80	0.84	0.79	0.87
Year		2009	2010	2011	2012	2013
Winter	MW	5.8	5.1	4.4	4.0	3.8
	MVAr	4.3	4.6	3.3	3.2	3.2
	MVA	7.2	6.8	5.5	5.1	5.0
	PF	0.80	0.74	0.80	0.78	0.76

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.3	3.3	3.3	3.2	3.2	
	MVAr	2.2	2.2	2.2	2.1	2.1	
	MVA	4.0	4.0	3.9	3.9	3.8	
	PF	0.83	0.83	0.83	0.83	0.83	
	Total Capacity (MVA)	19.0	19.0	19.0	19.0	19.0	
	50% POE Forecast						
	MW	3.3	3.3	3.3	3.3	3.2	
	MVAr	2.2	2.2	2.2	2.2	2.1	
	MVA	4.0	4.0	3.9	3.9	3.9	
	PF	0.83	0.83	0.83	0.83	0.83	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	7.3	7.3	7.3	7.3	7.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	-1.0MVA Customer load decrease
2011/12	-0.8MVA Customer load decrease

Year	Future Step Change (10% POE MVA)
2016/17	+3.9MVA from Cheltenham 7.6kV

Substation: Cheltenham 66/11kV

Region: Metro West

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	3.4	3.8	5.0
	MVAr	N/A	N/A	0.8	1.0	1.1
	MVA	N/A	N/A	3.5	3.9	5.1
	PF	N/A	N/A	0.97	0.97	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	2.4	2.7	3.0
	MVAr	N/A	N/A	0.7	0.4	0.4
	MVA	N/A	N/A	2.5	2.7	3.1
	PF	N/A	N/A	0.96	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	4.6	4.7	4.8	4.9	5.0	
	MVAr	1.1	1.1	1.2	1.2	1.2	
	MVA	4.7	4.8	4.9	5.0	5.1	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	29.9	29.9	29.9	29.9	29.9	
	50% POE Forecast						
	MW	4.0	4.1	4.2	4.3	4.4	
	MVAr	1.0	1.0	1.0	1.0	1.1	
	MVA	4.2	4.2	4.3	4.4	4.5	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	2.4	2.4	2.3+5	2.3	2.2	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	+1.2MVA from Cheltenham 7.6kV +0.6MVA Customer load increase
2011/12	+1.5MVA from Port Adelaide North +0.4MVA Customer load increase

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Croydon 66/11kV

Region: Metro West

Number of Feeders: 9

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	34.1	37.7	34.1	27.9	29.2
	MVAr	11.2	12.1	10.2	6.4	5.9
	MVA	35.9	39.6	35.6	28.6	29.8
	PF	0.95	0.95	0.96	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	26.7	24.9	25.0	24.0	20.3
	MVAr	5.3	11.5	3.2	2.8	1.2
	MVA	27.2	27.4	25.2	24.2	20.3
	PF	0.98	0.91	0.99	0.99	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	27.5	27.0	26.4	25.9	25.4	
	MVAr	6.6	6.5	6.4	6.3	6.1	
	MVA	28.3	27.7	27.2	26.6	26.1	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	48.4	48.4	48.4	48.4	48.4	
	50% POE Forecast						
	MW	25.3	24.8	24.2	23.7	23.2	
	MVAr	6.1	6.0	5.8	5.7	5.6	
	MVA	26	25.5	24.9	24.4	23.9	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	25.6	25.6	25.6	25.6	25.6	
	Transfer Capacity (MVA)	26.3	26.9	27.6	28.2	28.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	-0.8MVA to Thebarton
	-0.3MVA to Kilkenny
2012/13	-4.7MVA Customer load decrease

Year	Future Step Change (10% POE MVA)

Substation: Croydon Park 66/11kV

Region: Metro West

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	22.6	21.5	17.8	18.5	19.1
	MVAr	9.7	8.4	7.5	8.2	7.7
	MVA	24.6	23.1	19.3	20.3	20.6
	PF	0.92	0.93	0.92	0.92	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	17.4	14.3	11.4	12.4	13.2
	MVAr	5.3	4.3	2.6	4.0	3.3
	MVA	18.2	14.9	11.7	13.1	13.6
	PF	0.96	0.96	0.97	0.95	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.8	17.4	17.0	16.6	16.2	
	MVAr	7.5	7.3	7.1	6.9	6.8	
	MVA	19.3	18.9	18.4	18.0	17.5	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	26.4	26.4	26.4	26.4	26.4	
	50% POE Forecast						
	MW	16.3	15.9	15.4	15.0	14.6	
	MVAr	6.8	6.6	6.4	6.3	6.1	
	MVA	17.6	17.2	16.7	16.3	15.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	13.7	13.7	13.7	13.7	13.7	
	Transfer Capacity (MVA)	16.1	16.6	17.1	17.6	18.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Findon 66/11kV

Region: Metro West

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.7	19.5	16.4	16.5	18.6
	MVAr	6.9	7.8	5.8	6.5	6.7
	MVA	19.0	21.0	17.4	17.7	19.8
	PF	0.93	0.93	0.94	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	11.2	12.5	11.6	11.7	10.7
	MVAr	3.1	3.4	2.7	3.4	2.9
	MVA	11.6	13.0	11.9	12.2	11.1
	PF	0.96	0.97	0.98	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.6	19.4	19.3	19.1	19.0	
	MVAr	7.1	7.1	7.0	7.0	6.9	
	MVA	20.8	20.7	20.5	20.4	20.2	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	24.8	24.8	24.8	24.8	24.8	
	50% POE Forecast						
	MW	17.8	17.6	17.5	17.3	17.2	
	MVAr	6.5	6.4	6.4	6.3	6.3	
	MVA	18.9	18.8	18.6	18.5	18.3	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	14.1	14.1	14.1	14.1	14.1	
	Transfer Capacity (MVA)	11.1	11.2	11.2	11.3	11.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Flinders Park 66/11kV

Region: Metro West

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.5	21.2	18.0	18.9	19.3
	MVAr	8.0	8.4	7.7	8.0	9.0
	MVA	22.0	22.8	19.6	20.5	21.3
	PF	0.93	0.93	0.92	0.92	0.91
Year		2009	2010	2011	2012	2013
Winter	MW	14.5	14.5	13.0	12.1	11.7
	MVAr	4.2	5.8	4.3	6.0	5.3
	MVA	15.1	15.6	13.7	13.5	12.8
	PF	0.96	0.93	0.95	0.90	0.91

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	20.8	21.0	21.1	21.2	21.3	
	MVAr	9.3	9.3	9.4	9.4	9.5	
	MVA	22.8	23.0	23.1	23.2	23.3	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	27.3	27.3	27.3	27.3	27.3	
	50% POE Forecast						
	MW	18.9	19.0	19.2	19.3	19.4	
	MVAr	8.4	8.5	8.5	8.6	8.6	
	MVA	20.7	20.8	21.0	21.1	21.2	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	14.1	14.1	14.1	14.1	14.1	
	Transfer Capacity (MVA)	20.4	20.3	20.2	20.1	20.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	-1.7MVA to Fulham Gardens

Year	Future Step Change (10% POE MVA)

Substation: Fulham Gardens 66/11kV

Region: Metro West

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.0	38.5	33.5	34.2	40.4
	MVAr	14.4	14.9	12.9	13.1	14.4
	MVA	39.7	41.3	35.9	36.7	42.9
	PF	0.93	0.93	0.93	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	25.1	27.1	24.6	26.7	25.1
	MVAr	7.8	7.8	6.3	7.4	7.2
	MVA	26.3	28.2	25.4	27.7	26.1
	PF	0.96	0.96	0.97	0.96	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	37.0	37.1	37.2	37.3	37.4	
	MVAr	13.9	13.9	14.0	14.0	14.0	
	MVA	39.5	39.6	39.7	39.9	39.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	49.0	49.0	49.0	49.0	49.0	
	50% POE Forecast						
	MW	32.6	32.6	32.7	32.7	32.8	
	MVAr	12.2	12.2	12.3	12.3	12.3	
	MVA	34.8	34.8	34.9	35.0	35.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	24.8	24.8	24.8	24.8	24.8	
	Transfer Capacity (MVA)	12.9	13.0	13.0	13.0	13.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+1.7MVA from Flinders Park
2010/11	+1.0MVA from Henley South
2013/14	+2.1MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Glanville 66/7.6kV

Region: Metro West

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 16 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	14.2	14.2	11.5	11.6	13.5
	MVAr	5.7	5.1	3.1	3.1	4.2
	MVA	15.3	15.1	11.9	12.0	14.2
	PF	0.93	0.94	0.97	0.97	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	10.4	10.5	9.9	9.2	8.8
	MVAr	3.4	3.3	2.8	2.5	1.7
	MVA	11.0	11.0	10.3	9.5	9.0
	PF	0.95	0.96	0.96	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	12.3	12.3	12.2	12.2	12.2	
	MVAr	3.5	3.5	3.5	3.5	3.5	
	MVA	12.8	12.8	12.7	12.7	12.6	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	20.4	20.4	20.4	20.4	20.4	
	50% POE Forecast						
	MW	10.9	10.8	10.8	10.7	10.6	
	MVAr	3.1	3.1	3.1	3.1	3.0	
	MVA	11.3	11.3	11.2	11.1	11.1	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	12.0	12.0	12.0	12.0	12.0	
	Transfer Capacity (MVA)	7.9	8.0	8.1	8.2	8.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	+0.4MVA Customer load increase
2010/11	+0.4MVA Customer load increase
2011/12	-0.4MVA Customer load decrease
	-0.8MVA to Largs North

Year	Future Step Change (10% POE MVA)

Substation: Henley South 66/11kV

Region: Metro West

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 48 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	31.1	34.4	29.5	29.3	33.8
	MVAr	10.4	12.2	10.2	10.2	11.0
	MVA	32.8	36.5	31.2	31.0	35.5
	PF	0.95	0.94	0.95	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	21.7	24.0	22.5	23.5	21.0
	MVAr	5.0	6.2	5.7	5.5	5.2
	MVA	22.2	24.8	23.2	24.1	21.6
	PF	0.97	0.97	0.97	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	30.6	30.6	30.7	30.7	30.7	
	MVAr	10.4	10.4	10.5	10.5	10.5	
	MVA	32.3	32.3	32.4	32.4	32.5	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	55.7	55.7	55.7	55.7	55.7	
	50% POE Forecast						
	MW	27.1	27.2	27.3	27.4	27.4	
	MVAr	9.3	9.3	9.3	9.3	9.4	
	MVA	28.7	28.8	28.8	28.9	29.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5	
	Transfer Capacity (MVA)	12.0	12.0	12.0	12.0	12.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)	Year	Future Step Change (10% POE MVA)
2010/11	-1.0MVA to Fulham Gardens		

Substation: Kilburn 66/11kV

Region: Metro West

Number of Feeders: 8

Number of Transformers: 3

Total Nameplate Rating (MVA): 63 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	49.4	44.6	44.7	44.1	39.3
	MVAr	28.6	27.5	26.0	25.5	22.7
	MVA	57.1	52.4	51.7	50.9	45.4
	PF	0.87	0.85	0.87	0.87	0.87
Year		2009	2010	2011	2012	2013
Winter	MW	42.8	45.2	43.6	40.2	39.8
	MVAr	26.1	28.2	24.3	20.9	20.9
	MVA	50.1	53.3	49.9	45.3	44.9
	PF	0.85	0.85	0.87	0.89	0.89

Forecast^

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	39.4	38.7	38.1	37.4	36.7	
	MVAr	24.0	23.6	23.2	22.8	22.4	
	MVA	46.2	45.3	44.6	43.8	43.0	
	PF	0.85	0.85	0.85	0.85	0.85	
	Total Capacity (MVA)	76.2	76.2	76.2	76.2	76.2	
	50% POE Forecast						
	MW	37.8	37.3	36.7	36.2	35.6	
	MVAr	23.1	22.7	22.4	22.1	21.7	
	MVA	44.3	43.7	43.0	42.4	41.7	
	PF	0.85	0.85	0.85	0.85	0.85	
	Firm Delivery Capacity (MVA)	54.3	54.3	54.3	54.3	54.3	
	Transfer Capacity (MVA)	11.1	11.3	11.5	11.8	12.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	3					

Year	Former Step Change (MVA)	Year	Future Step Change (10% POE MVA)
2010/11	-5.0MVA to Cavan		

*Potential impact of below embedded generation has been removed from the above Actuals: (i.e. generation output = 0)

- 4MW of dump export generation (2009/10 to 2012/13)
- 2MW of dump export generation (2013/14)

^Impact of below embedded generation included in the Forecast: (i.e. generation output = up to 2MW)

- 2MW of dump export generation

Substation: Kilkenny 66/11kV

Region: Metro West

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	15.2	15.1	14.9	14.4	15.1
	MVAr	5.9	5.9	4.6	5.2	3.9
	MVA	16.3	16.2	15.6	15.3	15.6
	PF	0.93	0.93	0.96	0.94	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	14.3	19.7	13.5	12.6	12.4
	MVAr	5.7	5.6	5.0	3.2	3.8
	MVA	15.4	20.5	14.4	13.0	12.9
	PF	0.93	0.96	0.94	0.97	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.0	13.5	13.0	12.6	12.2	
	MVAr	4.4	4.2	4.1	3.9	3.8	
	MVA	14.6	14.2	13.7	13.2	12.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	55.9	55.9	55.9	55.9	55.9	
	50% POE Forecast						
	MW	12.9	12.3	11.7	11.1	10.6	
	MVAr	4.0	3.8	3.6	3.5	3.3	
	MVA	13.5	12.9	12.3	11.7	11.1	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	31.4	31.4	31.4	31.4	31.4	
	Transfer Capacity (MVA)	13.5	14.2	14.9	15.6	16.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	+0.3MVA from Croydon

Year	Future Step Change (10% POE MVA)

Substation: Largs North 66/7.6kV

Region: Metro West

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	13.2	14.0	12.0	12.8	14.4
	MVAr	5.2	5.4	4.7	4.6	4.8
	MVA	14.2	15.0	12.9	13.6	15.2
	PF	0.93	0.93	0.93	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	10.2	10.6	10.2	10.7	11.0
	MVAr	3.7	3.3	3.2	3.0	3.1
	MVA	10.9	11.1	10.7	11.1	11.4
	PF	0.94	0.96	0.95	0.96	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	13.4	13.4	13.3	13.3	13.3	
	MVAr	4.8	4.8	4.8	4.7	4.7	
	MVA	14.2	14.2	14.2	14.1	14.1	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	27.5	27.5	27.5	27.5	27.5	
	50% POE Forecast						
	MW	11.9	11.9	11.8	11.7	11.7	
	MVAr	4.2	4.2	4.2	4.2	4.2	
	MVA	12.7	12.6	12.5	12.5	12.4	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	3.7	3.7	3.7	3.8	3.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	+0.9MVA Customer load Increase
2011/12	+0.8MVA from Glanville
2012/13	+0.6MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: LeFevre 66/11kV

Region: Metro West

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 64 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	5.9	7.5	8.8	8.5	9.5
	MVAr	4.0	3.6	1.3	2.8	2.1
	MVA	7.1	8.3	8.9	8.9	9.7
	PF	0.83	0.90	0.99	0.95	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	4.7	6.4	7.9	7.9	7.7
	MVAr	2.3	1.9	1.3	2.4	1.2
	MVA	5.2	6.7	8.0	8.3	7.8
	PF	0.90	0.96	0.99	0.96	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.2	9.1	9.0	9.0	8.9	
	MVAr	2.3	2.3	2.2	2.2	2.2	
	MVA	9.5	9.4	9.3	9.2	9.1	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	72.2	72.2	72.2	72.2	72.2	
	50% POE Forecast						
	MW	9.2	9.2	9.1	9.0	8.9	
	MVAr	2.3	2.3	2.3	2.2	2.2	
	MVA	9.5	9.4	9.4	9.3	9.2	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	38.1	38.1	38.1	38.1	38.1	
	Transfer Capacity (MVA)	7.3	7.3	7.4	7.5	7.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	4					

Year	Former Step Change (MVA)
2010/11	+2.0MVA Customer load increase
2013/14	+2.0MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: New Osborne 66/11kV

Region: Metro West

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.4	5.2	4.8	5.9	5.4
	MVAr	4.5	3.4	4.4	3.2	2.2
	MVA	6.3	6.2	6.5	6.7	5.8
	PF	0.70	0.84	0.74	0.88	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	5.2	4.4	5.1	4.8	4.9
	MVAr	3.8	3.6	4.0	4.2	3.3
	MVA	6.5	5.7	6.5	6.4	5.9
	PF	0.81	0.77	0.79	0.75	0.83

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.0	0.0	0.0	0.0	0.0	
	MVAr	0.0	0.0	0.0	0.0	0.0	
	MVA	0.0	0.0	0.0	0.0	0.0	
	PF	0.00	0.00	0.00	0.00	0.00	
	Total Capacity (MVA)	9.5	9.5	9.5	9.5	9.5	
	50% POE Forecast						
	MW	0.0	0.0	0.0	0.0	0.0	
	MVAr	0.0	0.0	0.0	0.0	0.0	
	MVA	0.0	0.0	0.0	0.0	0.0	
	PF	0.00	0.00	0.00	0.00	0.00	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0	0	0	0	0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	16					

Year	Former Step Change (MVA)
2013/14	-2.4MVA Customer load decrease

Year	Future Step Change (10% POE MVA)
2014/15	-5.8MVA customer load decrease

Substation: New Richmond 66/11kV

Region: Metro West

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.0	35.7	30.9	31.9	32.4
	MVAr	17.9	16.9	15.3	13.1	12.5
	MVA	41.1	39.5	34.5	34.5	34.8
	PF	0.90	0.90	0.90	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	22.3	22.6	22.0	21.5	21.5
	MVAr	8.9	8.6	8.8	7.7	7.6
	MVA	24.0	24.2	23.7	22.8	22.8
	PF	0.93	0.93	0.93	0.94	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	30.4	30.3	30.2	30.2	30.1	
	MVAr	13.2	13.2	13.1	13.1	13.0	
	MVA	33.1	33.1	33.0	32.9	32.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	51.1	51.1	51.1	51.1	51.1	
	50% POE Forecast						
	MW	27.6	27.6	27.5	27.5	27.5	
	MVAr	12.0	12.0	12.0	11.9	11.9	
	MVA	30.1	30.1	30.0	30.0	30.0	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	26.4	26.4	26.4	26.4	26.4	
	Transfer Capacity (MVA)	16.6	16.6	16.7	16.7	16.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	-0.5MVA to Keswick
	-0.5MVA to Thebarton

Year	Future Step Change (10% POE MVA)

Substation: Port Adelaide 66/7.6kV

Region: Metro West

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 16 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	12.5	13.0	12.5	12.2	11.8
	MVAr	6.7	6.9	5.6	5.9	6.0
	MVA	14.2	14.7	13.7	13.6	13.2
	PF	0.88	0.88	0.91	0.90	0.89
Year		2009	2010	2011	2012	2013
Winter	MW	8.9	9.6	8.4	8.4	8.4
	MVAr	4.1	4.7	3.5	4.2	3.2
	MVA	9.8	10.7	9.1	9.4	9.0
	PF	0.91	0.90	0.92	0.89	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	10.9	10.8	10.7	10.5	10.4	
	MVAr	6.0	5.9	5.8	5.7	5.6	
	MVA	12.5	12.3	12.1	12.0	11.8	
	PF	0.88	0.88	0.88	0.88	0.88	
	Total Capacity (MVA)	19.9	19.9	19.9	19.9	19.9	
	50% POE Forecast						
	MW	9.9	9.8	9.6	9.5	9.4	
	MVAr	5.4	5.3	5.2	5.2	5.1	
	MVA	11.3	11.2	11.0	10.8	10.7	
	PF	0.88	0.88	0.88	0.88	0.88	
	Firm Delivery Capacity (MVA)	10.5	10.5	10.5	10.5	10.5	
	Transfer Capacity (MVA)	5.9	6.0	6.1	6.2	6.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Port Adelaide North 66/11kV

Region: Metro West

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	27.4	24.7	23.5	19.6	22.5
	MVAr	13.6	13.8	11.6	16.1	12.1
	MVA	30.6	28.3	26.2	25.4	25.5
	PF	0.90	0.87	0.90	0.77	0.88
Year		2009	2010	2011	2012	2013
Winter	MW	22.2	23.6	19.7	18.2	21.3
	MVAr	12.5	11.1	9.6	9.3	10.9
	MVA	25.5	26.1	21.9	20.4	24.0
	PF	0.87	0.90	0.90	0.89	0.89

Forecast^

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	23.5	23.5	23.5	23.6	23.6	
	MVAr	11.7	11.7	11.7	11.7	11.7	
	MVA	26.2	26.2	26.3	26.3	26.3	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	47.2	47.2	47.2	47.2	47.2	
	50% POE Forecast						
	MW	21.8	21.9	21.9	22.0	22.0	
	MVAr	10.8	10.9	10.9	10.9	11.0	
	MVA	24.3	24.4	24.5	24.6	24.6	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	25.3	25.3	25.3	25.3	25.3	
	Transfer Capacity (MVA)	10.2	10.3	10.3	10.4	10.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	-0.9MVA to Athol Park
2011/12	-1.5MVA to Cheltenham 11kV

Year	Future Step Change (10% POE MVA)

*Potential impact of below embedded generation has been removed from the above Actuals: (i.e. generation output = 0)

- 4MW of dump export generation (2009/10 to 2012/13)
- 2MW of dump export generation (2013/14)

^Impact of below embedded generation included in the Forecast: (i.e. generation output = up to 2MW)

- 2MW of dump export generation

Substation: Queenstown 66/7.6kV

Region: Metro West

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 16 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	15.1	15.4	12.8	13.4	13.8
	MVAr	7.4	6.5	5.7	6.4	5.1
	MVA	16.8	16.7	14.0	14.8	14.7
	PF	0.90	0.92	0.91	0.90	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	9.9	10.5	9.6	9.5	10.5
	MVAr	4.6	3.6	3.7	2.7	2.9
	MVA	10.9	11.1	10.3	9.9	10.9
	PF	0.91	0.95	0.93	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	12.9	12.7	12.5	12.4	12.2	
	MVAr	5.4	5.4	5.3	5.2	5.1	
	MVA	14.0	13.8	13.6	13.4	13.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	22.7	22.7	22.7	22.7	22.7	
	50% POE Forecast						
	MW	11.5	11.4	11.2	11.1	10.9	
	MVAr	4.9	4.8	4.7	4.7	4.6	
	MVA	12.5	12.3	12.2	12.0	11.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	12.0	12.0	12.0	12.0	12.0	
	Transfer Capacity (MVA)	6.9	7.0	7.1	7.2	7.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Thebarton 66/11kV

Region: Metro West

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	32.0	33.9	31.5	31.5	31.8
	MVAr	8.5	8.7	7.6	7.6	7.2
	MVA	33.1	35.0	32.4	32.4	32.6
	PF	0.97	0.97	0.97	0.97	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	20.6	24.1	22.0	22.1	21.5
	MVAr	1.3	2.3	0.0	8.6	1.5
	MVA	20.6	24.3	22.0	23.7	21.6
	PF	1.00	1.00	1.00	0.93	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	30.3	30.1	29.8	29.6	29.4	
	MVAr	7.1	7.1	7.0	7.0	6.9	
	MVA	31.1	30.9	30.6	30.4	30.2	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	49.0	49.0	49.0	49.0	49.0	
	50% POE Forecast						
	MW	28.2	27.9	27.7	27.4	27.2	
	MVAr	6.7	6.6	6.5	6.5	6.4	
	MVA	29.0	28.7	28.4	28.2	27.9	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	25.8	25.8	25.8	25.8	25.8	
	Transfer Capacity (MVA)	13.6	13.7	13.9	14.1	14.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+0.8MVA from Croydon
2010/11	+1.0MVA Customer load increase
2010/11	+0.5MVA from New Richmond

Year	Future Step Change (10% POE MVA)

Substation: Woodville 66/7.6kV

Region: Metro West

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.7	6.2	5.3	5.6	6.8
	MVAr	5.9	5.4	4.6	4.9	3.2
	MVA	8.9	8.2	7.0	7.4	7.6
	PF	0.75	0.76	0.75	0.75	0.91
Year		2009	2010	2011	2012	2013
Winter	MW	6.2	4.4	3.6	4.1	3.0
	MVAr	5.5	3.9	3.2	2.7	2.9
	MVA	8.3	5.9	4.8	4.9	4.2
	PF	0.75	0.75	0.75	0.83	0.73

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.9	6.9	6.8	6.8	6.7	
	MVAr	3.8	3.8	3.7	3.7	3.7	
	MVA	7.9	7.9	7.8	7.7	7.7	
	PF	0.88	0.88	0.88	0.88	0.88	
	Total Capacity (MVA)	9.5	9.5	9.5	9.5	9.5	
	50% POE Forecast						
	MW	6.0	6.0	5.9	5.9	5.9	
	MVAr	3.3	3.3	3.2	3.2	3.2	
	MVA	6.9	6.8	6.8	6.7	6.7	
	PF	0.88	0.88	0.88	0.88	0.88	
	Firm Delivery Capacity (MVA)	5.0	5.0	5.0	5.0	5.0	
	Transfer Capacity (MVA)	3.6	3.6	3.6	3.6	3.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	-0.6MVA to Cheltenham 7.6kV

Year	Future Step Change (10% POE MVA)

Substation: Woodville 66/33kV

Region: Metro West

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 40 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.7	7.2	7.1	7.0	7.4
	MVAr	4.3	4.1	4.7	4.4	3.8
	MVA	8.0	8.3	8.5	8.3	8.3
	PF	0.84	0.87	0.84	0.85	0.89
Year		2009	2010	2011	2012	2013
Winter	MW	4.7	5.8	5.6	5.2	5.2
	MVAr	3.3	2.8	2.9	2.6	2.2
	MVA	5.8	6.4	6.3	5.8	5.7
	PF	0.82	0.90	0.89	0.90	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	7.2	7.1	7.1	7.0	6.9	
	MVAr	4.1	4.1	4.0	4.0	4.0	
	MVA	8.3	8.2	8.1	8.1	8.0	
	PF	0.87	0.87	0.87	0.87	0.87	
	Total Capacity (MVA)	37.9	37.9	37.9	37.9	37.9	
	50% POE Forecast						
	MW	6.9	6.8	6.8	6.7	6.7	
	MVAr	3.9	3.9	3.9	3.9	3.8	
	MVA	7.9	7.9	7.8	7.8	7.7	
	PF	0.87	0.87	0.87	0.87	0.87	
	Firm Delivery Capacity (MVA)	20.0	20.0	20.0	20.0	20.0	
	Transfer Capacity (MVA)	4.9	4.9	4.9	5.0	5.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	+1.6MVA Customer load increase

Year	Future Step Change (10% POE MVA)

8.4.3 Western Suburbs 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
			1	2	3	4	5
Woodville #	Actil	1	2.0	2.0	2.0	2.0	2.0
Actil #	Cheltenham	1	0.0	0.0	0.0	0.0	0.0
Woodville #	Woodville Industrial Pk	1	2.7	2.7	2.7	2.7	2.7
Woodville #	Charles Sturt Industrial	21.7	0.9	0.9	0.9	0.9	0.9
Cheltenham #	Finsbury No 1	1	4.0	4.0	4.0	4.0	4.0
Cheltenham #	Finsbury No 2	1	1.5	1.5	1.5	1.5	1.5
# = Industrial Weathered Line							

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Woodville-Actil
 Woodville-Woodville Industrial Pk
 Cheltenham-Finsbury No 1
 Cheltenham-Finsbury No 2

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the line by increasing conductor clearances; or
- Power factor correction to reduce the load on the line.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations

8.4.4 Western Suburbs Primary Distribution Feeders

Cavan Substation New 11kV Feeder

System Limitation

The Market 11kV feeder (SA-520F) is supplied from the Cavan 66/11kV Zone Substation and has a normal supply capacity of 480A. Market 11kV feeder mainly feeds industrial customers and has a forecast growth rate of 2.5%. Under 50% PoE conditions, the feeder's normal supply capacity will be exceeded in 2015/16 and the N-1 offload capacity will be exceeded in 2019/2020

Potential solutions that address the system limitation include:

- Establish a new 11kV feeder at Cavan 66/11kV Substation and split the Market 11kV feeder (preferred solution).
- Establish a new 11kV feeder at Kilburn 66/11kV Substation and split the Market 11kV feeder.
- Convert the remaining 7.6kV feeders at Cheltenham Substation to 11kV;

Feeder tie improvements and load transfers are not feasible due to high existing demand on adjacent feeders and unsuitable switching point locations

A contingency plan is in place to manage customer load recovery after a failure.

Due to the large amount of load at risk, demand side participation is not expected to achieve a large enough reduction of load to defer the constraint on Market 11kV feeder.

A RIT-D is not expected to be required for this system limitation.

8.5 Northern Suburbs Regional Development Plan

The Northern Suburbs Area

The SA Power Networks’ Northern Suburbs includes Elizabeth and extends north to Gawler and south to Parafield Gardens. There are 2 connection systems in the Northern Suburbs, being Para and Parafield Gardens West.

SA Power Networks’ Distribution Network

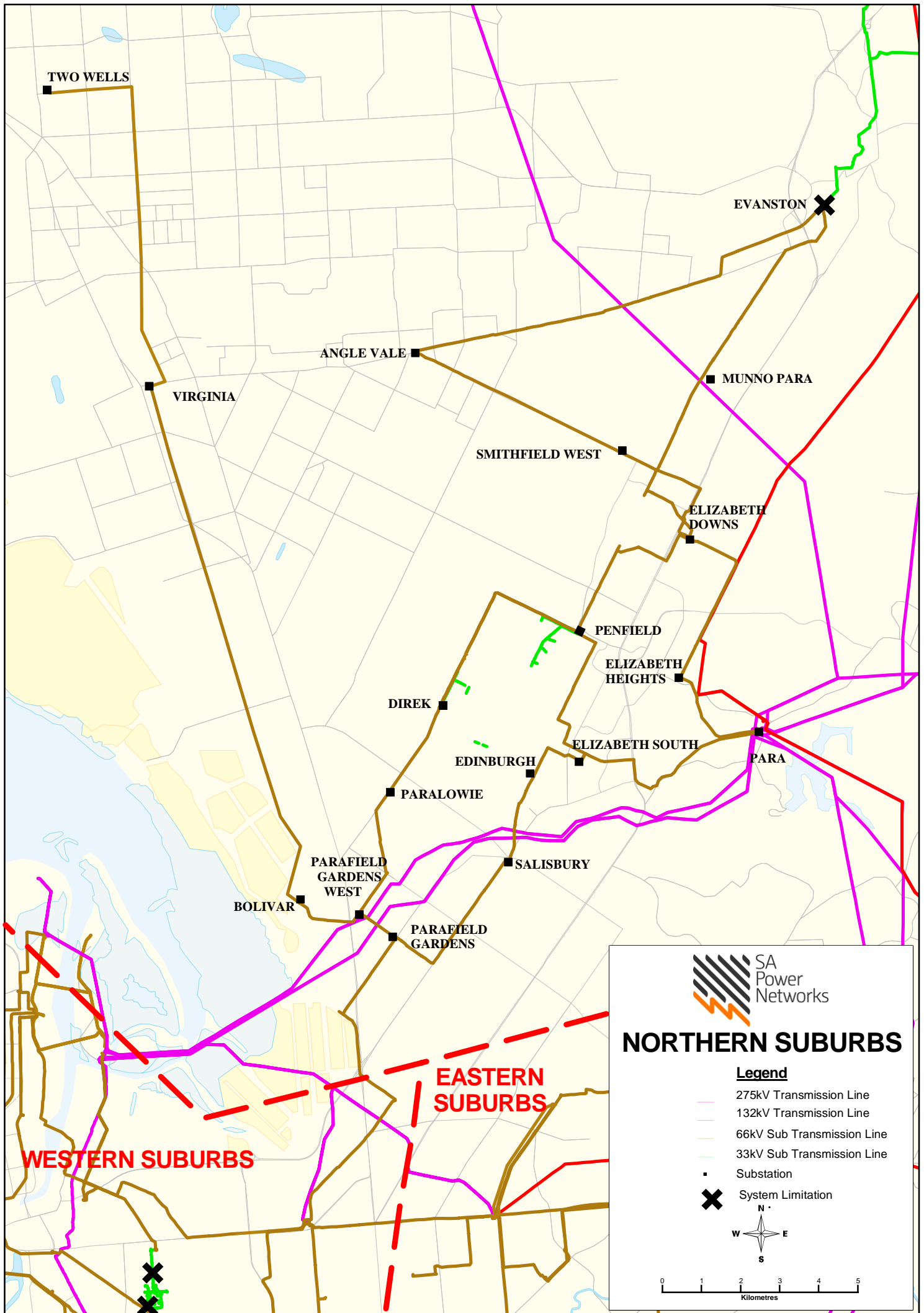
Electricity is supplied throughout the Northern Suburbs via distribution substations. These substations are operated at 66,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks’ distribution system via 11kV primary distribution feeders, which are connected to distribution substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Northern Suburbs in the next two years.

8.5.1 Northern Suburbs SCADA Substations

Source Connection Point	Associated SCADA Substations
Northern Suburbs Meshed 66kV Network: <ul style="list-style-type: none"> • Para • Parafield Gardens West • Munno Para (after 2015) 	<ul style="list-style-type: none"> • Angle Vale • Direk • Edinburgh • Elizabeth Downs • Elizabeth Heights • Elizabeth South • Evanston • Parafield Gardens • Paralowie • Penfield • Salisbury • Smithfield West • Virginia • Two Wells



NORTHERN SUBURBS

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- ✕ System Limitation



Substation: Metro North 275/66kV

Region: Metro North

(ETC) Transmission Category: 4

Number of Transformers: 4

Total Nameplate Rating (MVA): 870 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	351	368	323	328	302
	MVAr	63	42	11	35	7
	MVA	357	371	324	330	302
	PF	0.98	0.99	1.00	0.99	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	236	243	241	241	215
	MVAr	23	23	57	54	39
	MVA	237	244	247	247	218
	PF	1.00	1.00	0.97	0.98	1

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	320.2	324.3	328.3	319.2	327.9
	MVAr	21.1	21.4	21.6	21.0	21.6
	MVA	320.9	325.0	329.0	319.9	328.7
	PF	1.0	1.0	1.0	1.0	1.0
	Firm Delivery Capacity (MVA)	870	870	870	870	870
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	14				

Year	Former Step Change (MVA)
2012/13	-43.5MW to Western Suburbs due to Cavan transfer
	+2.0MW Customer load increase
2013/14	+2.0MW Customer load increase
	+9.0MW Customer load increase
	+5.0MW Customer load increase
	+4.0MW Customer load increase

Year	Future Step Change (10% POE MVA)
2017/18	-13MVA Customer load decrease

Substation: Angle Vale 66/11kV

Region: Metro North

Number of Feeders: 5

Number of Transformers: 3

Total Nameplate Rating (MVA): 22.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.9	16.6	15.1	15.2	17.4
	MVAr	9.3	7.1	6.5	6.6	6.1
	MVA	20.1	18.0	16.4	16.5	18.4
	PF	0.89	0.92	0.92	0.92	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	9.2	11.6	10.6	10.4	10.6
	MVAr	3.2	3.5	3.2	2.8	2.7
	MVA	9.8	12.1	11.1	10.8	10.9
	PF	0.94	0.96	0.96	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.9	15.2	15.4	15.7	16.0	
	MVAr	5.8	5.9	6.0	6.1	6.2	
	MVA	16.0	16.3	16.6	16.9	17.2	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	27.3	27.3	27.3	27.3	27.3	
	50% POE Forecast						
	MW	13.7	14.0	14.3	14.6	14.9	
	MVAr	5.3	5.5	5.6	5.7	5.8	
	MVA	14.7	15.0	15.3	15.7	16.0	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	20.5	20.5	20.5	20.5	20.5	
	Transfer Capacity (MVA)	8.9	8.7	8.5	8.3	8.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	-3.0MVA to Virginia
2010/11	-1.1MVA to Penfield

Year	Future Step Change (10% POE MVA)
2014/15	-2.5MVA to Smithfield West

Substation: Direk 66/11kV

Region: Metro North

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	21.4	22.5	22.2	21.4	23.0
	MVAr	9.5	7.6	8.5	8.4	7.2
	MVA	23.4	23.7	23.7	23.0	24.1
	PF	0.91	0.95	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	11.0	16.0	16.5	16.7	16.5
	MVAr	2.4	3.6	3.4	4.5	3.8
	MVA	11.2	16.4	16.9	17.2	17.0
	PF	0.98	0.98	0.98	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	23.3	23.3	23.2	23.3	23.3	
	MVAr	8.2	8.2	8.1	8.2	8.2	
	MVA	24.7	24.7	24.6	24.7	24.7	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	56.4	56.4	56.4	56.4	56.4	
	50% POE Forecast						
	MW	21.6	21.6	21.5	21.7	21.6	
	MVAr	7.6	7.6	7.6	7.6	7.6	
	MVA	22.9	22.9	22.8	23.0	22.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	29.8	29.8	29.8	29.8	29.8	
	Transfer Capacity (MVA)	8.1	8.0	8.0	7.9	7.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	+2.2MVA from Paralowie
	+4.4MVA from Edinburgh
2011/12	+0.6MVA from Paralowie

Year	Future Step Change (10% POE MVA)

Substation: Edinburgh 66/11kV

Region: Metro North

Number of Feeders: 9

Number of Transformers: 3

Total Nameplate Rating (MVA): 75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	24.8	24.3	18.9	16.7	15.2
	MVAr	9.8	10.3	7.5	6.6	6.7
	MVA	26.7	26.4	20.4	18.0	16.6
	PF	0.93	0.92	0.93	0.93	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	19.8	28.7	19.3	14.6	12.9
	MVAr	7.8	8.4	7.6	5.8	5.2
	MVA	21.3	29.9	20.7	15.7	13.9
	PF	0.93	0.96	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	16.6	16.7	16.8	8.2	8.3	
	MVAr	6.9	7.0	7.0	3.4	3.4	
	MVA	18.0	18.1	18.2	8.9	8.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	84.4	84.4	84.4	84.4	84.4	
	50% POE Forecast						
	MW	15.8	15.9	16.0	7.4	7.4	
	MVAr	6.6	6.6	6.7	3.1	3.1	
	MVA	17.1	17.3	17.4	8.0	8.1	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	60.4	60.4	60.4	60.4	60.4	
	Transfer Capacity (MVA)	5.6	5.5	5.5	5.4	5.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	-4.4MVA to Direk
2011/12	-6.7MVA Customer load decrease

Year	Future Step Change (10% POE MVA)
2017/18	-9.3MVA Customer load decrease

Substation: Elizabeth Downs 66/11kV

Region: Metro North

Number of Feeders: 9

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	38.9	40.4	38.3	40.4	43.6
	MVAr	14.2	13.5	12.7	11.6	11.3
	MVA	41.4	42.6	40.3	42.0	45.0
	PF	0.94	0.95	0.95	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	26.0	29.2	28.9	30.5	29.7
	MVAr	6.4	6.2	5.5	6.0	4.2
	MVA	26.8	29.8	29.4	31.1	30.0
	PF	0.97	0.98	0.98	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	39.2	40.4	41.6	42.8	44.1	
	MVAr	11.5	11.9	12.2	12.6	13.0	
	MVA	40.8	42.1	43.3	44.6	46.0	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	59.6	59.6	59.6	59.6	59.6	
	50% POE Forecast						
	MW	35.3	36.3	37.5	38.6	39.8	
	MVAr	10.4	10.7	11.0	11.4	11.7	
	MVA	36.8	37.9	39.0	40.2	41.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	31.9	31.9	31.9	31.9	31.9	
	Transfer Capacity (MVA)	18.2	17.7	17.1	16.6	16.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+1.0MVA from Penfield

Year	Future Step Change (10% POE MVA)
2014/15	-7.3MVA to Smithfield West

*Within planning criteria risk margin

Substation: Elizabeth Heights 66/11kV

Region: Metro North

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.7	20.5	17.0	17.9	18.6
	MVAr	7.6	7.1	6.7	5.6	5.8
	MVA	22.0	21.7	18.3	18.7	19.5
	PF	0.94	0.94	0.93	0.96	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	15.2	15.4	14.0	14.1	13.3
	MVAr	3.6	3.2	2.7	2.6	2.1
	MVA	15.6	15.7	14.3	14.3	13.5
	PF	0.97	0.98	0.98	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.2	19.3	19.4	19.6	19.6	
	MVAr	6.1	6.1	6.2	6.2	6.3	
	MVA	20.1	20.2	20.3	20.5	20.6	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	27.6	27.6	27.6	27.6	27.6	
	50% POE Forecast						
	MW	17.3	17.4	17.6	17.8	17.8	
	MVAr	5.5	5.6	5.6	5.7	5.7	
	MVA	18.2	18.3	18.4	18.7	18.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	18.2	18.0	17.9	17.7	17.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Elizabeth South - Residential 66/11kV

Region: Metro North

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	11.0	10.5	9.8	9.8	10.1
	MVAr	3.4	0.0	3.2	3.3	2.9
	MVA	11.5	10.5	10.4	10.3	10.5
	PF	0.96	1.00	0.95	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	8.9	9.3	9.1	9.3	9.0
	MVAr	1.9	1.9	1.5	1.5	1.1
	MVA	9.1	9.5	9.2	9.4	9.0
	PF	0.98	0.98	0.99	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	10.2	10.5	10.7	11.2	11.4	
	MVAr	3.5	3.6	3.7	3.8	3.9	
	MVA	10.8	11.1	11.3	11.8	12.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	28.4	28.4	28.4	28.4	28.4	
	50% POE Forecast						
	MW	9.1	9.1	9.0	9.1	9.0	
	MVAr	3.0	3.0	3.0	3.0	3.0	
	MVA	9.6	9.6	9.5	9.6	9.5	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	12.3	12.4	12.4	12.5	12.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Evanston 66/11kV

Region: Metro North

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	34.5	35.0	28.8	31.3	33.2
	MVAr	13.6	13.9	11.1	12.1	11.4
	MVA	37.1	37.7	30.9	33.6	35.2
	PF	0.93	0.93	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	24.8	24.0	22.7	22.8	22.2
	MVAr	6.7	6.6	5.5	5.5	5.0
	MVA	25.7	24.9	23.4	23.5	22.7
	PF	0.97	0.97	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	35.5	36.4	37.3	38.4	39.2	
	MVAr	2.7	3.0	3.3	3.6	3.9	
	MVA	35.6	36.5	37.4	38.6	39.4	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	57.7	57.7	57.7	57.7	57.7	
	50% POE Forecast						
	MW	32.2	33.1	34.1	35.3	36.2	
	MVAr	1.6	1.9	2.2	2.6	2.9	
	MVA	32.2	33.2	34.2	35.4	36.3	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5	
	Transfer Capacity (MVA)	4.9	4.8	4.6	4.4	4.3	
	System Limitation (Y/N)	N	N	N	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	9MVAr capacitor bank installed

*Within planning criteria risk margin

Substation: Parafield Gardens 66/11kV

Region: Metro North

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 64 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	22.4	19.6	16.5	16.6	17.8
	MVAr	8.7	6.7	5.7	5.1	4.4
	MVA	24.0	20.7	17.5	17.4	18.4
	PF	0.93	0.95	0.94	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	14.6	15.1	12.7	12.2	10.9
	MVAr	3.9	3.5	2.8	2.2	1.8
	MVA	15.1	15.5	13.0	12.4	11.1
	PF	0.97	0.97	0.98	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	24.5	25.1	25.8	26.6	32.4	
	MVAr	7.5	7.7	7.9	8.1	9.9	
	MVA	25.6	26.3	27.0	27.8	33.9	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	70.2	70.2	70.2	70.2	70.2	
	50% POE Forecast						
	MW	22.6	23.3	24.0	24.8	30.7	
	MVAr	6.9	7.1	7.3	7.6	9.4	
	MVA	23.7	24.3	25.1	25.9	32.1	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	38.1	38.1	38.1	38.1	38.1	
	Transfer Capacity (MVA)	7.0	6.9	6.7	6.6	6.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	-1.0MVA to Paralowie
	-2.3MVA to Salisbury

Year	Future Step Change (10% POE MVA)
2014/15	+4.6MVA from Cavan
2018/19	+5.0MVA from Cavan

Substation: Paralowie 66/11kV

Region: Metro North

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	21.7	17.9	15.4	16.9	16.7
	MVAr	8.3	6.3	5.4	2.3	1.3
	MVA	23.2	19.0	16.3	17.1	16.7
	PF	0.93	0.94	0.94	0.99	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	15.4	14.1	11.5	11.4	12.7
	MVAr	3.9	3.1	2.4	2.4	2.3
	MVA	15.9	14.5	11.7	11.6	12.9
	PF	0.97	0.98	0.98	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.4	17.5	17.7	18.0	18.2	
	MVAr	3.8	3.8	3.8	3.9	3.9	
	MVA	17.8	17.9	18.1	18.4	18.6	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	27.5	27.5	27.5	27.5	27.5	
	50% POE Forecast						
	MW	16.2	16.5	16.8	17.2	17.5	
	MVAr	3.5	3.6	3.6	3.7	3.8	
	MVA	16.6	16.9	17.2	17.6	17.9	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	14.2	14.2	14.2	14.2	14.2	
	Transfer Capacity (MVA)	12.9	12.5	12.2	11.9	11.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	-2.2MVA to Direk
2010/11	-2.7MVA to Salisbury
	+1.0MVA from Parafield Gardens
2011/12	-0.6MVA to Direk
2012/13	9MVAr capacitor bank installed

Year	Future Step Change (10% POE MVA)

Substation: Penfield 66/11kV

Region: Metro North

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	32.3	33.4	27.9	30.9	31.4
	MVAr	12.7	13.3	11.4	11.9	10.7
	MVA	34.7	36.0	30.2	33.1	33.2
	PF	0.93	0.93	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	22.3	22.6	24.1	21.3	21.9
	MVAr	8.1	7.8	0.0	7.2	6.5
	MVA	23.7	24.0	24.1	22.5	22.9
	PF	0.94	0.95	1.00	0.95	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	26.3	26.9	27.5	28.1	28.7	
	MVAr	10.0	10.2	10.4	10.6	10.9	
	MVA	28.1	28.7	29.4	30.0	30.7	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	56.2	56.2	56.2	56.2	56.2	
	50% POE Forecast						
	MW	24.5	25.0	25.5	26.1	26.6	
	MVAr	9.3	9.5	9.7	9.9	10.1	
	MVA	26.2	26.7	27.3	27.9	28.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	29.8	29.8	29.8	29.8	29.8	
	Transfer Capacity (MVA)	8.3	8.1	7.9	7.8	7.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	-1.0MVA to Elizabeth Downs
2010/11	+1.1MVA from Angle Vale

Year	Future Step Change (10% POE MVA)
2014/15	-7.1MVA to Smithfield West

Substation: Salisbury 66/11kV

Region: Metro North

Number of Feeders: 10

Number of Transformers: 3

Total Nameplate Rating (MVA): 63 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	60.6	57.2	51.0	54.3	56.6
	MVAr	7.8	11.6	4.1	3.0	1.6
	MVA	61.1	58.4	51.1	54.4	56.6
	PF	0.99	0.98	1.00	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	42.9	38.7	41.6	39.7	39.0
	MVAr	0.9	2.2	4.7	3.6	2.8
	MVA	42.9	38.8	41.8	39.8	39.1
	PF	1.00	1.00	0.99	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	57.5	57.6	57.6	58.0	58.0	
	MVAr	3.1	3.1	3.1	3.1	3.1	
	MVA	57.6	57.7	57.7	58.1	58.1	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	72.6	72.6	72.6	72.6	72.6	
	50% POE Forecast						
	MW	52.7	52.7	52.6	53.0	52.9	
	MVAr	2.8	2.8	2.8	2.9	2.9	
	MVA	52.7	52.7	52.7	53.1	53	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	49.5	49.5	49.5	49.5	49.5	
	Transfer Capacity (MVA)	20.9	20.9	20.8	20.8	20.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	+2.7MVA from Paralowie
	+2.3MVA from Parafield Gardens
	+1.85MVA from Ingle Farm
	-5MVA customer load decrease

Year	Future Step Change (10% POE MVA)

Substation: Smithfield West 66/11kV

Region: Metro North

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 32 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	16.2	16.6	16.9	17.3	17.7	
	MVAr	4.9	5.0	5.1	5.2	5.4	
	MVA	16.9	17.3	17.7	18.1	18.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	36.2	36.2	36.2	36.2	36.2	
	50% POE Forecast						
	MW	14.5	14.9	15.3	15.7	16.1	
	MVAr	4.4	4.5	4.6	4.7	4.9	
	MVA	15.2	15.6	16	16.4	16.8	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	14.5	14.7	14.8	14.9	15.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	+2.5MVA from Angle Vale
2014/15	+7.3MVA from Elizabeth Downs
2014/15	+7.1MVA from Penfield

*Within planning criteria risk margin

Substation: Two Wells 66/11kV

Region: Metro North

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	N/A	4.2	4.3	4.3	4.4	
	MVAr	N/A	2.0	2.1	2.1	2.1	
	MVA	N/A	4.7	4.7	4.8	4.9	
	PF	N/A	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	N/A	14.9	14.9	14.9	14.9	
	50% POE Forecast						
	MW	N/A	3.8	3.8	3.9	3.9	
	MVAr	N/A	1.8	1.9	1.9	1.9	
	MVA	N/A	4.2	4.2	4.3	4.3	
	PF	N/A	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	N/A	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	N/A	3.4	3.3	3.3	3.3	
	System Limitation (Y/N)	N/A	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2015/16	+4.7MVA from Virginia

*Within planning criteria risk margin

Substation: Virginia 66/11kV

Region: Metro North

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	10.0	9.0	9.0	9.0	9.8
	MVAr	5.0	5.0	5.0	4.0	4.2
	MVA	11.2	10.3	10.3	9.8	10.6
	PF	0.89	0.87	0.87	0.91	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	5.0	6.0	6.0	6.0	5.0
	MVAr	2.0	2.0	2.0	2.0	1.0
	MVA	5.4	6.3	6.3	6.3	5.1
	PF	0.93	0.95	0.95	0.95	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.3	5.1	5.2	5.3	5.4	
	MVAr	4.5	2.5	2.5	2.6	2.6	
	MVA	10.3	5.7	5.8	5.9	5.9	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	14.9	14.9	14.9	14.9	14.9	
	50% POE Forecast						
	MW	8.4	4.7	4.7	4.8	4.8	
	MVAr	4.1	2.3	2.3	2.3	2.3	
	MVA	9.3	5.2	5.2	5.3	5.3	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	5.0	7.1	7.0	6.9	6.8	
	System Limitation (Y/N)	Y*	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)
2009/10	+3.0MVA from Angle Vale

Year	Future Step Change (10% POE MVA)
2015/16	-4.7MVA to Two Wells

*Solved by transfer to Two Wells Substation in 2015/16

8.6 Southern Suburbs Regional Development Plan

The Southern Suburbs

The SA Power Networks’ Southern Suburbs Region includes the region from Glenelg North to the West extending north-west to North Unley, south-west to Aldinga, and south to Willunga, from where it supplies the Fleurieu region. There are four main connection points in the Southern Suburbs, being City West, Magill, Morphett Vale East and Happy Valley.

SA Power Networks’ Distribution Network

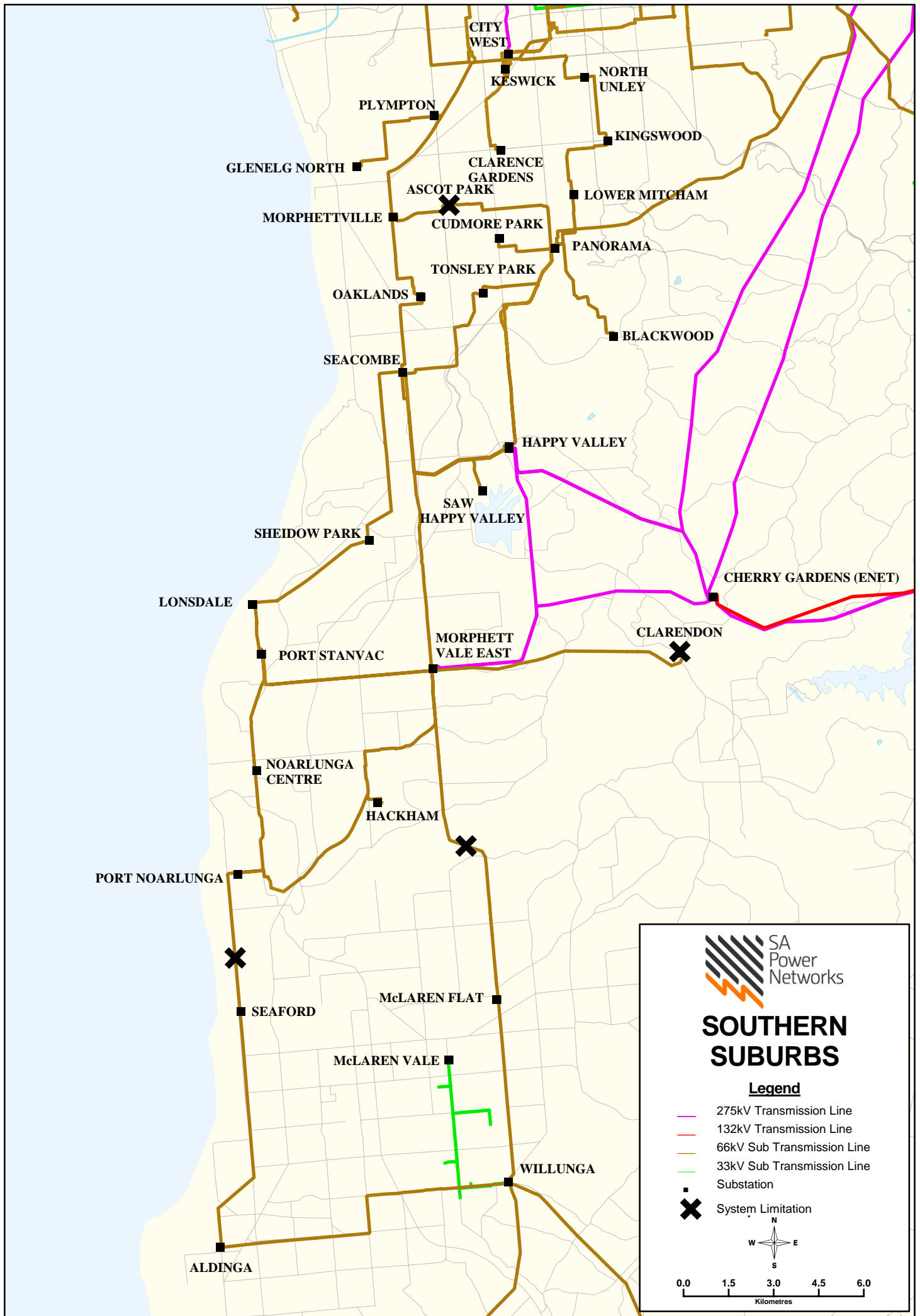
Electricity is supplied throughout the Southern Suburbs via Zone Substations. These Zone Substations are operated at 66,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks’ distribution system via 11kV feeders, which are connected to distribution substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Southern Suburbs in the next two years.

8.6.1 Southern Suburbs SCADA Substations

Source Connection Point	Associated SCADA Substations	
Southern Suburbs Meshed 66kV Network: <ul style="list-style-type: none"> • City West – South • Happy Valley • Magill – Transformer 1 • Morphett Vale East 	<ul style="list-style-type: none"> • Aldinga • Ascot Park • Blackwood • Clarence Gardens • Clarendon • Cudmore Park • Glenelg North • Hackham • Happy Valley 11kV • Keswick • Kingswood • Lower Mitcham • McLaren Flat • McLaren Vale • Morphett Vale East 11kV 	<ul style="list-style-type: none"> • Morphettville • Noarlunga Centre • North Unley • Oaklands • Panorama • Plympton • Port Noarlunga • Port Stanvac • Seacombe • Seaford • Sheidow Park • Tonsley Park • Willunga 33kV • Willunga 11kV



Substation: Metro South 275/66kV

Region: Metro South

(ETC) Transmission Category: 4

Number of Transformers: 7

Total Nameplate Rating (MVA): 1515 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	711	728	616	676	765
	MVAr	19	46	40	87	101
	MVA	712	729	618	682	772
	PF	1.00	1.00	1.00	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	512	544	538	527	507
	MVAr	64	73	65.9	115	97
	MVA	516	549	542	540	516
	PF	0.99	0.99	0.99	0.98	1

Forecast^

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	666.2	631.9	633.8	634.8	635.9
	MVAr	105.3	99.9	100.1	100.3	100.5
	MVA	674.5	639.8	641.6	642.7	643.8
	PF	0.99	0.99	0.99	0.99	0.99
	Firm Delivery Capacity (MVA)	1227	1227	1227	1227	1227
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	3				

Year	Former Step Change (MVA)
2009/10	+11.0MVA Customer load increase
2011/12	+6.0MVA Customer load increase
2012/13	+49.0MW Customer load increase

Year	Future Step Change (10% POE MVA)
2014/15	-43.5MW to Eastern Suburbs due to Linden Park transfer
2015/16	-50.0MW Customer load decrease

*Potential Impact of below embedded generation has been removed from the above Actuals: (i.e. generation output = 0)

- 21MW of diesel export generation at 11kV
- 34MW of wind export generation at 33kV (located within Fleurieu Region)
- 65MW of diesel export generation at 66kV
- 2MW of dump export generation at 11kV

^Impact of below embedded generation excluded from Forecast: (generation output = 0)

- 21MW of diesel export generation at 11kV
- 34MW of wind export generation at 33kV (located within Fleurieu Region)
- 65MW of diesel export generation at 66kV

^Impact of below embedded generation included in the Forecast: (generation output = up to 2MW)

- 2MW of dump export generation at 11kV

Substation: Aldinga 66/11kV

Region: Metro South

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	13.8	16.0	15.4	15.9	18.3
	MVAr	7.4	5.1	4.4	4.5	4.7
	MVA	15.7	16.8	16.0	16.6	18.9
	PF	0.88	0.95	0.96	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	10.8	11.1	7.9	12.8	12.3
	MVAr	2.4	2.4	1.7	2.7	1.9
	MVA	11.0	11.4	8.1	13.1	12.4
	PF	0.98	0.98	0.98	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.8	18.8	19.7	20.6	21.5	
	MVAr	4.9	5.2	5.5	5.7	6.0	
	MVA	18.5	19.5	20.5	21.4	22.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	33.2	33.2	33.2	33.2	33.2	
	50% POE Forecast						
	MW	15.5	16.3	17.1	17.9	18.7	
	MVAr	4.3	4.5	4.8	5.0	5.2	
	MVA	16.1	16.9	17.8	18.6	19.4	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	17.7	17.7	17.7	17.7	17.7	
	Transfer Capacity (MVA)	2.0	1.9	1.9	1.8	1.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	-0.3MVA to Myponga
	+0.3 MVA Customer load increase
	-1.0 MVA to Seaford
2010/11	+1.0 MVA from Seaford
	+1.0 MVA Customer load increase
2011/12	+1.0 MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Ascot Park 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 1

Total Nameplate Rating (MVA): 21 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	22.4	23.5	19.6	19.3	21.0
	MVAr	8.0	8.2	6.3	6.3	5.6
	MVA	23.8	24.9	20.6	20.3	21.7
	PF	0.94	0.94	0.95	0.95	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	16.3	18.5	16.4	16.1	15.9
	MVAr	4.4	4.4	3.9	3.9	3.0
	MVA	16.9	19.0	16.9	16.6	16.2
	PF	0.97	0.97	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.1	19.4	19.8	20.1	20.4	
	MVAr	5.7	5.8	5.9	6.0	6.1	
	MVA	19.9	20.3	20.7	21.0	21.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	27.0	27.0	27.0	27.0	27.0	
	50% POE Forecast						
	MW	16.4	16.8	17.1	17.4	17.8	
	MVAr	4.9	5.0	5.1	5.2	5.3	
	MVA	17.2	17.5	17.9	18.2	18.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	16.2	16.0	15.8	15.6	15.4	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y	
	Hrs per annum > 95% of Peak Load (hrs)		7				

Year	Former Step Change (MVA)
2011/12	+3.4MVA from Morphettville
	-3.8MVA to Tonsley Park
2012/13	-1.9MVA to Clarence Gardens

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Ascot Park 66/11kV Substation

System Limitation

Ascot Park 66/11kV Substation has one 21MVA 66/11kV transformer and is located in the Southern Suburb.

In the summer of 2018/19, up to 3.1MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions that address the system limitation include:

- Improve available transfers from Ascot Park Substation to adjacent substations by construct new feeder exit and feeder ties (preferred option); or
- Upgrade the Ascot Park Substation with a second transformer; or
- Power factor correction to reduce the load on the transformer.

Due to the extent of the overload during a contingent event, PF correction would not defer this system limitation for at least a 12 months period.

A RIT-D is not expected to be required for this system limitation.

Substation: Blackwood 66/11kV

Region: Metro South

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	26.6	28.4	23.9	24.6	27.9
	MVAr	10.1	10.3	8.1	7.3	7.7
	MVA	28.5	30.2	25.3	25.7	28.9
	PF	0.94	0.94	0.95	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	21.4	23.0	21.0	20.8	21.0
	MVAr	5.7	6.2	4.9	4.4	3.8
	MVA	22.2	23.8	21.5	21.3	21.3
	PF	0.97	0.97	0.97	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	25.1	25.1	25.1	25.0	24.9	
	MVAr	7.6	7.6	7.6	7.6	7.6	
	MVA	26.3	26.2	26.2	26.1	26.0	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	57.9	57.9	57.9	57.9	57.9	
	50% POE Forecast						
	MW	21.5	21.2	20.9	20.6	20.3	
	MVAr	6.6	6.5	6.4	6.3	6.2	
	MVA	22.5	22.2	21.9	21.5	21.2	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5	
	Transfer Capacity (MVA)	2.7	2.8	2.8	2.9	3.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Clarence Gardens 66/11kV

Region: Metro South

Number of Feeders: 5

Number of Transformers: 1

Total Nameplate Rating (MVA): 32 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	10.2	10.6	9.0	8.8	18.9
	MVAr	4.7	4.7	4.1	3.2	5.2
	MVA	11.2	11.6	9.9	9.4	19.6
	PF	0.91	0.91	0.91	0.94	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	8.3	12.6	7.4	7.5	7.5
	MVAr	2.5	3.6	2.2	1.9	1.7
	MVA	8.6	13.1	7.7	7.7	7.7
	PF	0.96	0.96	0.96	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.3	17.3	17.4	17.4	17.4	
	MVAr	6.4	6.5	6.5	6.5	6.5	
	MVA	18.4	18.5	18.5	18.6	18.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	36.2	36.2	36.2	36.2	36.2	
	50% POE Forecast						
	MW	14.9	14.9	14.9	14.9	14.9	
	MVAr	5.6	5.6	5.6	5.6	5.6	
	MVA	15.9	15.9	16.0	15.9	15.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	17.9	18.0	18.1	18.1	18.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2012/13	+1.9MVA from Ascot Park
	+2.2MVA from Keswick
	+3.8MVA from Kingswood
	+1.3MVA from Plympton

Year	Future Step Change (10% POE MVA)

Substation: Clarendon 66/11kV

Region: Metro South

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.3	3.2	2.9	2.6	3.2
	MVAr	1.6	1.4	1.3	1.0	1.1
	MVA	3.7	3.5	3.2	2.8	3.4
	PF	0.90	0.91	0.92	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	2.5	2.7	2.5	2.5	2.4
	MVAr	0.6	0.7	0.5	0.3	0.2
	MVA	2.6	2.8	2.6	2.6	2.4
	PF	0.97	0.97	0.98	0.99	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.7	2.7	2.8	2.8	2.8	
	MVAr	1.0	1.0	1.0	1.0	1.0	
	MVA	2.8	2.9	2.9	3.0	3.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	3.3	3.3	3.3	3.3	3.3	
	50% POE Forecast						
	MW	2.3	2.4	2.4	2.4	2.5	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	2.5	2.5	2.6	2.6	2.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.9	1.9	1.9	1.9	1.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)
2011/12	-0.4MVA to McLaren Flat

Year	Future Step Change (10% POE MVA)

Clarendon 66/11kV Substation

System Limitation

Clarendon 66/11kV Substation has one 2.5MVA 66/11kV transformer and is located near the township of Clarendon.

In the summer of 2013/14, the substation transformer was overloaded by 0.1MVA above its total capacity and 0.9MVA above its nameplate rating. While the 10% POE load forecast does not exceed the published total capacity above, the transformer is approaching 50 years of age and its total capacity is expected to reduce.

Potential solutions that address the system limitation include:

- Upgrade 11kV feeder ties and transfer load to a nearby substation (preferred option); or
- Upgrade the Clarendon Substation with a newer larger transformer or a second transformer; or
- Power factor correction to reduce the load on the transformer.

1.5MVAR of power factor correction or a load transfer of 0.3MVA would defer this system limitation for at least a 12 month period.

A RIT-D is not expected to be required for this system limitation.

Substation: Cudmore Park 66/11kV

Region: Metro South

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	16.9	18.2	17.1	16.0	16.7
	MVAr	8.5	9.0	8.5	8.3	8.3
	MVA	18.9	20.3	19.1	18.0	18.6
	PF	0.89	0.90	0.90	0.89	0.90
Year		2009	2010	2011	2012	2013
Winter	MW	14.1	15.6	14.1	14.1	13.3
	MVAr	6.3	7.0	6.4	6.0	5.7
	MVA	15.5	17.1	15.5	15.3	14.5
	PF	0.91	0.91	0.91	0.92	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	15.9	15.6	15.4	15.1	14.8	
	MVAr	7.9	7.8	7.6	7.5	7.4	
	MVA	17.7	17.5	17.2	16.8	16.5	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	22.1	22.1	22.1	22.1	22.1	
	50% POE Forecast						
	MW	14.5	14.1	13.8	13.4	13.1	
	MVAr	7.2	7.0	6.9	6.7	6.5	
	MVA	16.2	15.8	15.4	15.0	14.6	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	13.0	13.0	13.0	13.0	13.0	
	Transfer Capacity (MVA)	6.0	6.3	6.5	6.7	6.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2011/12	+1.1MVA from Panorama

Year	Future Step Change (10% POE MVA)

Substation: Glenelg North 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	22.0	21.6	16.4	15.2	17.3
	MVAr	9.5	9.0	6.8	6.0	6.5
	MVA	24.0	23.4	17.7	16.3	18.5
	PF	0.92	0.92	0.92	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	15.9	17.0	14.4	12.2	11.5
	MVAr	6.2	6.1	4.6	3.6	3.2
	MVA	17.0	18.1	15.1	12.7	11.9
	PF	0.93	0.94	0.95	0.96	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	15.8	16.1	16.3	16.5	16.7	
	MVAr	6.3	6.4	6.5	6.5	6.6	
	MVA	17.0	17.3	17.5	17.8	18.0	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	27.9	27.9	27.9	27.9	27.9	
	50% POE Forecast						
	MW	13.9	14.2	14.5	14.7	15.0	
	MVAr	5.5	5.6	5.7	5.8	5.9	
	MVA	15.0	15.3	15.6	15.8	16.1	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	5.6	5.5	5.5	5.4	5.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	-3.0MVA to Plympton
	-3.6MVA to Morphettville

Year	Future Step Change (10% POE MVA)

Substation: Hackham 66/11kV

Region: Metro South

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	14.3	12.3	16.1	14.0
	MVAr	N/A	4.2	3.7	4.9	3.6
	MVA	N/A	14.9	12.8	16.8	14.5
	PF	N/A	0.96	0.96	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	10.4	10.1	10.1
	MVAr	N/A	N/A	2.2	1.6	1.9
	MVA	N/A	N/A	10.6	10.2	10.3
	PF	N/A	N/A	0.98	0.99	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	12.9	12.9	12.9	12.8	12.8	
	MVAr	3.7	3.7	3.7	3.7	3.7	
	MVA	13.4	13.4	13.4	13.4	13.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	31.6	31.6	31.6	31.6	31.6	
	50% POE Forecast						
	MW	11.2	11.2	11.2	11.1	11.1	
	MVAr	3.2	3.2	3.2	3.2	3.2	
	MVA	11.7	11.7	11.6	11.6	11.6	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	15.9	16.0	16.2	16.4	16.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	+1.6MVA from Noarlunga Centre
	+6.8MVA from Morphett Vale East
	+5.7MVA from Port Noarlunga

Year	Future Step Change (10% POE MVA)

Substation: Happy Valley 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	34.1	36.3	29.7	31.1	33.5
	MVAr	13.2	13.4	9.9	9.8	10.1
	MVA	36.6	38.7	31.3	32.6	35.0
	PF	0.93	0.94	0.95	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	29.1	30.4	25.2	26.3	24.4
	MVAr	8.0	7.5	5.8	4.4	4.8
	MVA	30.2	31.3	25.8	26.6	24.9
	PF	0.96	0.97	0.98	0.99	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	31.4	31.3	31.2	31.1	30.9	
	MVAr	10.0	9.9	9.9	9.9	9.8	
	MVA	32.9	32.9	32.7	32.6	32.4	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	59.8	59.8	59.8	59.8	59.8	
	50% POE Forecast						
	MW	27.1	27.0	27.0	26.8	26.7	
	MVAr	8.6	8.6	8.6	8.5	8.5	
	MVA	28.5	28.4	28.3	28.2	28.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	31.9	31.9	31.9	31.9	31.9	
	Transfer Capacity (MVA)	8.5	8.6	8.7	8.9	9.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	-3.7MVA to Sheidow Park

Year	Future Step Change (10% POE MVA)

Substation: Keswick 66/11kV

Region: Metro South

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 42 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.1	41.5	38.1	38.5	37.3
	MVAr	5.3	6.5	11.7	11.1	10.4
	MVA	37.5	42.0	39.9	40.0	38.7
	PF	0.99	0.99	0.96	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	27.5	27.3	28.4	31.0	29.1
	MVAr	13.0	12.4	12.2	12.8	11.4
	MVA	30.4	30.0	30.9	33.6	31.3
	PF	0.90	0.91	0.92	0.92	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	36.3	36.4	36.5	36.5	36.5	
	MVAr	10.6	10.6	10.6	10.6	10.6	
	MVA	37.9	37.9	38	38	38	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	49.1	49.1	49.1	49.1	49.1	
	50% POE Forecast						
	MW	33.2	33.2	33.1	33.0	32.9	
	MVAr	9.7	9.7	9.6	9.6	9.6	
	MVA	34.6	34.5	34.5	34.4	34.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	25.8	25.8	25.8	25.8	25.8	
	Transfer Capacity (MVA)	23.2	23.5	23.8	24.1	24.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	+1.0MVA Customer load increase
2010/11	+2.3MVA from Plympton
	+0.5MVA from New Richmond
2012/13	-2.2MVA to Clarence Gardens

Year	Future Step Change (10% POE MVA)

Substation: Kingswood 66/11kV

Region: Metro South

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 64 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	54.6	56.0	44.7	46.7	46.6
	MVAr	23.5	22.4	17.6	18.4	17.0
	MVA	59.5	60.3	48.1	50.2	49.6
	PF	0.92	0.93	0.93	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	39.0	41.5	37.1	34.7	34.0
	MVAr	12.4	12.9	10.1	9.2	8.8
	MVA	40.9	43.5	38.4	35.9	35.1
	PF	0.95	0.96	0.97	0.97	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	44.4	44.7	44.9	45.1	45.2	
	MVAr	17.0	17.1	17.2	17.3	17.3	
	MVA	47.6	47.9	48.1	48.3	48.4	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	71.2	71.2	71.2	71.2	71.2	
	50% POE Forecast						
	MW	38.7	38.9	39.2	39.4	39.6	
	MVAr	14.8	14.9	15.0	15.1	15.2	
	MVA	41.4	41.7	42.0	42.2	42.4	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	37.5	37.5	37.5	37.5	37.5	
	Transfer Capacity (MVA)	18.5	18.6	18.7	18.8	18.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	-2.2MVA to Lower Mitcham
2010/11	+1.5MVA from North Unley
	-2.0 MVA to Lower Mitcham
2011/12	-2.9MVA to Linden Park
2012/13	-3.8MVA to Clarence Gardens

Year	Future Step Change (10% POE MVA)

Substation: Lower Mitcham 66/11kV

Region: Metro South

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.6	21.0	17.7	18.3	19.2
	MVAr	6.8	7.5	6.2	6.1	5.4
	MVA	18.9	22.3	18.7	19.3	20.0
	PF	0.93	0.94	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	11.9	14.8	14.9	14.0	14.3
	MVAr	3.4	4.3	3.9	3.4	3.2
	MVA	12.3	15.4	15.4	14.4	14.6
	PF	0.96	0.96	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	18.2	18.3	18.3	18.4	18.4	
	MVAr	5.9	5.9	5.9	5.9	5.9	
	MVA	19.2	19.2	19.3	19.3	19.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	28.2	28.2	28.2	28.2	28.2	
	50% POE Forecast						
	MW	15.7	15.7	15.6	15.5	15.4	
	MVAr	5.1	5.0	5.0	5.0	4.9	
	MVA	16.5	16.5	16.4	16.3	16.2	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	8.2	8.3	8.5	8.6	8.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+2.2MVA from Kingswood
2010/11	+2.0MVA from Kingswood
2012/13	+2.5MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: McLaren Flat 66/11kV

Region: Metro South

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.0	10.0	10.0	10.0	9.7
	MVAr	3.6	3.2	5.0	5.0	4.3
	MVA	7.0	10.5	11.2	11.2	10.6
	PF	0.86	0.95	0.89	0.89	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	4.0	8.0	8.0	6.0	7.0
	MVAr	1.0	2.0	2.0	2.0	2.0
	MVA	4.1	8.2	8.2	6.3	7.3
	PF	0.97	0.97	0.97	0.95	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.4	9.6	9.7	9.8	9.9	
	MVAr	4.3	4.3	4.4	4.4	4.5	
	MVA	10.3	10.5	10.6	10.7	10.9	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	31.0	31.0	31.0	31.0	31.0	
	50% POE Forecast						
	MW	8.2	8.2	8.2	8.2	8.2	
	MVAr	3.7	3.7	3.7	3.7	3.7	
	MVA	9.0	9.0	9.0	9.0	9.0	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	16.8	16.8	16.8	16.8	16.8	
	Transfer Capacity (MVA)	4.3	4.4	4.4	4.5	4.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	+4.5MVA from McLaren Vale
2011/12	+1.3MVA from McLaren Vale
	+0.4MVA from Clarendon
2012/13	+0.4MVA Customer load increase
	-2.6MVA to Port Noarlunga

Year	Future Step Change (10% POE MVA)

Substation: McLaren Vale 33/11kV

Region: Metro South

Number of Feeders: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	5.8	N/A	1.7	2.3	2.3
	MVAr	3.0	N/A	0.4	0.5	1.0
	MVA	6.6	N/A	1.8	2.4	2.5
	PF	0.89	N/A	0.97	0.98	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	4.0	2.0	1.8	1.9	2.0
	MVAr	1.4	0.3	0.3	0.2	1.1
	MVA	4.2	2.0	1.8	1.9	2.3
	PF	0.94	0.99	0.99	1.00	0.87

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.2	2.2	2.3	2.3	2.4	
	MVAr	1.0	1.0	1.1	1.1	1.1	
	MVA	2.4	2.5	2.5	2.6	2.6	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	5.4	5.4	5.4	5.4	5.4	
	50% POE Forecast						
	MW	1.9	1.9	2.0	2.0	2.1	
	MVAr	0.9	0.9	0.9	0.9	1.0	
	MVA	2.1	2.1	2.2	2.3	2.3	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	Transfer Capacity (MVA)	3.0	2.9	2.8	2.8	2.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+0.5MVA from Port Noarlunga
2010/11	-4.5MVA to McLaren Flat
2011/12	-1.3MVA to McLaren Flat

Year	Future Step Change (10% POE MVA)

Substation: Morphett Vale East 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 48 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	41.6	36.5	30.8	28.0	33.5
	MVAr	14.2	12.2	10.9	8.6	10.2
	MVA	44.0	38.5	32.7	29.3	35.0
	PF	0.95	0.95	0.94	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	30.9	32.3	29.5	24.8	23.2
	MVAr	6.5	7.6	6.4	5.2	3.8
	MVA	31.6	33.2	30.2	25.3	23.5
	PF	0.98	0.97	0.98	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	30.9	30.4	30.0	29.5	29.0	
	MVAr	9.9	9.7	9.6	9.4	9.3	
	MVA	32.4	32.0	31.5	30.9	30.4	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	57.3	57.3	57.3	57.3	57.3	
	50% POE Forecast						
	MW	27.0	26.7	26.4	26.1	25.7	
	MVAr	8.6	8.5	8.4	8.3	8.2	
	MVA	28.4	28.0	27.7	27.4	27.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5	
	Transfer Capacity (MVA)	23.3	23.8	24.3	24.8	25.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	+0.7MVA from Port Noarlunga
2010/11	-6.8MVA to Hackham

Year	Future Step Change (10% POE MVA)

Substation: Morphettville 66/11kV

Region: Metro South

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	23.9	25.4	21.2	21.1	24.6
	MVAr	6.6	7.2	4.2	3.9	5.5
	MVA	24.8	26.4	21.6	21.4	25.2
	PF	0.96	0.96	0.98	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	17.1	18.3	17.3	17.0	16.0
	MVAr	7.2	7.3	6.8	6.0	5.6
	MVA	18.5	19.7	18.6	18.0	17.0
	PF	0.92	0.93	0.93	0.94	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	22.2	22.5	22.7	22.8	23.0	
	MVAr	4.0	4.0	4.1	4.1	4.1	
	MVA	22.6	22.8	23	23.2	23.4	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	28.0	28.0	28.0	28.0	28.0	
	50% POE Forecast						
	MW	19.6	19.8	19.9	20.1	20.2	
	MVAr	3.5	3.6	3.6	3.6	3.6	
	MVA	19.9	20.1	20.3	20.4	20.5	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	13.0	13.1	13.1	13.2	13.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	-1.2MVA to Oaklands
	-3.4MVA to Ascot Park
	+3.6MVA from Glenelg North

Year	Future Step Change (10% POE MVA)

Substation: Noarlunga Centre 66/11kV

Region: Metro South

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	24.2	20.3	17.1	19.2	18.7
	MVAr	9.6	8.2	7.3	7.7	7.8
	MVA	26.1	21.9	18.6	20.7	20.3
	PF	0.93	0.93	0.92	0.93	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	15.3	15.7	15.8	12.5	13.3
	MVAr	4.7	4.3	5.8	4.3	4.0
	MVA	16.0	16.3	16.9	13.2	13.9
	PF	0.96	0.96	0.94	0.95	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	16.6	16.4	16.1	15.8	15.6	
	MVAr	6.9	6.8	6.7	6.6	6.5	
	MVA	18.0	17.7	17.4	17.1	16.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	28.3	28.3	28.3	28.3	28.3	
	50% POE Forecast						
	MW	15.2	15.1	15.0	14.9	14.7	
	MVAr	6.3	6.3	6.2	6.2	6.1	
	MVA	16.5	16.4	16.2	16.1	16.0	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	21.3	21.7	22.1	22.5	22.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	-1.6MVA to Hackham

Year	Future Step Change (10% POE MVA)

Substation: North Unley 66/11kV

Region: Metro South

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	21.6	20.5	17.4	17.6	18.4
	MVAr	10.2	9.7	8.0	7.8	7.8
	MVA	23.9	22.7	19.2	19.2	20.0
	PF	0.91	0.90	0.91	0.91	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	13.6	13.3	12.4	12.0	11.4
	MVAr	5.9	5.1	4.9	3.5	3.9
	MVA	14.8	14.2	13.4	12.5	12.0
	PF	0.92	0.93	0.93	0.96	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.1	16.9	16.8	16.6	16.4	
	MVAr	7.5	7.4	7.4	7.3	7.2	
	MVA	18.7	18.5	18.3	18.1	17.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	25.4	25.4	25.4	25.4	25.4	
	50% POE Forecast						
	MW	15.2	15.0	14.9	14.7	14.5	
	MVAr	6.7	6.6	6.5	6.5	6.4	
	MVA	16.6	16.4	16.3	16.1	15.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	13.5	13.5	13.5	13.5	13.5	
	Transfer Capacity (MVA)	5.7	5.8	5.9	6.0	6.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	-1.5MVA to Kingswood

Year	Future Step Change (10% POE MVA)

Substation: Oaklands 66/11kV

Region: Metro South

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 48 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	43.5	44.3	37.9	40.4	46.0
	MVAr	12.7	11.2	8.0	9.0	10.1
	MVA	45.3	45.7	38.7	41.4	47.1
	PF	0.96	0.97	0.98	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	29.7	31.5	30.2	31.4	29.1
	MVAr	2.9	3.3	2.8	0.0	1.6
	MVA	29.8	31.6	30.3	31.4	29.2
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	41.6	41.7	41.7	41.7	41.7	
	MVAr	8.8	8.8	8.8	8.8	8.8	
	MVA	42.5	42.6	42.7	42.6	42.6	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	57.5	57.5	57.5	57.5	57.5	
	50% POE Forecast						
	MW	36.7	36.6	36.6	36.5	36.4	
	MVAr	7.7	7.7	7.7	7.7	7.7	
	MVA	37.5	37.4	37.4	37.3	37.2	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	30.3	30.3	30.3	30.3	30.3	
	Transfer Capacity (MVA)	18.6	18.9	19.1	19.3	19.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2011/12	+1.2MVA from Morphettville

Year	Future Step Change (10% POE MVA)

Substation: Panorama 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	21.8	23.1	20.7	21.3	24.2
	MVAr	3.0	3.0	1.4	6.8	6.7
	MVA	22.0	23.3	20.7	22.4	25.1
	PF	0.99	0.99	1.00	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	16.2	16.8	15.4	16.8	17.1
	MVAr	4.8	5.2	4.2	4.0	3.5
	MVA	16.9	17.6	16.0	17.2	17.5
	PF	0.96	0.96	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	22.6	22.7	22.8	22.8	22.8	
	MVAr	5.5	5.6	5.6	5.6	5.6	
	MVA	23.3	23.4	23.4	23.5	23.5	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	58.2	58.2	58.2	58.2	58.2	
	50% POE Forecast						
	MW	19.7	19.8	19.9	19.9	20.0	
	MVAr	4.8	4.9	4.9	4.9	4.9	
	MVA	20.3	20.4	20.5	20.5	20.6	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	30.7	30.7	30.7	30.7	30.7	
	Transfer Capacity (MVA)	14.6	14.7	14.9	15.0	15.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	-1.1MVA to Cudmore Park
2012/13	+3.5MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Plympton 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	23.6	24.0	21.2	20.9	21.6
	MVAr	3.2	4.4	2.3	2.3	1.5
	MVA	23.8	24.4	21.4	21.1	21.7
	PF	0.99	0.98	0.99	0.99	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	17.7	22.0	15.4	19.7	16.2
	MVAr	5.8	6.6	4.2	5.9	4.3
	MVA	18.6	23.0	16.0	20.6	16.8
	PF	0.95	0.96	0.97	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.6	19.4	19.2	18.9	18.6	
	MVAr	1.9	1.9	1.9	1.8	1.8	
	MVA	19.7	19.5	19.3	19	18.7	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	28.4	28.4	28.4	28.4	28.4	
	50% POE Forecast						
	MW	17.4	17.2	17.0	16.7	16.4	
	MVAr	1.7	1.7	1.7	1.6	1.6	
	MVA	17.5	17.3	17	16.8	16.5	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	17.1	17.5	17.9	18.4	18.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+2.0MVA Customer load increase
2010/11	+3.0MVA from Glenelg North
	-2.3MVA to Keswick
2012/13	-1.3MVA to Clarence Gardens

Year	Future Step Change (10% POE MVA)

Substation: Port Noarlunga 66/11kV

Region: Metro South

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	26.3	22.8	23.3	24.0	27.1
	MVA	6.6	6.5	6.9	6.4	6.4
	MVA	27.1	23.7	24.3	24.8	27.8
	PF	0.97	0.96	0.96	0.97	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	18.7	19.0	15.9	19.3	17.8
	MVA	4.4	4.2	2.7	3.4	2.6
	MVA	19.2	19.4	16.1	19.6	18.0
	PF	0.97	0.98	0.99	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	26.2	27.0	27.8	28.6	29.3	
	MVA	7.0	7.2	7.4	7.6	7.8	
	MVA	27.1	28.0	28.8	29.6	30.3	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	63.1	63.1	63.1	63.1	63.1	
	50% POE Forecast						
	MW	23.3	24.1	24.9	25.7	26.4	
	MVA	6.2	6.4	6.6	6.8	7.1	
	MVA	24.1	24.9	25.8	26.6	27.4	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	37.0	37.0	37.0	37.0	37.0	
	Transfer Capacity (MVA)	12.7	12.4	12.1	11.8	11.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	-0.5MVA to McLaren Vale -0.7MVA to Morphett Vale East
2010/11	-5.7MVA to Hackham
2011/12	+3.1MVA from Seaford
2012/13	+2.6MVA from McLaren Flat

Year	Future Step Change (10% POE MVA)

Substation: Port Stanvac 66/11kV

Region: Metro South

Number of Feeders: 18

Number of Transformers: 3

Total Nameplate Rating (MVA): 75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.6	38.6	34.6	35.9	37.0
	MVAr	12.5	11.9	10.5	11.4	9.0
	MVA	39.6	40.4	36.2	37.7	38.1
	PF	0.95	0.96	0.96	0.95	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	28.2	33.6	29.0	28.4	30.9
	MVAr	6.4	8.4	6.0	4.5	5.6
	MVA	28.9	34.7	29.6	28.8	31.4
	PF	0.98	0.97	0.98	0.99	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	35.1	34.8	34.5	34.2	33.8	
	MVAr	10.2	10.2	10.1	10.0	9.9	
	MVA	36.5	36.2	36	35.6	35.2	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	88.6	88.6	88.6	88.6	88.6	
	50% POE Forecast						
	MW	31.8	31.4	31.0	30.5	30.1	
	MVAr	9.3	9.2	9.1	8.9	8.8	
	MVA	33.2	32.7	32.3	31.8	31.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	62.0	62.0	62.0	62.0	62.0	
	Transfer Capacity (MVA)	19.9	20.4	20.8	21.3	21.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	+5.2MVA from Sheidow Park
	+2.1MVA Customer load increase
2011/12	-4.0MVA Customer load decrease

Year	Future Step Change (10% POE MVA)

***Impact of below embedded generation removed from Actuals & excluded from Forecast:**

21MW of Diesel export generation at 11kV

Substation: Seacombe 66/11kV

Region: Metro South

Number of Feeders: 8

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.6	39.0	36.1	37.0	42.2
	MVAr	8.2	6.3	5.2	4.6	5.7
	MVA	38.5	39.5	36.5	37.3	42.6
	PF	0.98	0.99	0.99	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	25.9	28.2	27.5	30.1	29.6
	MVAr	1.0	1.1	5.9	0.0	5.5
	MVA	25.9	28.3	28.1	30.1	30.1
	PF	1.00	1.00	0.98	1.00	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	39.7	40.1	40.5	40.8	41.1	
	MVAr	5.4	5.4	5.5	5.5	5.6	
	MVA	40	40.4	40.8	41.1	41.5	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	59.2	59.2	59.2	59.2	59.2	
	50% POE Forecast						
	MW	35.0	35.2	35.4	35.5	35.7	
	MVAr	4.8	4.8	4.8	4.8	4.8	
	MVA	35.3	35.5	35.7	35.9	36	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	31.6	31.6	31.6	31.6	31.6	
	Transfer Capacity (MVA)	14.7	14.8	14.9	15.0	15.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+0.7MVA from Sheidow Park
2010/11	-2.0MVA to Tonsley Park
2011/12	+3.8MVA from Sheidow Park

Year	Future Step Change (10% POE MVA)

Substation: Seaford 66/11kV

Region: Metro South

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	11.3	11.1	7.8	7.4	7.0
	MVAr	4.5	4.6	2.8	2.2	2.5
	MVA	12.2	12.0	8.3	7.8	7.4
	PF	0.93	0.93	0.94	0.96	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	7.6	8.8	6.6	6.6	5.4
	MVAr	1.7	1.8	1.6	1.3	0.8
	MVA	7.8	9.0	6.8	6.7	5.4
	PF	0.98	0.98	0.97	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.3	6.4	6.6	6.6	6.7	
	MVAr	2.8	2.8	2.9	2.9	2.9	
	MVA	6.9	7.0	7.2	7.3	7.4	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	15.8	15.8	15.8	15.8	15.8	
	50% POE Forecast						
	MW	5.4	5.6	5.9	6.1	6.3	
	MVAr	2.4	2.5	2.6	2.7	2.8	
	MVA	5.9	6.2	6.4	6.7	6.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	10.9	10.6	10.2	10.0	9.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+1.0MVA from Aldinga
2010/11	-1.0MVA to Aldinga
2011/12	-3.1MVA to Port Noarlunga

Year	Future Step Change (10% POE MVA)

Substation: Sheidow Park 66/11kV

Region: Metro South

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	29.1	28.4	20.8	22.1	24.9
	MVAr	10.4	10.0	3.8	0.7	0.0
	MVA	30.9	30.1	21.2	22.2	24.9
	PF	0.94	0.94	0.98	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	22.7	14.9	19.0	17.9	16.7
	MVAr	5.0	2.7	3.7	0.6	2.4
	MVA	23.2	15.1	19.3	17.9	16.9
	PF	0.98	0.98	0.98	1.00	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	22.6	22.6	22.6	22.6	22.6	
	MVAr	2.4	2.4	2.4	2.4	2.4	
	MVA	22.7	22.7	22.7	22.7	22.7	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	35.0	35.0	35.0	35.0	35.0	
	50% POE Forecast						
	MW	19.8	19.9	20.1	20.2	20.4	
	MVAr	2.1	2.1	2.2	2.2	2.2	
	MVA	19.9	20.1	20.2	20.4	20.5	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	18.6	18.6	18.6	18.6	18.6	
	Transfer Capacity (MVA)	10.5	10.5	10.5	10.5	10.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+3.7MVA from Happy Valley
	-5.2MVA to Port Stanvac
	-0.7MVA to Seacombe
2011/12	-1.5MVA Installed 6MVAr Cap Bank
	-3.8MVA to Seacombe

Year	Future Step Change (10% POE MVA)

Substation: Tonsley Park 66/11kV

Region: Metro South

Number of Feeders: 6

Number of Transformers: 3

Total Nameplate Rating (MVA): 30 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	27.8	19.7	19.4	20.5	20.5
	MVAr	16.0	9.3	7.9	8.4	8.2
	MVA	32.1	21.8	20.9	22.2	22.1
	PF	0.87	0.90	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	13.5	14.6	12.5	15.1	14.7
	MVAr	5.7	5.0	4.7	4.0	2.5
	MVA	14.7	15.4	13.4	15.6	14.9
	PF	0.92	0.95	0.94	0.97	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.6	19.5	19.4	19.2	19.1	
	MVAr	7.9	7.9	7.9	7.8	7.8	
	MVA	21.1	21.0	20.9	20.8	20.6	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	40.1	40.1	40.1	40.1	40.1	
	50% POE Forecast						
	MW	17.4	17.2	17.0	16.9	16.7	
	MVAr	7.1	7.0	6.9	6.8	6.8	
	MVA	18.8	18.6	18.4	18.2	18.0	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	28.9	28.9	28.9	28.9	28.9	
	Transfer Capacity (MVA)	9.2	9.4	9.6	9.8	10.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	+2.0MVA from Seacombe
2011/12	+3.8MVA from Ascot Park

Year	Future Step Change (10% POE MVA)

***Forecast excludes additional 11MVA of load reserved for the redevelopment of the former Mitsubishi site at Clovelly Park.**

Substation: Willunga 66/11kV

Region: Metro South

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	5.2	4.3	3.9	4.1	4.7
	MVAr	2.6	1.6	1.6	1.8	1.9
	MVA	5.8	4.6	4.3	4.5	5.1
	PF	0.90	0.94	0.93	0.92	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	3.4	3.9	3.5	3.7	3.7
	MVAr	0.0	0.6	0.6	0.5	0.5
	MVA	3.4	4.0	3.6	3.7	3.7
	PF	1.00	0.99	0.99	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	4.0	3.9	3.9	3.8	3.8	
	MVAr	1.7	1.6	1.6	1.6	1.6	
	MVA	4.3	4.3	4.2	4.2	4.1	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	6.7	6.7	6.7	6.7	6.7	
	50% POE Forecast						
	MW	3.5	3.4	3.4	3.3	3.3	
	MVAr	1.5	1.4	1.4	1.4	1.4	
	MVA	3.8	3.7	3.7	3.6	3.6	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.9	0.9	0.9	0.9	0.9	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Willunga 66/33kV

Region: Metro South

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 7.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.6	2.8	2.0	2.4	2.8
	MVAr	3.4	1.1	0.7	0.9	0.9
	MVA	7.4	3.0	2.2	2.6	2.9
	PF	0.89	0.93	0.95	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	4.2	2.2	2.3	1.9	2.2
	MVAr	1.7	0.3	0.4	0.4	0.3
	MVA	4.6	2.2	2.3	2.0	2.2
	PF	0.93	0.99	0.99	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.6	2.6	2.7	2.7	2.8	
	MVAr	0.8	0.9	0.9	0.9	0.9	
	MVA	2.7	2.8	2.8	2.9	2.9	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	10.6	10.6	10.6	10.6	10.6	
	50% POE Forecast						
	MW	2.2	2.3	2.3	2.4	2.4	
	MVAr	0.7	0.7	0.8	0.8	0.8	
	MVA	2.3	2.4	2.5	2.5	2.6	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	3.0	2.9	2.9	2.8	2.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.5MVA from Port Noarlunga
2010/11	-4.5MVA to McLaren Flat
2011/12	-1.3MVA to McLaren Flat

Year	Future Step Change (10% POE MVA)

8.6.3 Southern Suburbs Non-SCADA Substations 10% POE Forecast

				2014/2015	2015/2016	2016/2017	2017/2018	2018/19
Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Valente	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1

System Limitations: Nil

8.6.4 Southern Suburbs 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Willunga							
Willunga	McLaren Vale	10.5	3.4	3.5	3.6	3.6	3.7

System Limitations: Nil

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

8.7 Adelaide Central Region (Central Business District) Regional Development Plan

The ACR

The SA Power Networks' ACR includes the area east of West Terrace, north of South Terrace, west of East Terrace, and south of the River Torrens and contains the Adelaide CBD.

The ACR is meshed within the Eastern Suburbs sub-transmission network system, supplied via East Terrace and City West connection points, with other sub-transmission lines supplying the ACR emanating from Magill and Northfield Connection Points.

SA Power Networks' Distribution Network

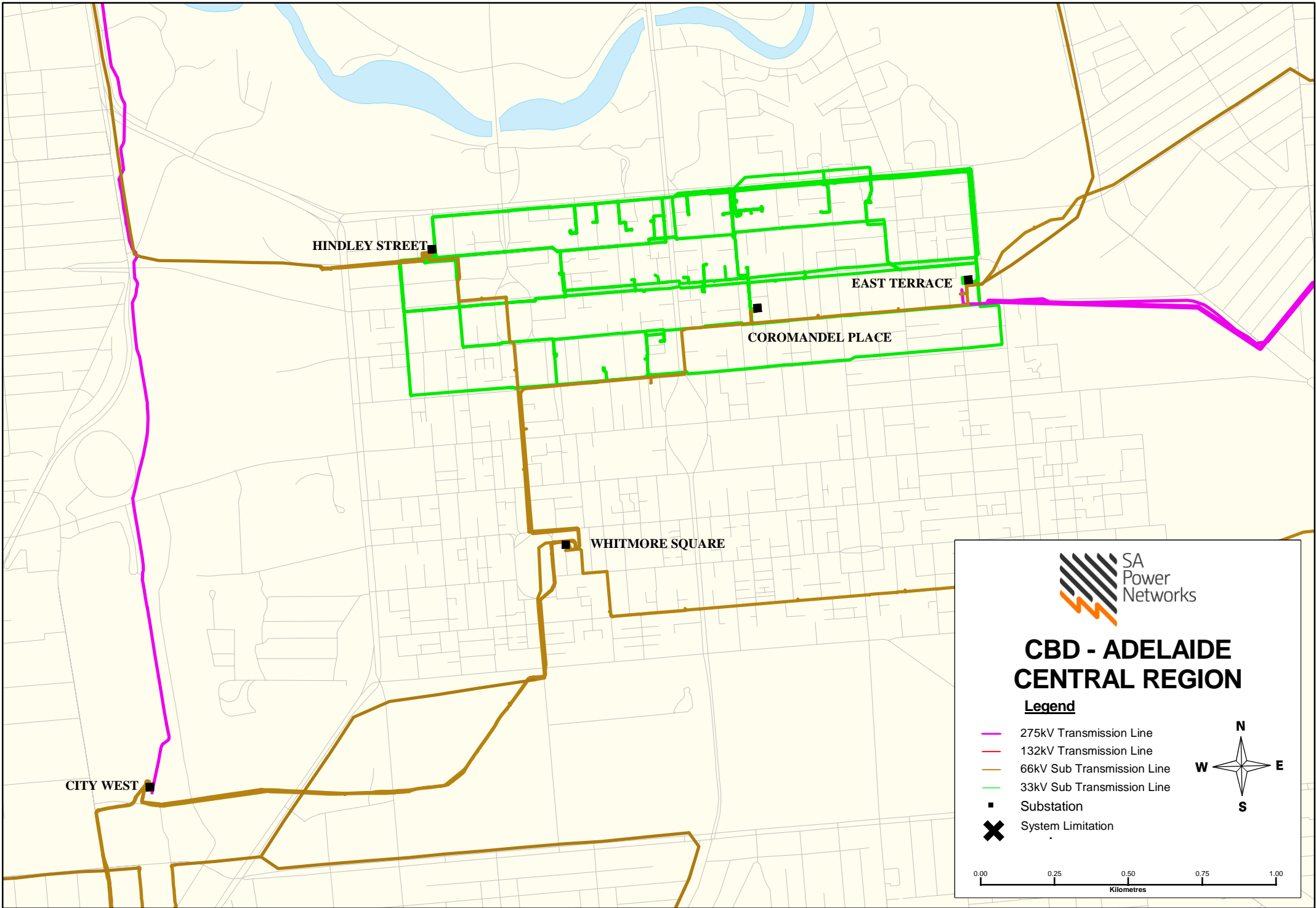
Electricity is supplied throughout the ACR via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 11,000 Volts or 33,000 Volts.

Customers are supplied from SA Power Networks' distribution system via 33kV and 11kV feeders, which are connected to distribution substations. The ACR feeder system is characterised by cables installed within an extensive duct and manhole system. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a Zone Substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Adelaide Central Region in the next two years.

8.7.1 ACR SCADA Substations

Source Connection Point	Associated SCADA Substations
ACR Meshed 66kV Network: <ul style="list-style-type: none"> • City West – ACR • East Tce 	<ul style="list-style-type: none"> • Coromandel Place • East Tce 11kV • East Tce 33kV • Hindley Street 11kV • Hindley Street 33kV • Whitmore Square



HINDLEY STREET

EAST TERRACE

COROMANDEL PLACE

WHITMORE SQUARE

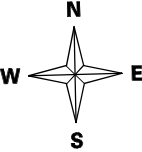
CITY WEST



CBD - ADELAIDE CENTRAL REGION

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- System Limitation



Substation: Adelaide Central Region 275/66kV

Region: ACR

(ETC) Transmission Category: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 525 MVA

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	205	202	199	196	193	
	MVAr	50	64	63	63	62	
	MVA	210	211	209	206	203	
	PF	0.97	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	270	270	270	270	270	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		13				

Substation: Coromandel Place 66/11kV

Region: ACR

Number of Feeders: 27

Number of Transformers: 3

Total Nameplate Rating (MVA): 75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	47.5	48.2	43.7	50.1	50.6
	MVAr	19.3	18.7	17.0	18.1	17.6
	MVA	51.3	51.7	46.9	53.2	53.6
	PF	0.93	0.93	0.93	0.94	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	29.4	29.9	34.4	29.6	30.9
	MVAr	11.5	9.7	12.5	9.2	9.5
	MVA	31.5	31.5	36.6	31.0	32.3
	PF	0.93	0.95	0.94	0.96	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	51.6	50.9	50.2	49.5	48.8
	MVAr	18.9	18.7	18.4	18.2	17.9
	MVA	54.9	54.2	53.5	52.7	52.0
	PF	0.94	0.94	0.94	0.94	0.94
	Firm Delivery Capacity (MVA)	74.0	74.0	74.0	74.0	74.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)Hrs	13				

Year	Former Step Change (MVA)
2009/10	+1.2MVA from Whitmore Square
	+0.6MVA from East Tce 33kV
	+0.4MVA from Hindley St 33kV
2010/11	+0.6MVA from East Tce 33kV
	+0.4MVA from Hindley St 33kV
2011/12	+0.6MVA from East Tce 33kV
	+0.4MVA from Hindley St 33kV
2012/13	+4.3MVA Customer Load Increase

Year	Future Step Change (10% POE MVA)

Substation: East Terrace 66/11kV

Region: ACR

Number of Feeders: 28

Number of Transformers: 3

Total Nameplate Rating (MVA): 63 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	46.8	47.1	41.3	44.0	43.1
	MVAR	7.9	8.9	5.8	4.4	3.7
	MVA	47.4	47.9	41.7	44.2	43.2
	PF	0.99	0.98	0.99	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	26.1	29.1	32.5	26.6	26.6
	MVAR	11.8	10.7	12.7	8.7	9.0
	MVA	28.6	31.0	34.9	28.0	28.1
	PF	0.91	0.94	0.93	0.95	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	44.1	43.5	42.9	42.2	41.6
	MVAR	4.8	13.7	13.7	13.6	13.5
	MVA	44.4	45.6	45.0	44.3	43.7
	PF	0.99	0.95	0.95	0.95	0.95
	Firm Delivery Capacity (MVA)	55.6	55.6	55.6	55.6	55.6
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)Hrs	13				

Year	Former Step Change (MVA)
2009/10	+1.0MVA from Whitmore Square

Year	Future Step Change (10% POE MVA)
2015/16	9MVAR Cap Bank to be removed

Substation: East Terrace & Hindley Street 66/33kV

Region: ACR

Number of Feeders: 17

Number of Transformers: 3

Total Nameplate Rating (MVA): 75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	29.2	28.0	25.3	24.1	23.0
	MVAr	13.6	13.5	9.4	8.3	8.9
	MVA	32.2	31.1	27.0	25.5	25.1
	PF	0.95	0.94	0.95	0.97	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	22.7	20.3	20.6	17.8	15.8
	MVAr	6.5	11.0	10.7	4.7	7.9
	MVA	23.6	23.1	23.2	18.4	17.9
	PF	0.96	0.88	0.89	0.97	0.88

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	23.8	23.5	23.2	22.9	22.5
	MVAr	9.5	9.3	9.2	9.1	9
	MVA	26	25.7	25.4	25	24.6
	PF	0.92	0.91	0.91	0.92	0.91
	Firm Delivery Capacity (MVA)	50.0	50.0	50.0	50.0	50.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)Hrs	13				

Year	Former Step Change (MVA)
2009/10	-0.6MVA to Coromandel Place
2010/11	-0.6MVA to Coromandel Place
2011/12	-0.6MVA to Coromandel Place

Year	Future Step Change (10% POE MVA)

Substation: Hindley Street 66/11kV

Region: ACR

Number of Feeders: 26

Number of Transformers: 3

Total Nameplate Rating (MVA): 63 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	42.9	41.1	40.4	39.7	41.7
	MVAr	19.5	18.2	7.0	5.9	5.7
	MVA	47.1	44.9	41.0	40.1	42.1
	PF	0.91	0.91	0.99	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	25.9	27.5	29.0	26.0	25.4
	MVAr	9.9	10.9	11.2	5.7	5.1
	MVA	27.8	29.6	31.1	26.6	25.9
	PF	0.93	0.93	0.93	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	42.5	41.8	41.3	40.7	40.1
	MVAr	6.6	6.5	6.4	6.3	6.2
	MVA	43.0	42.4	41.8	41.2	40.6
	PF	0.99	0.99	0.99	0.99	0.99
	Firm Delivery Capacity (MVA)	53.8	53.8	53.8	53.8	53.8
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)Hrs	13				

Year	Former Step Change (MVA)
2009/10	+1.0MVA from Whitmore Square
2011/12	+1.5MVA Customer Load Increase
	9MVAr Capacitor Bank Installed

Year	Future Step Change (10% POE MVA)

Substation: Whitmore Square 66/11kV

Region: ACR

Number of Feeders: 24

Number of Transformers: 3

Total Nameplate Rating (MVA): 63 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	43.8	44.7	40.2	42.6	41.8
	MVAR	13.9	11.0	9.9	10.0	8.5
	MVA	45.9	46.1	41.4	43.8	42.7
	PF	0.95	0.97	0.97	0.97	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	28.7	27.6	25.0	28.3	26.1
	MVAR	10.9	10.1	9.9	9.0	7.7
	MVA	30.7	29.4	26.9	29.7	27.2
	PF	0.93	0.94	0.93	0.95	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	42.5	41.9	41.3	40.6	40
	MVAR	9.8	15.6	15.5	15.3	15.2
	MVA	43.7	44.7	44.1	43.4	42.8
	PF	0.97	0.94	0.94	0.94	0.93
	Firm Delivery Capacity (MVA)	51.6	51.6	51.6	51.6	51.6
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)Hrs	13				

Year	Former Step Change (MVA)
2009/10	-1.2MVA to Coromandel Place
	-1.0MVA to East Terrace 11kV
	-1.0MVA to Hindley Street 11kV

Year	Future Step Change (10% POE MVA)
2015/16	6MVAR Cap Bank to be removed

8.8 Eyre Peninsula Regional Development Plan

The Eyre Peninsula Region

The SA Power Networks' Eyre Peninsula region includes the region south of Cleve and Wudinna, and west to Ceduna. Connection Points are located at Port Lincoln, Whyalla, Wudinna, and Yadnarie substations.

SA Power Networks' Distribution Network

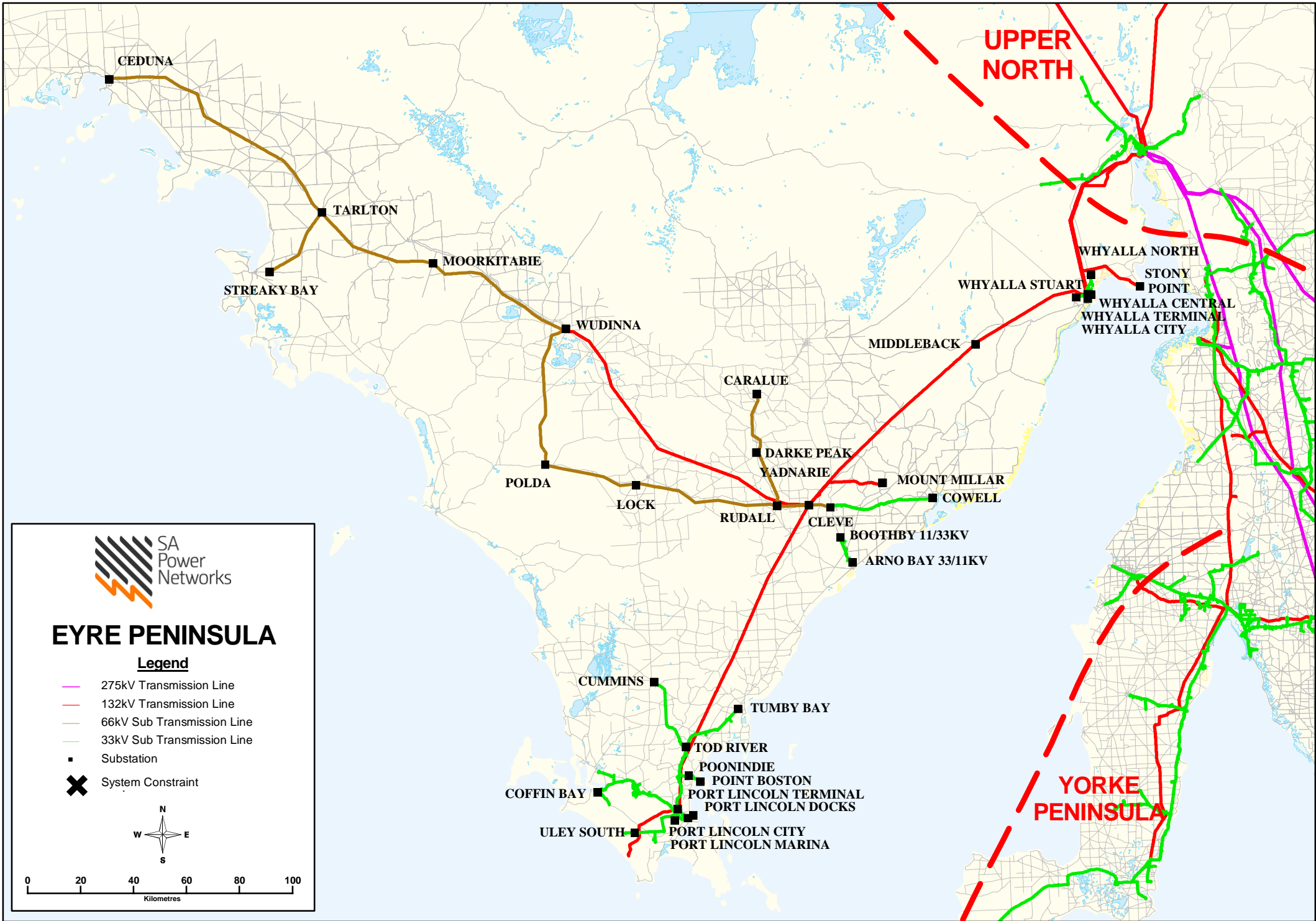
Electricity is supplied to the various towns and localities throughout the Eyre Peninsula region via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 11,000 Volts or 33,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks distribution system via 11kV and 19kV primary distribution feeders, which are connected to distribution substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Eyre Peninsula Region in the next two years.

8.8.1 Eyre Peninsula SCADA Substations

Source Connection Point	Associated SCADA Substation
Port Lincoln Terminal	<ul style="list-style-type: none"> • Coffin Bay • Cummins • Point Boston • Poonindie • Port Lincoln City • Port Lincoln Docks • Port Lincoln Marina • Tumby Bay • Little Swamp • Uley South
Whyalla Central	<ul style="list-style-type: none"> • Whyalla City • Whyalla Stuart
Wudinna	<ul style="list-style-type: none"> • Ceduna • Streaky Bay • Wudinna 11kV
Yadnarie	<ul style="list-style-type: none"> • Arno Bay • Caralue • Cleve 11kV • Cleve 33kV • Cowell



UPPER NORTH

YORKE PENINSULA



SA
Power
Networks

EYRE PENINSULA

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- ✕ System Constraint



Substation: Port Lincoln Terminal 132/33kV

Region: Eyre Peninsula

(ETC) Transmission Category: 3

Number of Transformers: 3

Total Nameplate Rating (MVA): 75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	37.8	39.7	29.4	34.9	32.4
	MVAr	15.8	19.2	10.7	11.5	8.0
	MVA	41.0	44.1	31.3	36.7	33.3
	PF	0.92	0.90	0.94	0.95	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	29.5	31.8	32.3	32.9	31.8
	MVAr	6.3	6.7	6.1	2.8	5.0
	MVA	30.2	32.5	32.9	33.0	32.2
	PF	0.98	0.98	0.98	1.00	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	33.4	33.3	33.1	33.1	33.1
	MVAr	10.4	10.3	10.3	10.3	10.3
	MVA	34.9	34.9	34.7	34.7	34.6
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	64.0	64.0	64.0	64.0	64.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Whyalla Central 132/33kV

Region: Eyre Peninsula

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 240 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	91.3	91.9	83.6	66.4	71.1
	MVAr	44.2	44.5	29.8	22.3	20.6
	MVA	101.4	102.1	88.7	70.0	74.0
	PF	0.90	0.90	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	68.2	78.0	80.0	68.9	69.1
	MVAr	28.0	30.3	38.2	31.8	24.7
	MVA	73.7	83.7	88.7	76.0	73.4
	PF	0.92	0.93	0.90	0.91	0.94

Forecast*

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	73.5	73.4	73.3	73.2	73.1
	MVAr	29.2	29.2	29.5	29.4	29.7
	MVA	79.1	79.0	79.0	78.9	78.9
	PF	0.93	0.93	0.93	0.93	0.93
	Firm Delivery Capacity (MVA)	120	120	120	120	120
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Customer embedded generation included in forecast on the 10%POE basis.

Substation: Wudinna 132/66kV

Region: Eyre Peninsula

(ETC) Transmission Category: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	15.4	15.7	14.2	14.1	15.3
	MVAr	2.2	2.2	2.0	2.0	0.7
	MVA	15.6	15.8	14.3	14.2	15.3
	PF	0.99	0.99	0.99	0.99	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	9.6	10.5	10.9	10.7	10.2
	MVAr	1.4	1.5	1.6	3.1	3.7
	MVA	9.7	10.7	11.0	11.1	10.9
	PF	0.99	0.99	0.99	0.96	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	13.9	13.8	13.6	13.5	13.3
	MVAr	0.4	0.4	0.4	0.4	0.4
	MVA	13.9	13.8	13.6	13.5	13.3
	PF	1.00	1.00	1.00	1.00	1.00
	Firm Delivery Capacity (MVA)	25	25	25	25	25
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Yadnarie 132/66kV

Region: Eyre Peninsula

(ETC) Transmission Category: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 40 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	11.5	9.5	7.7	8.0	8.2
	MVAr	0.9	0.2	0.0	1.4	1.3
	MVA	11.5	9.5	7.7	8.1	8.3
	PF	1.00	1.00	1.00	0.98	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	7.1	7.4	6.3	6.8	5.8
	MVAr	5.0	2.8	2.4	3.1	4.0
	MVA	8.6	7.9	6.7	6.1	7.0
	PF	0.82	0.94	0.93	0.89	0.82

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	7.8	7.8	7.8	7.8	7.9
	MVAr	1.2	1.2	1.2	1.2	1.2
	MVA	7.9	7.9	7.9	7.9	8.0
	PF	0.99	0.99	0.99	0.99	0.99
	Firm Delivery Capacity (MVA)	27.4	27.4	27.4	27.4	27.4
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Arno Bay 33/11kV

Region: Eyre Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.0	1.0	1.0	0.9	0.8
	MVAr	0.4	0.4	0.4	0.3	0.3
	MVA	1.1	1.1	1.1	1.0	0.8
	PF	0.93	0.93	0.93	0.95	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	0.7	0.8	0.7	0.8	0.7
	MVAr	0.3	0.3	0.3	0.1	0.3
	MVA	0.7	0.9	0.8	0.8	0.7
	PF	0.93	0.93	0.93	0.99	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.8	0.8	0.7	0.7	0.7	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	0.8	0.8	0.8	0.8	0.8	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.9	0.9	0.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.3MVA Customer load increase

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Caralue 66/11kV

Region: Eyre Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.3	2.5	2.1	2.2	2.1
	MVAr	0.0	0.0	0.5	0.4	0.4
	MVA	2.3	2.5	2.1	2.2	2.1
	PF	1.00	1.00	0.97	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	1.9	2.2	2.2	2.2	2.1
	MVAr	0.7	0.7	0.5	0.7	0.8
	MVA	2.0	2.3	2.2	2.3	2.3
	PF	0.94	0.95	0.98	0.95	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.4	2.4	2.3	2.3	2.3	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	2.5	2.4	2.4	2.4	2.3	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	3.3	3.3	3.3	3.3	3.3	
	50% POE Forecast						
	MW	2.2	2.2	2.2	2.2	2.2	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	2.3	2.3	2.3	2.3	2.3	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Ceduna 66/11kV

Region: Eyre Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	7.1	6.5	6.4	6.5	7.2
	MVAr	3.2	1.3	1.6	1.1	1.6
	MVA	7.8	6.6	6.5	6.6	7.4
	PF	0.91	0.98	0.97	0.99	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	4.9	5.4	6.0	5.8	5.5
	MVAr	1.3	1.4	0.3	0.2	0.0
	MVA	5.0	5.6	6.0	5.8	5.5
	PF	0.97	0.97	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	7.2	7.1	7.0	6.9	6.8	
	MVAr	1.3	1.3	1.3	1.3	1.2	
	MVA	7.3	7.2	7.1	7.0	6.9	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	14.2	14.2	14.2	14.2	14.2	
	50% POE Forecast						
	MW	6.4	6.3	6.2	6.1	6.0	
	MVAr	1.2	1.1	1.1	1.1	1.1	
	MVA	6.5	6.4	6.3	6.2	6.1	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	7.5	7.5	7.5	7.5	7.5	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.4MVA Customer load increase
2010/11	Capacitor Bank restored to service

Year	Future Step Change (10% POE MVA)

Substation: Cleve 66/33kV

Region: Eyre Peninsula

Number of Feeders: 0

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	2.6	2.2	2.4	2.7
	MVAr	N/A	0.4	0.1	0.2	0.5
	MVA	N/A	2.6	2.2	2.4	2.8
	PF	N/A	0.99	1.00	1.00	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	1.8	1.6	1.8	1.7
	MVAr	N/A	0.2	0.1	0.2	0.3
	MVA	N/A	1.8	1.6	1.8	1.7
	PF	N/A	0.99	1.00	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.2	2.3	2.3	2.3	2.3	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	2.3	2.3	2.3	2.3	2.3	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	17.8	17.8	17.8	17.8	17.8	
	50% POE Forecast						
	MW	1.9	1.8	1.7	1.7	1.6	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	1.9	1.8	1.7	1.7	1.6	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	5.7	5.9	6.2	6.5	6.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+2.4MVA from Cleve 11kV

Year	Future Step Change (10% POE MVA)

Substation: Cleve 66/11kV

Region: Eyre Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.3	3.2	2.7	2.7	2.7
	MVAr	2.6	1.4	1.1	1.2	0.9
	MVA	6.8	3.5	2.9	2.9	2.9
	PF	0.92	0.91	0.92	0.92	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	4.3	2.6	2.2	2.3	2.2
	MVAr	0.0	0.6	0.7	0.4	0.3
	MVA	4.3	2.7	2.3	2.3	2.2
	PF	1.00	0.98	0.96	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.5	2.6	2.6	2.6	2.7	
	MVAr	1.0	1.0	1.0	1.1	1.1	
	MVA	2.7	2.8	2.8	2.8	2.9	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	6.5	6.5	6.5	6.5	6.5	
	50% POE Forecast						
	MW	2.3	2.4	2.5	2.6	2.6	
	MVAr	0.9	1.0	1.0	1.0	1.0	
	MVA	2.5	2.6	2.7	2.8	2.8	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

5Year	Former Step Change (MVA)
2009/10	-2.4MVA to Cleve 33kV

Year	Future Step Change (10% POE MVA)

Substation: Coffin Bay 33/11kV

Region: Eyre Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.5	1.5	1.7	1.6	1.4
	MVAr	0.6	0.6	0.8	0.4	0.4
	MVA	1.6	1.6	1.9	1.7	1.5
	PF	0.93	0.93	0.89	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	0.9	0.9	1.0	1.0	0.9
	MVAr	0.2	0.1	0.2	0.4	0.1
	MVA	0.9	0.9	1.0	1.0	0.9
	PF	0.98	0.99	0.97	0.94	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.3	1.3	1.3	1.2	1.2	
	MVAr	0.4	0.4	0.4	0.4	0.3	
	MVA	1.4	1.4	1.3	1.3	1.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	2.7	2.7	2.7	2.7	2.7	
	50% POE Forecast						
	MW	1.1	1.1	1.1	1.0	1.0	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	1.2	1.1	1.1	1.1	1.0	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Cowell 33/11kV

Region: Eyre Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.5	2.9	2.4	2.0	2.2
	MVAr	0.7	1.1	0.2	0.4	0.4
	MVA	2.6	3.1	2.4	2.1	2.2
	PF	0.96	0.94	1.00	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	1.4	1.6	1.7	1.6	1.5
	MVAr	0.5	0.6	0.3	0.7	0.0
	MVA	1.5	1.8	1.7	1.8	1.5
	PF	0.93	0.93	0.99	0.93	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.3	2.3	2.3	2.4	2.4	
	MVAr	0.8	0.8	0.8	0.9	0.9	
	MVA	2.4	2.5	2.5	2.5	2.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	2.0	2.1	2.2	2.2	2.3	
	MVAr	0.7	0.8	0.8	0.8	0.8	
	MVA	2.2	2.2	2.3	2.4	2.4	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Cummins 33/11kV

Region: Eyre Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.2	3.7	2.3	2.6	3.0
	MVAr	0.7	1.5	1.0	0.6	0.8
	MVA	3.3	4.0	2.5	2.7	3.1
	PF	0.98	0.93	0.91	0.98	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	2.2	2.5	2.5	2.0	2.0
	MVAr	0.9	0.6	0.5	0.3	0.5
	MVA	2.4	2.6	2.5	2.0	2.0
	PF	0.93	0.97	0.98	0.99	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.2	2.2	2.2	2.2	2.2	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	2.3	2.3	2.3	2.3	2.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	2.0	2.0	1.9	1.9	1.9	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	2.1	2.1	2.0	2.0	2.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	2.3	2.3	2.3	2.3	2.3	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.2MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Little Swamp 33/11kV

Region: Eyre Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 0.15 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.2	0.2	0.2	0.2	0.2	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.2	0.2	0.2	0.2	0.2	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	0.195	0.195	0.195	0.195	0.195	
	50% POE Forecast						
	MW	0.2	0.2	0.2	0.2	0.2	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.21	0.21	0.21	0.21	0.21	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Point Boston 33/11kV

Region: Eyre Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.1	0.9	0.8	0.8	0.8
	MVA	0.9	0.6	0.7	0.5	0.2
	MVA	1.4	1.1	1.1	0.9	0.9
	PF	0.76	0.84	0.75	0.86	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	0.8	1.0	0.9	0.8	0.7
	MVA	0.4	0.3	0.5	0.4	0.2
	MVA	0.9	1.1	1.0	0.9	0.7
	PF	0.86	0.95	0.89	0.89	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.8	0.8	0.8	0.8	0.8	
	MVA	0.3	0.3	0.3	0.3	0.3	
	MVA	0.9	0.9	0.8	0.8	0.8	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	8.0	8.0	8.0	8.0	8.0	
	50% POE Forecast						
	MW	0.8	0.8	0.8	0.8	0.8	
	MVA	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2010/11	Customer load decrease
2011/12	Customer load decrease

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Poonindie 33/11kV

Region: Eyre Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	0.5	0.5
	MVA	N/A	N/A	N/A	0.2	0.1
	MVA	N/A	N/A	N/A	0.6	0.5
	PF	N/A	N/A	N/A	0.93	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	0.5
	MVA	N/A	N/A	N/A	N/A	0.5
	MVA	N/A	N/A	N/A	N/A	0.1
	PF	N/A	N/A	N/A	N/A	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.8	0.8	0.8	0.8	0.8	
	MVA	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	2.0	2.0	2.0	2.0	2.0	
	50% POE Forecast						
	MW	0.7	0.7	0.7	0.7	0.7	
	MVA	0.2	0.2	0.2	0.2	0.2	
	MVA	0.7	0.7	0.7	0.7	0.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.5	1.5	1.5	1.5	1.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	3					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Port Lincoln City 33/11kV

Region: Eyre Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	14.7	17.3	13.5	15.7	15.2
	MVAr	4.3	5.3	4.6	4.4	3.4
	MVA	15.3	18.1	14.3	16.3	15.6
	PF	0.96	0.96	0.95	0.96	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	13.9	14.8	15.2	15.1	14.5
	MVAr	2.0	1.7	4.2	0.9	0.5
	MVA	14.1	14.9	15.7	15.1	14.5
	PF	0.99	0.99	0.96	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.7	9.6	9.5	9.4	9.4	
	MVAr	4.3	2.8	2.8	2.7	2.7	
	MVA	15.3	10.0	9.9	9.8	9.8	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	30.8	30.8	30.8	30.8	30.8	
	50% POE Forecast						
	MW	13.1	8.4	8.2	8.1	8.0	
	MVAr	3.8	2.5	2.4	2.4	2.3	
	MVA	13.7	8.8	8.6	8.5	8.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	15.4	15.4	15.4	15.4	15.4	
	Transfer Capacity (MVA)	2.1	2.1	2.2	2.2	2.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2015/16	-5.3MVA to Port Lincoln Marina

Substation: Port Lincoln Docks 33/11kV

Region: Eyre Peninsula

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.9	11.0	8.6	10.0	8.6
	MVAr	3.5	4.7	3.2	3.3	2.6
	MVA	10.5	12.0	9.2	10.5	9.0
	PF	0.94	0.92	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	8.4	9.1	10.8	10.9	10.5
	MVAr	1.5	2.5	1.5	2.4	2.2
	MVA	8.5	9.4	10.9	11.2	10.7
	PF	0.98	0.97	0.99	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.2	7.0	6.9	6.8	6.8	
	MVAr	3.0	2.3	2.3	2.2	2.2	
	MVA	9.7	7.3	7.2	7.2	7.2	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	12.3	12.3	12.3	12.3	12.3	
	50% POE Forecast						
	MW	8.3	6.2	6.1	6.0	5.9	
	MVAr	2.7	2.0	2.0	2.0	1.9	
	MVA	8.8	6.6	6.4	6.3	6.2	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	7.8	7.9	8.0	8.1	8.2	
	System Limitation (Y/N)	Y*	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		9				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2015/16	-2.3MVA to Port Lincoln Marina

*Within planning criteria risk margin

Substation: Port Lincoln Marina 33/11kV

Region: Eyre Peninsula

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	N/A	7.4	7.4	7.4	7.4	
	MVAr	N/A	1.8	1.8	1.8	1.8	
	MVA	N/A	7.6	7.6	7.6	7.6	
	PF	N/A	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	N/A	12.3	12.3	12.3	12.3	
	50% POE Forecast						
	MW	N/A	6.5	6.5	6.5	6.5	
	MVAr	N/A	2.1	2.1	2.1	2.1	
	MVA	N/A	6.8	6.8	6.8	6.8	
	PF	N/A	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	N/A	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	N/A	8.0	8.0	8.1	8.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		9				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2015/16	+2.3MVA from Port Lincoln Docks
	+5.3MVA from Port Lincoln City

Substation: Streaky Bay 66/11kV

Region: Eyre Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.8	3.2
	MVAr	N/A	N/A	N/A	1.0	0.9
	MVA	N/A	N/A	N/A	3.0	3.4
	PF	N/A	N/A	N/A	0.94	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	1.8	1.8
	MVAr	N/A	N/A	N/A	0.7	0.1
	MVA	N/A	N/A	N/A	1.9	1.8
	PF	N/A	N/A	N/A	0.93	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.0	3.0	3.0	3.0	3.0	
	MVAr	1.0	1.0	1.0	1.0	1.0	
	MVA	3.3	3.3	3.3	3.3	3.2	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	6.5	6.5	6.5	6.5	6.5	
	50% POE Forecast						
	MW	2.8	2.8	2.8	2.8	2.8	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	3.0	3.0	3.0	2.9	2.9	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Tumby Bay 33/11kV

Region: Eyre Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.6	N/A	2.6	2.4	N/A
	MVAr	0.8	N/A	0.9	0.8	N/A
	MVA	2.8	N/A	2.8	2.5	N/A
	PF	0.95	N/A	0.95	0.95	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	2.7	N/A	2.9	3.1	3.1
	MVAr	0.2	N/A	0.9	1.0	1.1
	MVA	2.7	N/A	3.0	3.3	3.3
	PF	1.00	N/A	0.95	0.95	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.5	2.5	2.5	2.5	2.6	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	2.6	2.6	2.7	2.7	2.7	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	5.4	5.4	5.4	5.4	5.4	
	50% POE Forecast						
	MW	2.2	2.2	2.3	2.3	2.3	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.3	2.4	2.4	2.4	2.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.6MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Whyalla City 33/11kV

Region: Eyre Peninsula

Number of Feeders: 7

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.8	19.9	18.0	19.0	20.2
	MVAr	7.8	6.3	0.5	3.2	0.4
	MVA	22.2	20.9	18.0	19.2	20.2
	PF	0.94	0.95	1.00	0.99	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	12.7	14.0	12.5	13.0	12.7
	MVAr	3.5	3.6	2.7	3.0	2.6
	MVA	13.2	14.4	12.8	13.3	12.9
	PF	0.96	0.97	0.98	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	20.7	20.7	20.7	20.6	20.6	
	MVAr	2.0	2.0	2.0	2.0	2.0	
	MVA	20.8	20.8	20.8	20.7	20.7	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	28.5	28.5	28.5	28.5	28.5	
	50% POE Forecast						
	MW	18.3	18.2	18.2	18.2	18.1	
	MVAr	1.8	1.8	1.8	1.8	1.8	
	MVA	18.3	18.3	18.3	18.2	18.2	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	7.0	7.0	7.0	7.0	7.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	9MVAr Capacitor Bank installed

Year	Future Step Change (10% POE MVA)

Substation: Whyalla Stuart 33/11kV

Region: Eyre Peninsula

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.0	17.8	15.3	16.7	16.6
	MVAr	5.7	6.2	5.0	4.9	4.3
	MVA	17.9	18.9	16.1	17.3	17.1
	PF	0.95	0.94	0.95	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	10.0	11.3	10.6	11.1	10.5
	MVAr	2.5	2.4	2.3	2.3	1.7
	MVA	10.2	11.6	10.8	11.3	10.6
	PF	0.97	0.98	0.98	0.98	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.4	17.2	17.1	16.9	16.8	
	MVAr	5.1	5.1	5.0	5.0	5.0	
	MVA	18.1	18.0	17.8	17.7	17.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	31.0	31.0	31.0	31.0	31.0	
	50% POE Forecast						
	MW	15.6	15.4	15.3	15.2	15.0	
	MVAr	4.6	4.5	4.5	4.5	4.4	
	MVA	16.2	16.1	15.9	15.8	15.7	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	16.6	16.6	16.6	16.6	16.6	
	Transfer Capacity (MVA)	6.9	6.9	7.0	7.0	7.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	+0.2MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Wudinna 66/11kV

Region: Eyre Peninsula

Number of Feeders: 2

Number of Transformers: 4

Total Nameplate Rating (MVA): 4 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.0	2.6
	MVAr	N/A	N/A	N/A	0.3	0.4
	MVA	N/A	N/A	N/A	2.0	2.6
	PF	N/A	N/A	N/A	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	2.2	1.6
	MVAr	N/A	N/A	N/A	0.7	0.1
	MVA	N/A	N/A	N/A	2.3	1.6
	PF	N/A	N/A	N/A	0.95	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.2	2.1	2.1	2.1	2.0	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	2.2	2.1	2.1	2.1	2.1	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	5.2	5.2	5.2	5.2	5.2	
	50% POE Forecast						
	MW	1.9	1.9	1.9	1.9	1.9	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	2.0	1.9	1.9	1.9	1.9	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	4.5	4.5	4.5	4.5	4.5	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

8.8.3 Eyre Peninsula Non-SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Darke Peak	1	1.0	1.3	0.7	0.7	0.7	0.7	0.7
Lock	1	1.0	1.3	0.9	0.9	0.9	0.9	0.9
Lock 66kV Reg		20	25.0	0.9	0.9	0.9	0.9	0.9
Moorkitabie	1	1.0	1.3	0.8	0.8	0.8	0.8	0.8
Polda	1	1.0	1.3	0.6	0.6	0.6	0.5	0.5
Rudall	1	0.5	0.7	0.1	0.1	0.1	0.1	0.1
Stony Point*	1	2.5	2.5	0.1	0.1	0.1	0.1	0.1
Tarlton	2	1.0	1.3	0.7	0.7	0.7	0.7	0.7
Uley	1	1.0	1.3	1.3	1.3	1.3	1.3	1.3

* Small Connection Point

System Limitations: Nil

8.8.4 Eyre Peninsula 66kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
66KV LINES ON EYRE PENINSULA							
YADNARIE	CLEVE	10.3	5.0	5.0	5.1	5.1	5.1
YADNARIE	RUDALL	10.3	4.4	4.4	4.4	4.4	4.3
RUDALL	DARKE PEAK	10.3	3.1	3.1	3.1	3.1	3.0
DARKE PEAK	CARALUE	10.3	2.4	2.4	2.4	2.4	2.3
RUDALL	LOCK	10.3	1.2	1.2	1.2	1.2	1.2
LOCK	POLDA	10.3	0.0	0.0	0.0	0.0	0.0
POLDA	WUDINNA	10.3	0.9	0.9	0.8	0.8	0.8
WUDINNA	MOORKITABIE	53.2	12.0	11.9	11.8	11.7	11.6
MOORKITABIE	TARLTON	53.2	11.2	11.1	11.0	10.9	10.8
TARLTON	STREAKY BAY	31.0	3.2	3.2	3.2	3.1	3.1
TARLTON	CEDUNA	53.2	7.3	7.2	7.2	7.1	7.0

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.8.5 Eyre Peninsula 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
			1	2	3	4	5
33kV lines ex Whyalla							
Whyalla Central #	Whyalla City No 1	26.5	11.2	11.2	11.1	11.1	11.1
Whyalla Central #	Whyalla City No 2	27.7	9.7	9.7	9.6	9.6	9.6
Whyalla Central #	Whyalla Stuart	27.7	18.1	18.0	17.8	17.6	17.5
Whyalla Central #	Whyalla North Tee	24.6	1.1	1.0	1.0	1.0	1.0
Whyalla North Tee	Whyalla North	12.5	1.1	1.0	1.0	1.0	1.0
# = Industrial Weathered Line							
33kV lines ex Pt Lincoln							
Pt Lincoln Terminal	Pt Lincoln City Tee	15.5	9.7	9.7	9.8	9.8	9.8
Pt Lincoln City Tee	Pt Lincoln City	40.5	0.0	0.0	0.0	0.0	0.0
Pt Lincoln Terminal	Pt Lincoln City	28.9	15.3	15.3	15.3	15.3	15.4
Pt Lincoln City Tee	Pt Lincoln Docks	40.5	9.7	9.7	9.7	9.8	9.8
Pt Lincoln Terminal	Poonindie Tee	20.3	8.1	8.1	8.1	8.1	8.2
Poonindie Tee	Todd River	20.3	6.4	6.4	6.4	6.5	6.5
Poonindie Tee	Poonindie	12.9	1.7	1.7	1.7	1.7	1.7
Poonindie	Point Boston	13.2	0.9	0.9	0.8	0.8	0.8
Todd River	Cummins	5.1	2.3	2.3	2.3	2.3	2.3
Todd River	Tumby Bay	5.1	2.6	2.7	2.7	2.7	2.7
Pt Lincoln Terminal	Uley Sth Tee	7.1	5.2	5.2	5.2	5.2	5.2
Uley Sth Tee	Uley Sth	5.1	2.4	2.5	2.5	2.5	2.5
Uley Sth Tee	Uley	5.2	2.7	2.7	2.7	2.7	2.7
Uley	Coffin Bay	5.2	1.4	1.4	1.3	1.3	1.3
33kV lines ex Cleve							
Cleve	Cowell	15	2.26	2.3	2.3	2.3	2.3
Boothby	Arno Bay	15	0.82	0.8	0.8	0.8	0.8

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.9 Upper North Regional Development Plan

Upper North Region

The SA Power Networks' Upper North region includes the Upper North areas Port Augusta and Port Pirie. Connection Points are located at Baroota, Davenport West, Leigh Creek South, Mount Gunson, Neuroodla, and the meshed connection points of Bungama & Port Pirie substations.

SA Power Networks' Distribution Network

Electricity is supplied to the various towns and localities throughout the Upper North Region via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 11,000 Volts or 33,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks' distribution system via 11kV and 19kV primary distribution feeders, which are connected to Zone Substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a Zone Substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Upper North Region in the next two years.

8.9.1 Upper North SCADA Substations

Source Connection Point	Associated SCADA Substations
Baroota	<ul style="list-style-type: none"> Bungama 11kV Booloroo Centre Wirrabara Forest
Davenport West	<ul style="list-style-type: none"> Port Augusta Pt Augusta West No. 1 Pt Augusta West No. 2 Stirling North 1 Stirling North 2
Port Pirie / Bungama	<ul style="list-style-type: none"> Jamestown Peterborough Port Broughton Port Pirie South

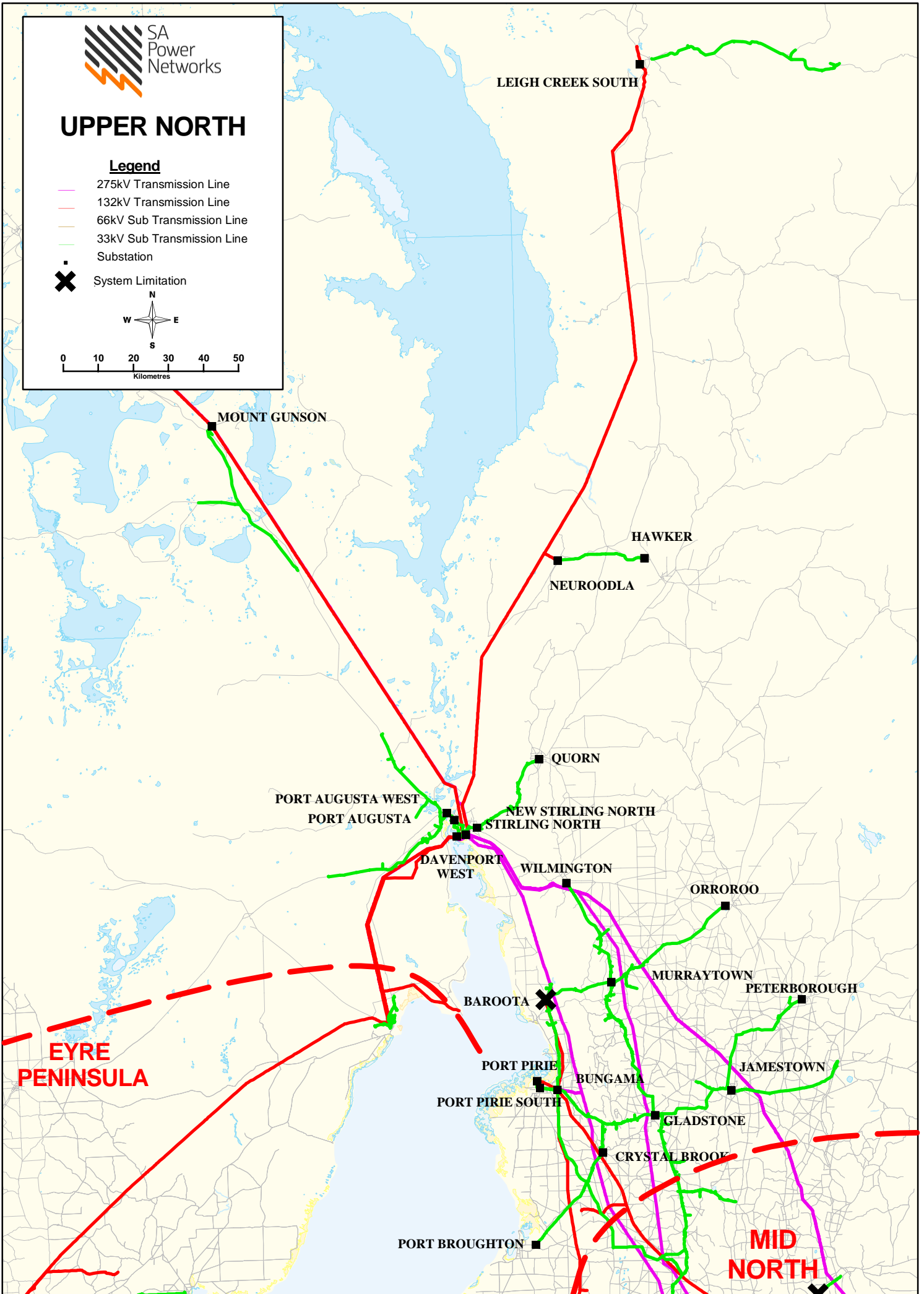
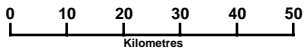


UPPER NORTH

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation

System Limitation



Substation: Baroota 132/33kV

Region: Upper North

(ETC) Transmission Category: 1, 2 in 2017

Number of Transformers: 1

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	8.7	8.5	7.3	7.7	7.8
	MVAr	2.2	1.5	1.0	1.1	0.9
	MVA	9.0	8.6	7.4	7.8	7.8
	PF	0.97	0.99	0.99	0.99	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	5.9	6.6	5.9	6.0	5.9
	MVAr	0.1	0.0	0.0	0.7	0.8
	MVA	5.9	6.6	5.9	6.0	6.0
	PF	1.00	1.00	1.00	1.00	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	7.7	7.7	7.7	7.7	7.6
	MVAr	1.0	1.0	1.0	1.0	1.0
	MVA	7.8	7.8	7.8	7.7	7.7
	PF	0.99	0.99	0.99	0.99	0.99
	Firm Delivery Capacity (MVA)	0	0	0	0	0
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*
	Hrs per annum > 95% of Peak Load (hrs)	4				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

* N-1 capacity not required by ETC until 2017

Baroota 132/33kV Connection Point

System Limitation

Baroota 132/33kV Connection Point has one 10MVA 132/33kV transformer and is located near the township of Baroota, approximately 7km north of Port Germein.

The ETC has changed the security standard for Baroota from Category 1 to Category 2 (requires N-1 Capacity) from 2017. As a consequence this Connection Point Substation will not be compliant with the ETC from 2017 onwards unless it is upgraded by both ElectraNet and SA Power Networks.

The Transmission Company (Electranet) are managing the Regulatory Test process for the Transmission Connection Point, refer to <http://www.electranet.com.au/network/current-and-planned-projects/mid-north/baroota-substation-upgrade/>

Substation: Davenport West 132/33kV

Region: Upper North

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 120 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	31.0	30.8	25.9	27.4	28.6
	MVAr	9.5	5.0	4.2	3.9	5.1
	MVA	32.4	31.2	26.2	27.7	29.0
	PF	0.96	0.99	0.99	0.99	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	19.4	22.5	19.4	19.7	19.1
	MVAr	3.1	2.7	3.9	4.0	1.8
	MVA	19.7	22.7	19.8	20.1	19.2
	PF	0.99	0.99	0.98	0.98	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	29.3	28.8	28.3	27.9	27.4
	MVAr	5.7	5.6	5.5	5.4	5.4
	MVA	29.9	29.4	28.8	28.4	28.0
	PF	0.98	0.98	0.98	0.98	0.98
	Firm Delivery Capacity (MVA)	60.0	60.0	60.0	60.0	60.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	9				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Leigh Creek South 132/33kV

Region: Upper North

(ETC) Transmission Category: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.7	1.6	1.4	1.5	1.5
	MVAr	0.1	0.5	0.5	0.5	0.4
	MVA	1.7	1.7	1.5	1.5	1.6
	PF	1.00	0.95	0.95	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	1.3	1.4	1.4	1.3	1.3
	MVAr	0.1	0.1	0.1	1.0	0.4
	MVA	1.3	1.4	1.4	1.3	1.4
	PF	1.00	1.00	1.00	1.00	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	1.5	1.5	1.5	1.5	1.5
	MVAr	0.5	0.5	0.5	0.5	0.5
	MVA	1.6	1.6	1.6	1.5	1.5
	PF	0.95	0.95	0.95	0.95	0.95
	Total Capacity (MVA)	5.0	5.0	5.0	5.0	5.0
	System Limitation (Y/N)	N	N	N	N	N
Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Mount Gunson 132/33kV

Region: Upper North

(ETC) Transmission Category: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	0.4	0.2	0.1	0.1	0.2
	MVAr	0.1	0.1	0.0	0.0	0.0
	MVA	0.4	0.2	0.2	0.2	0.2
	PF	0.99	0.95	0.98	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	0.1	0.2	0.2	0.2	0.3
	MVAr	0.1	0.1	0.1	0.0	0.2
	MVA	0.1	0.2	0.2	0.2	0.3
	PF	0.68	0.91	0.96	0.97	0.84

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	0.2	0.2	0.2	0.2	0.2
	MVAr	0.1	0.1	0.1	0.1	0.1
	MVA	0.2	0.2	0.2	0.2	0.2
	PF	0.84	0.84	0.84	0.84	0.84
	Total Capacity (MVA)	5.0	5.0	5.0	5.0	5.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	18				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Neuroodla 132/33kV

Region: Upper North

(ETC) Transmission Category: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	0.9	0.9	0.9	0.9	0.9
	MVAr	0.4	0.5	0.4	0.4	0.4
	MVA	1.0	1.1	0.9	1.0	1.0
	PF	0.90	0.90	0.90	0.90	0.90
Year		2009	2010	2011	2012	2013
Winter	MW	0.8	0.9	0.9	0.8	0.8
	MVAr	0.4	0.5	0.4	0.4	0.4
	MVA	0.9	1.0	0.9	0.9	0.9
	PF	0.90	0.90	0.90	0.90	0.90

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	0.9	0.9	0.9	0.9	0.9
	MVAr	0.4	0.4	0.4	0.4	0.4
	MVA	1.0	1.0	1.0	1.0	1.0
	PF	0.90	0.90	0.90	0.90	0.90
	Total Capacity (MVA)	5.0	5.0	5.0	5.0	5.0
	System Limitation (Y/N)	N	N	N	N	N
Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Port Pirie / Bungama 132/33kV

Region: Upper North

(ETC) Transmission Category: 4G

Number of Transformers: 3

Total Nameplate Rating (MVA): 180 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	84.9	72.0	73.5	69.6	66.6
	MVAr	26.5	25.7	19.5	13.4	12.6
	MVA	88.9	76.4	76.0	70.9	67.8
	PF	0.95	0.94	0.97	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	60.5	72.0	66.2	60.4	60.6
	MVAr	21.3	25.8	24.0	30.1	12.3
	MVA	64.1	76.5	70.4	67.5	61.9
	PF	0.94	0.94	0.94	0.90	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	55.3	55.5	70.7	70.9	71.2
	MVAr	19.7	20.0	27.3	27.6	27.7
	MVA	58.7	59.0	75.8	76.1	76.4
	PF	0.94	0.94	0.93	0.93	0.93
	Firm Delivery Capacity (MVA)	87.0*	87.0*	87.0*	87.0*	87.0*
	System Limitation (Y/N)	N	N	N	N	N

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	-15MVA temporary customer load decrease
2016/17	+15MVA customer load increase

* Includes Industrial and Rural Connection Point Capacities

Substation: Booleroo Centre 33/11kV

Region: Upper North

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.7	0.7	0.7	0.7	0.7	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.7	0.7	0.7	0.7	0.7	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.6	0.6	0.6	0.6	0.6	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.6	0.6	0.6	0.6	0.6	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)						

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Bungama 33/11kV

Region: Upper North

Number of Feeders: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.1	1.1	1.0	0.8	0.9
	MVAr	0.5	0.4	0.4	0.3	0.4
	MVA	1.2	1.1	1.1	0.9	1.0
	PF	0.93	0.93	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	0.8	0.9	0.7	0.7	N/A
	MVAr	0.3	0.4	0.3	0.3	N/A
	MVA	0.9	0.9	0.8	0.7	N/A
	PF	0.93	0.92	0.92	0.93	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.8	0.8	0.8	0.8	0.8	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	1.1	1.1	1.1	1.1	1.1	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.7	0.7	0.7	0.7	0.7	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	1.0	1.0	1.0	1.0	1.0	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	0.8	0.8	0.8	0.8	0.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Jamestown 33/11kV

Region: Upper North

Number of Feeders: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	2.8	2.1	N/A	N/A
	MVAr	N/A	1.1	0.8	N/A	N/A
	MVA	N/A	3.0	2.3	N/A	N/A
	PF	N/A	0.93	0.93	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	2.0	2.0	2.2
	MVAr	N/A	N/A	0.8	0.8	0.7
	MVA	N/A	N/A	2.2	2.2	2.3
	PF	N/A	N/A	0.93	0.93	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.0	3.0	3.0	3.0	3.0	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	3.1	3.1	3.1	3.1	3.1	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	2.7	2.7	2.7	2.7	2.7	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	2.8	2.8	2.8	2.8	2.8	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	2.3	2.3	2.3	2.3	2.3	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Peterborough 33/11kV

Region: Upper North

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.5	2.3	1.9	1.9	2.1
	MVAr	0.8	0.9	0.0	0.0	0.6
	MVA	2.6	2.5	1.9	1.9	2.2
	PF	0.95	0.93	1.00	1.00	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	2.2	2.3	2.2	2.2	2.1
	MVAr	0.5	0.4	0.0	0.0	0.3
	MVA	2.2	2.3	2.2	2.2	2.1
	PF	0.98	0.98	1.00	1.00	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.9	1.9	1.9	1.9	1.9	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	2.0	2.0	1.9	1.9	1.9	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	6.2	6.2	6.2	6.2	6.2	
	50% POE Forecast						
	MW	1.7	1.7	1.7	1.6	1.6	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.7	1.7	1.7	1.7	1.7	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Port Augusta 33/11kV

Region: Upper North

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.3	17.9	15.4	13.8	15.0
	MVAr	1.9	0.6	0.0	0.0	0.5
	MVA	17.4	17.9	15.4	13.8	15.0
	PF	0.99	1.00	1.00	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	9.6	12.2	10.8	10.2	9.5
	MVAr	0.1	0.5	4.0	3.5	1.1
	MVA	9.6	12.2	11.5	10.8	9.6
	PF	1.00	1.00	0.94	0.94	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	15.2	14.9	14.6	14.3	14.0	
	MVAr	0.9	0.8	0.8	0.8	0.8	
	MVA	15.2	14.9	14.6	14.3	14.0	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	28.4	28.4	28.4	28.4	28.4	
	50% POE Forecast						
	MW	14.0	13.7	13.4	13.1	12.8	
	MVAr	0.8	0.8	0.8	0.7	0.7	
	MVA	14.0	13.7	13.4	13.1	12.9	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	2.8	2.8	2.9	3.0	3.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2011/12	-1.8MVA to Port Augusta West

Year	Future Step Change (10% POE MVA)

Substation: Port Augusta West TF1 33/11kV

Region: Upper North

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.8	7.2	5.5	5.2	N/A
	MVAr	1.6	1.6	1.2	1.8	N/A
	MVA	7.0	7.3	5.6	5.5	N/A
	PF	0.97	0.98	0.98	0.95	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	5.3	5.5	4.9	3.8	3.8
	MVAr	0.1	0.1	0.3	1.2	0.6
	MVA	5.3	5.5	4.9	4.0	3.8
	PF	1.00	1.00	1.00	0.95	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.6	5.5	5.4	5.4	5.3	
	MVAr	1.0	1.0	1.0	1.0	1.0	
	MVA	5.7	5.6	5.5	5.5	5.4	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	14.8	14.8	14.8	14.8	14.8	
	50% POE Forecast						
	MW	5.2	5.1	5.0	4.9	4.9	
	MVAr	1.0	0.9	0.9	0.9	0.9	
	MVA	5.3	5.2	5.1	5.0	4.9	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	9.5	9.6	9.7	9.9	10.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	-3.7MVA to Port Augusta West TF2 +1.8MVA from Port Augusta

Year	Future Step Change (10% POE MVA)

Substation: Port Augusta West TF2 33/11kV

Region: Upper North

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.7	1.8
	MVAr	N/A	N/A	N/A	0.0	0.6
	MVA	N/A	N/A	N/A	2.7	1.8
	PF	N/A	N/A	N/A	1.00	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	1.1	1.1
	MVAr	N/A	N/A	N/A	0.0	0.2
	MVA	N/A	N/A	N/A	1.1	1.1
	PF	N/A	N/A	N/A	1.00	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.7	1.7	1.6	1.6	1.6	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	1.8	1.8	1.7	1.7	1.6	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	14.8	14.8	14.8	14.8	14.8	
	50% POE Forecast						
	MW	1.6	1.5	1.5	1.4	1.4	
	MVAr	0.5	0.4	0.4	0.4	0.4	
	MVA	1.6	1.6	1.5	1.5	1.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	8.1	8.4	8.6	8.9	9.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	+3.7MVA from Port Augusta West TF1

Year	Future Step Change (10% POE MVA)

Substation: Port Broughton 33/11kV

Region: Upper North

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.4	3.9	3.7	3.4	3.1
	MVAr	1.7	1.5	1.5	1.5	1.3
	MVA	4.7	4.2	4.0	3.7	3.3
	PF	0.93	0.93	0.93	0.92	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	2.3	2.4	2.1	2.4	2.0
	MVAr	0.9	0.9	0.8	1.0	0.9
	MVA	2.5	2.6	2.3	2.6	2.2
	PF	0.93	0.93	0.93	0.92	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.9	2.9	2.9	2.8	2.8	
	MVAr	1.2	1.2	1.2	1.2	1.2	
	MVA	3.2	3.2	3.1	3.1	3.1	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	5.4	5.4	5.4	5.4	5.4	
	50% POE Forecast						
	MW	2.5	2.5	2.4	2.4	2.4	
	MVAr	1.1	1.0	1.0	1.0	1.0	
	MVA	2.7	2.7	2.6	2.6	2.6	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	3					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Port Pirie South 33/11kV

Region: Upper North

Number of Feeders: 5

Number of Transformers: 3

Total Nameplate Rating (MVA): 37.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	22.8	20.4	17.2	16.4	20.8
	MVAr	9.3	8.3	7.3	6.1	7.1
	MVA	24.6	22.1	18.7	17.5	22.0
	PF	0.93	0.93	0.92	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	12.4	14.0	13.9	12.5	14.2
	MVAr	3.8	4.3	3.4	3.2	2.9
	MVA	13.0	14.6	14.3	12.9	14.4
	PF	0.96	0.96	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.9	19.7	19.5	19.2	19.0	
	MVAr	7.2	7.2	7.1	7.0	6.9	
	MVA	21.2	21.0	20.7	20.5	20.3	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	40.5	40.5	40.5	40.5	40.5	
	50% POE Forecast						
	MW	17.3	17.1	16.9	16.7	16.5	
	MVAr	6.3	6.2	6.1	6.1	6.0	
	MVA	18.4	18.2	18.0	17.7	17.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	27.7	27.7	27.7	27.7	27.7	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	+1.3MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Stirling North 1 & 2 33/11kV

Region: Upper North

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.8	2.4
	MVAr	N/A	N/A	N/A	0.5	0.6
	MVA	N/A	N/A	N/A	2.8	2.4
	PF	N/A	N/A	N/A	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	2.2	2.2
	MVAr	N/A	N/A	N/A	0.5	0.6
	MVA	N/A	N/A	N/A	2.3	2.4
	PF	N/A	N/A	N/A	0.95	0.90

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.5	2.4	2.3	2.2	2.1	
	MVAr	1.1	1.1	1.0	1.0	0.9	
	MVA	2.7	2.6	2.5	2.4	2.3	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	7.2	7.2	7.2	7.2	7.2	
	50% POE Forecast						
	MW	2.2	2.1	2.0	1.9	1.9	
	MVAr	1.0	1.0	0.9	0.9	0.8	
	MVA	2.4	2.3	2.2	2.1	2.0	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Wirrabara Forest 33/11kV

Region: Upper North

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.8	0.8	0.8	0.8	0.8	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.7	0.7	0.7	0.7	0.7	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.7	0.7	0.7	0.7	0.7	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

8.9.3 Upper North Non-SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Baroota	1	0.5	0.7	0.3	0.3	0.3	0.3	0.3
Booloroo Centre	1	1.0	1.3	0.7	0.7	0.7	0.7	0.7
Booyoolie	1	0.15	0.2	0.02	0.02	0.02	0.02	0.02
Caltowie	1	0.2	0.3	0.1	0.1	0.1	0.1	0.1
Crystal Brook	2	2.0	2.6	2.1	2.1	2.1	2.1	2.1
Fullarville	1	0.2	0.3	0.03	0.03	0.03	0.03	0.03
Gladstone	2	4.0	4.8	2.5	2.5	2.5	2.5	2.5
Gladstone 33kV Reg	1	10.0	12.5	5.8	5.8	5.8	5.8	5.8
Hawker	2	1.0	1.3	0.9	0.9	0.9	0.9	0.9
Leigh Creek South	2	5.0	6.2	1.6	1.6	1.6	1.5	1.5
Melrose	1	0.5	0.7	0.3	0.3	0.3	0.3	0.3
Murraytown Reg	1	10.0	12.5	5.4	5.4	5.4	5.3	5.3
Orroroo	2	2.0	2.6	1.5	1.5	1.5	1.5	1.5
Port Germein	1	1.0	1.3	1.1	1.1	1.1	1.1	1.1
Quorn	1	2.5	3.3	2.1	2.1	2.0	2.0	2.0

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Wilmington	2	1.0	1.3	0.8	0.8	0.8	0.8	0.8
Wirrabara Forest	1	1.0	1.3	0.8	0.8	0.8	0.8	0.8
Wirrabara South	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Wongyarra	1	0.2	0.3	0.1	0.1	0.1	0.1	0.1
Yongala	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1

System Limitations: Nil

8.9.4 Upper North 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Davenport West							
Davenport West	Stirling Nth Tee	20.1	5.8	5.5	5.3	5.2	5.1
Davenport West	Pt Augusta No1	19.9	13.9	14.9	14.9	14.9	14.9
Davenport West	Pt Augusta West Tee	19.9	13.9	11.2	10.9	10.5	10.1
Stirling Nth Tee	Stirling Nth	10.4	5.8	5.5	5.3	5.2	5.1
Stirling Nth	Quorn	3.9	2.8	2.8	2.7	2.7	2.7
Pt Augusta West Tee [#]	Pt Augusta West	20.4	13.3	10.9	10.6	10.4	10.1
Pt Augusta West Tee [#]	Pt Augusta	23	7.2	7.6	7.6	7.5	7.4
Pt Augusta West	Pandurra	3.9	3.4	3.4	3.5	3.6	3.7
[#] = Industrial Weathered Line							
33kV lines ex Baroota							
Baroota	Baroota Tee	20.3	8.9	8.8	8.8	8.8	8.7
Baroota Tee	Bungama	5.1	3.5	3.4	3.4	3.4	3.4
Baroota Tee	Murraytown Tee	9.8	5.4	5.4	5.4	5.3	5.3
Murraytown Tee	Murraytown	9.8	5.4	5.4	5.4	5.3	5.3
Murraytown	Gladstone	3.4	1.2	1.2	1.2	1.2	1.2
Murraytown	Orroroo	3.9	2.9	2.9	2.9	2.8	2.8
Murraytown	Melrose	3.4	1.4	1.4	1.3	1.3	1.3
Melrose	Wilmington	4	0.8	0.8	0.8	0.8	0.8
33kV lines ex Bungama							
Bungama [#]	Pt Pirie South	30.1	11.8	11.8	11.9	11.9	12.0
Pt Pirie South [#]	Pt Pirie	39.8	14.8	14.9	14.9	15.0	15.0
Bungama [#]	Pt Pirie	30.1	8.8	8.8	8.9	8.9	8.9
Bungama	Crystal Brook Tee	21.3	9.3	9.3	9.3	9.3	9.3
Crystal Brook Tee	Gladstone	16	9.3	9.3	9.3	9.3	9.3
Crystal Brook Tee	Crystal Brook	3.4	0.0	0.0	0.0	0.0	0.0
Gladstone	Peterborough Tee	12.5	5.8	5.8	5.8	5.8	5.8
Peterborough Tee	Jamestown	6.7	3.8	3.9	3.9	3.9	3.9
Jamestown	Terowie	3.4	0.7	0.8	0.8	0.8	0.8
Peterborough	Yongala	6.1	2.0	2.0	1.9	1.9	1.9
Yongala	Peterborough Tee	6.1	2.0	2.0	1.9	1.9	1.9
Bungama	Pt Broughton Tee	13	6.0	6.0	6.0	6.0	6.0
Pt Broughton Tee	Pt Broughton	8.9	3.2	3.2	3.1	3.1	3.1
Pt Broughton Tee	Collinsfield	6.7	0.0	0.0	0.0	0.0	0.0
Pt Broughton Tee	Crystal Brook	3.9	2.8	2.8	2.9	2.9	2.9
[#] = Industrial Weathered Line							

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.10 Barossa Regional Development Plan

The Barossa Region

The SA Power Networks' Barossa Region includes the Barossa Valley extending north to Stockwell, south to Williamstown and west to Dorrien and Lyndoch. There is one connection point in the Barossa, that being Dorrien Substation.

SA Power Networks' Distribution Network

Electricity is supplied to the various towns and localities throughout the Barossa Region via Zone Substations. These Zone Substations are operated at 33,000 Volts stepped down to 11,000 or 7,600 Volts.

Customers are supplied from SA Power Networks distribution system via 7.6kV, 11kV and 19kV primary distribution feeders, which are connected to distribution substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Barossa Region in the next two years.

8.10.1 Barossa SCADA Substations

Source Connection Point	Associated SCADA Substations
Dorrien	<ul style="list-style-type: none"> • Angaston • Barossa South • Dorrien 11kV • Lyndoch • Nuriootpa • Stockwell • Williamstown South • Gomersal North



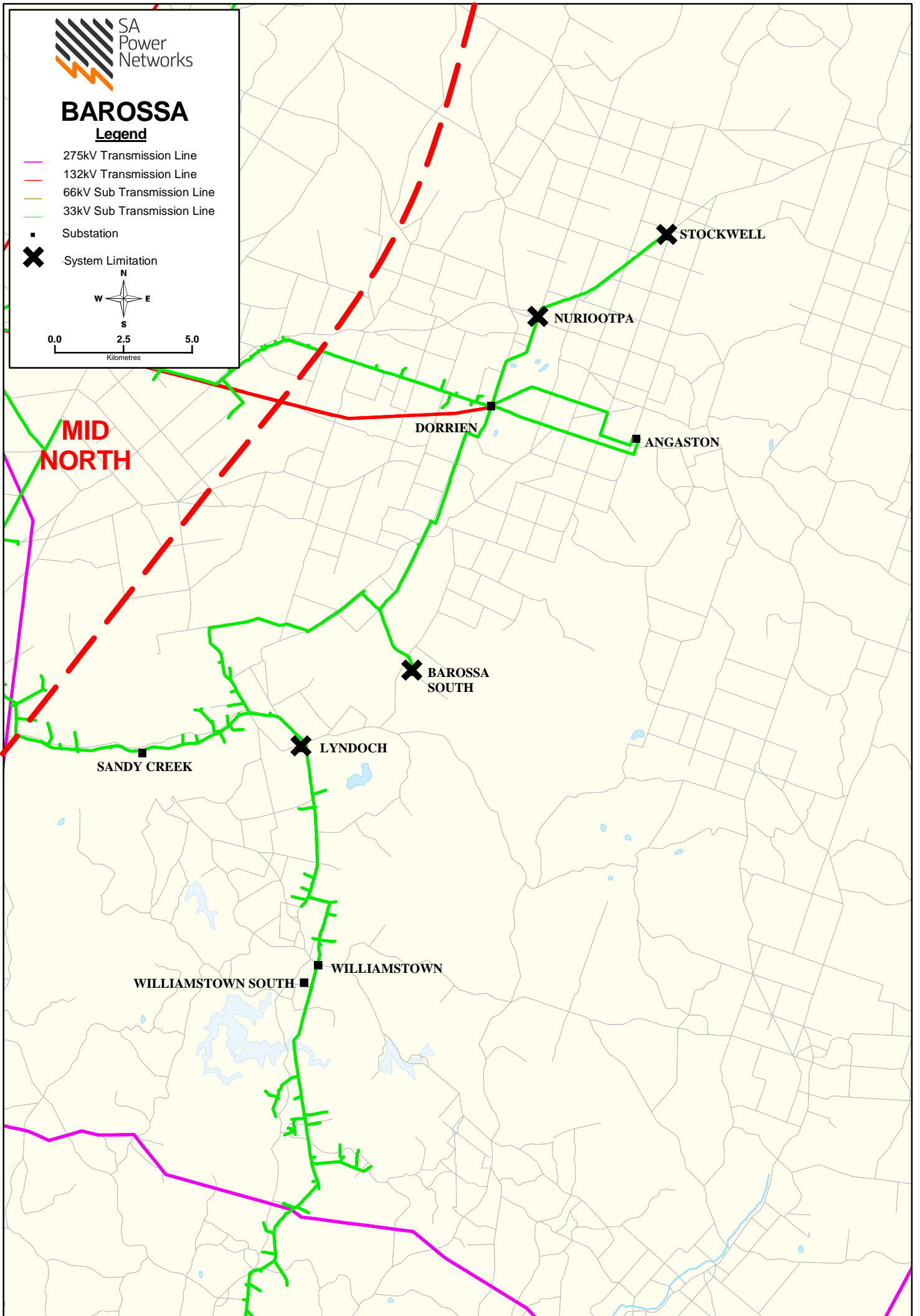
BAROSSA

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- System Limitation



0.0 2.5 5.0
Kilometres



Substation: Dorrien 132/33kV

Region: Barossa

(ETC) Transmission Category: 4

Number of Transformers: 3

Total Nameplate Rating (MVA): 180 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	57.7	52.3	55.7	57.3	56.6
	MVAr	18.6	17.1	19.3	15.8	14.4
	MVA	60.7	55.0	58.9	59.4	58.4
	PF	0.95	0.95	0.94	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	46.3	43.5	46.7	46.3	39.7
	MVAr	9.6	12.1	10.2	11.6	14.3
	MVA	47.3	45.2	47.8	47.7	42.2
	PF	0.98	0.96	0.98	0.97	0.94

Forecast*

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	59.2	59.0	58.9	58.7	58.5
	MVAr	19.2	19.1	19.0	19.0	18.9
	MVA	62.3	62.0	61.9	61.7	61.4
	PF	0.95	0.95	0.95	0.95	0.95
	Firm Delivery Capacity (MVA)	156.0	156.0	156.0	156.0	156.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

***Potential impact of below embedded generation has been removed from the above Actuals & excluded from Forecast: (i.e. generation output = 0)**

- **Approximately 50MW of export embedded diesel generation at Angaston at 33kV**

Substation: Angaston 33/11kV

Region: Barossa

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.6	21.4	18.9	18.6	19.5
	MVAr	0.0	0.0	4.8	6.2	2.3
	MVA	20.6	21.4	19.5	19.6	19.6
	PF	1.00	1.00	0.97	0.95	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	17.4	17.7	16.8	17.0	16.5
	MVAr	1.9	2.2	0.0	0.0	1.5
	MVA	17.5	17.8	16.8	17.0	16.5
	PF	0.99	0.99	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.6	19.4	19.1	18.8	18.5	
	MVAr	3.9	3.8	3.8	3.7	3.6	
	MVA	20	19.7	19.4	19.1	18.9	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	29.0	29.0	29.0	29.0	29.0	
	50% POE Forecast						
	MW	18.3	18.0	17.7	17.4	17.1	
	MVAr	3.6	3.5	3.5	3.4	3.4	
	MVA	18.7	18.4	18	17.7	17.4	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	15.2	15.2	15.2	15.2	15.2	
	Transfer Capacity (MVA)	2.8	2.9	2.9	2.9	2.9	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2011/12	+0.3MVA Customer load increase
	10MVAr Capacitor Bank out of Service
2013/14	10MVAr Capacitor Bank Reinstated

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Dorrien 33/11kV

Region: Barossa

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.1	8.5	8.5	9.4	9.0
	MVAr	4.3	3.8	0.0	1.9	0.4
	MVA	10.1	9.3	8.5	9.6	9.0
	PF	0.91	0.91	1.00	0.98	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	6.4	6.1	6.6	6.1	6.0
	MVAr	2.7	2.4	2.6	1.9	2.0
	MVA	6.9	6.5	7.1	6.4	6.3
	PF	0.92	0.93	0.93	0.95	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	10.0	10.1	10.1	10.1	10.1	
	MVAr	1.2	1.2	1.2	1.2	1.2	
	MVA	10.1	10.1	10.2	10.2	10.2	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	27.2	27.2	27.2	27.2	27.2	
	50% POE Forecast						
	MW	9.1	9.2	9.3	9.3	9.4	
	MVAr	1.1	1.1	1.1	1.1	1.1	
	MVA	9.2	9.3	9.3	9.4	9.5	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	15.3	15.3	15.3	15.3	15.3	
	Transfer Capacity (MVA)	5.5	5.4	5.4	5.3	5.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	-1.1MVA Customer load reduction
2011/12	3MVAr Capacitor Bank installed
	+0.3MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Barossa South 33/11kV

Region: Barossa

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.6	5.9	6.6	6.4	6.5
	MVAr	2.4	2.1	2.3	2.1	2.2
	MVA	7.0	6.2	7.0	6.7	6.9
	PF	0.94	0.94	0.94	0.95	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	3.8	3.8	3.9	3.8	3.4
	MVAr	1.4	1.0	0.9	0.9	0.6
	MVA	4.0	4.0	4.0	3.9	3.5
	PF	0.94	0.97	0.98	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	7.0	7.0	7.0	7.0	7.0	
	MVAr	2.4	2.4	2.4	2.5	2.5	
	MVA	7.4	7.4	7.4	7.5	7.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	8.9	8.9	8.9	8.9	8.9	
	50% POE Forecast						
	MW	6.5	6.5	6.5	6.5	6.5	
	MVAr	2.3	2.3	2.3	2.3	2.3	
	MVA	6.9	6.9	6.9	6.9	6.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.0	1.0	1.0	1.0	1.0	
	System Limitation (Y/N)	Y	Y	Y	Y	Y	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Barossa South Substation

System Limitation

Barossa South 33/11kV Substation has one 6.25MVA 33/11kV transformer and is located near the township of Rowland Flat.

In the summer of 2014/15, up to 5.9MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions considered to address the system limitation include:

- Upgrade the Barossa South Substation with a second transformer (preferred option);
- Establish a new substation nearby with new 11kV feeder ties back to Barossa South Substation; or
- Construct new 11kV feeder ties to surrounding substation to increase available transfers to existing adjacent Zone Substations.

Due to the extent of the overload during a contingent event, PF correction would not defer this system limitation. A load reduction of at least 2.9MVA would be required to defer the system limitation for a 12 month period.

A RIT-D is not expected to be required for this system limitation.

Substation: Gomersal North 33/11kV

Region: Barossa

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.3	0.3	0.3	0.3	0.3	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.3	0.3	0.3	0.3	0.3	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.3	0.3	0.3	0.3	0.3	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.3	0.3	0.3	0.3	0.3	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Lyndoch 33/11kV

Region: Barossa

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3.8 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	2.5	2.8	2.9	3.0
	MVAr	N/A	1.2	1.4	1.4	0.7
	MVA	N/A	2.7	3.1	3.2	3.1
	PF	N/A	0.90	0.90	0.90	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	1.9	1.8	2.1	2.1
	MVAr	N/A	0.9	0.9	1.0	1.0
	MVA	N/A	2.1	2.0	2.3	2.3
	PF	N/A	0.90	0.90	0.90	0.90

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.4	3.4	3.4	3.5	3.5	
	MVAr	1.4	1.4	1.4	1.4	1.5	
	MVA	3.6	3.7	3.7	3.8	3.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	4.3	4.3	4.3	4.3	4.3	
	50% POE Forecast						
	MW	3.0	3.0	3.1	3.1	3.1	
	MVAr	1.2	1.3	1.3	1.3	1.3	
	MVA	3.3	3.3	3.3	3.3	3.4	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.4	0.4	0.4	0.4	0.4	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Lyndoch Substation

System Limitation

Lyndoch 33/11kV Substation has one 3.8MVA 33/11kV transformer and is located near the township of Lyndoch.

In the summer of 2018/19, up to 3.0MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions considered to address the system limitation include:

- Upgrade the Barossa South Substation with a second transformer (preferred option);
- Establish a new substation nearby with new 11kV feeder ties back to Barossa South Substation; or
- Construct new 11kV feeder ties to surrounding substation to increase available transfers to existing adjacent Zone Substations.

Due to the extent of the overload during a contingent event, PF correction would not defer this system limitation. A load reduction of at least 2.9MVA would be required to defer the system limitation for a 12 month period.

A RIT-D is not expected to be required for this system limitation.

Substation: Nuriootpa 33/11kV

Region: Barossa

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	10.9	11.3	9.0	10.4	10.7
	MVAr	3.0	2.6	1.9	4.2	2.2
	MVA	11.3	11.6	9.2	11.2	10.9
	PF	0.97	0.97	0.98	0.93	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	7.6	8.0	8.0	7.6	7.8
	MVAr	0.1	2.5	0.0	2.2	2.1
	MVA	7.6	8.4	8.0	7.9	8.0
	PF	1.00	0.95	1.00	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	11.2	11.2	11.1	11.1	11.1	
	MVAr	3.6	3.6	3.6	3.6	3.6	
	MVA	11.8	11.7	11.7	11.7	11.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	13.4	13.4	13.4	13.4	13.4	
	50% POE Forecast						
	MW	10.1	10.1	10.0	9.9	9.8	
	MVAr	3.3	3.3	3.2	3.2	3.2	
	MVA	10.7	10.6	10.5	10.4	10.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	4.7	4.7	8.7	8.6	8.5	
	System Limitation (Y/N)	Y^	Y^	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

^Solved by 2016 new feeder tie upgrade at Stockwell Substation

Substation: Stockwell 33/11kV

Region: Barossa

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.1	5.4	6.1	6.5	5.9
	MVAr	1.8	1.6	1.8	2.0	1.7
	MVA	6.3	5.6	6.4	6.8	6.1
	PF	0.96	0.96	0.96	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	3.9	4.1	4.2	4.4	4.0
	MVAr	1.1	1.2	1.2	0.9	0.9
	MVA	4.0	4.3	4.4	4.5	4.1
	PF	0.96	0.96	0.96	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.5	6.5	6.6	6.6	6.6	
	MVAr	2.0	2.0	2.0	2.0	2.0	
	MVA	6.8	6.8	6.9	6.9	6.9	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	8.9	8.9	8.9	8.9	8.9	
	50% POE Forecast						
	MW	6.1	6.1	6.2	6.2	6.3	
	MVAr	1.8	1.9	1.9	1.9	1.9	
	MVA	6.4	6.4	6.5	6.5	6.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.9	0.9	4.0	3.9	3.9	
	System Limitation (Y/N)	Y^	Y^	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

^Solved by 2016 new feeder tie upgrade at Stockwell Substation

Stockwell Substation

System Limitation

Stockwell 33/11kV Substation has one 6.25MVA 33/11kV transformer and is located near the township of Stockwell.

In the summer of 2014/15, up to 6.0MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions considered to address the system limitation include:

- Construct new 11kV feeder ties to surrounding substations to increase the available load transfers (preferred option);
- Upgrade the Stockwell Substation with a second transformer;
- Establish a new substation nearby with new 11kV feeder ties back to Stockwell Substation.

Due to the extent of the overload during a contingent event, PF correction would not defer this system limitation. A load reduction of at least 3MVA would be required to defer this system limitation for a 12 month period.

A RIT-D is not expected to be required for this system limitation.

Substation: Williamstown South 33/11kV

Region: Barossa

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3.8 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.9	1.9	1.9	1.9	1.9	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	2.0	2.0	2.0	2.0	2.0	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	4.3	4.3	4.3	4.3	4.3	
	50% POE Forecast						
	MW	1.8	1.8	1.8	1.8	1.8	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	1.9	1.9	1.9	1.9	1.9	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	2.0	2.0	2.0	2.0	2.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	+2MVA from Williamstown

8.10.3 Barossa Non SCADA substations 10% POE Forecast

				2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Lyndoch South	1	0.5	0.7	0.5	0.5	0.5	0.5	0.5
Williamstown	1	2.5	3.0	1.2	1.2	1.2	1.3	1.3

System Limitations: Nil

8.10.4 Barossa 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
			1	2	3	4	5
33kV lines ex Dorrien							
Dorrien	Nuriootpa	20.3	18.5	18.5	18.5	18.5	18.5
Nuriootpa	Stockwell	15.5	6.8	6.8	6.8	6.8	6.8
Dorrien	Angaston No1	27.7	10.0	9.9	9.7	9.6	9.5
Dorrien No 2	Angaston No2	27.7	10.0	9.9	9.7	9.6	9.5
Dorrien	Barossa South Tee	24.6	18.2	18.3	18.4	18.5	18.6
Barossa South Tee	Barossa South	24.6	7.4	7.4	7.4	7.4	7.4
Barossa South Tee	Lyndoch Tee	24.6	10.8	10.9	11.0	11.1	11.2
Lyndoch Tee	Sandy Creek	3.9	1.7	1.8	1.9	2.0	2.0
Sandy Creek	Evanston Tee	3.9	0.8	0.9	0.9	0.9	0.9
Lyndoch Tee	Lyndoch	15	9.1	9.1	9.1	9.1	9.1
Lyndoch	Williamstown	8.1	5.4	5.4	5.4	5.4	5.3
Williamstown	A4892	6.2	0.1	0.1	0.1	0.1	0.1

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

8.11 Eastern Hills Regional Development Plan

The Eastern Hills

The SA Power Networks' Eastern Hills Region includes the region from Milang extending north to Williamstown, west to Crafers, and east to Nairne. There are three main connection systems in the Eastern Hills, being Mount Barker, Mount Barker South and Angas Creek, and a minor connection point at Kanmantoo Mine.

SA Power Networks' Distribution Network

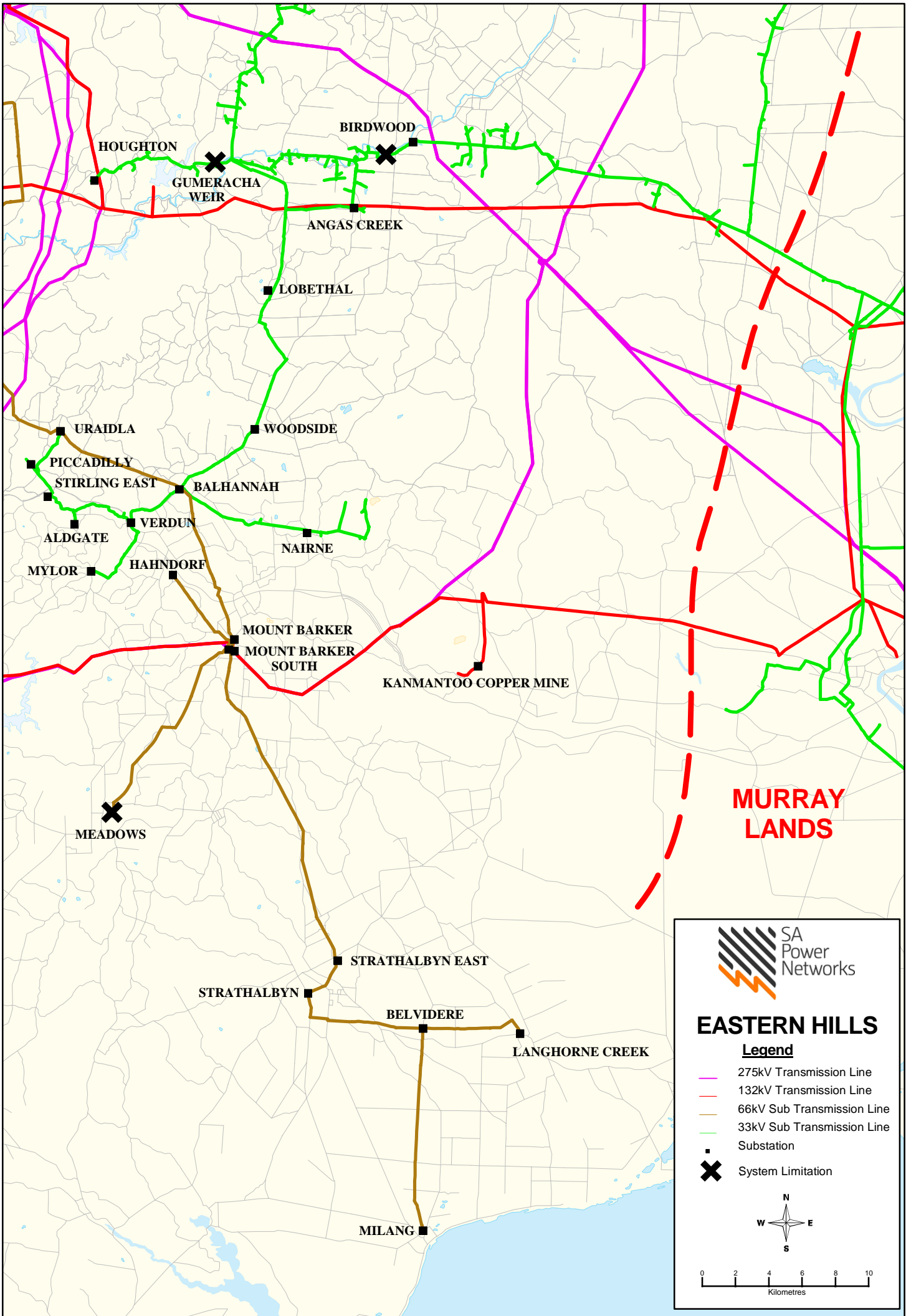
Electricity is supplied to the various towns and localities throughout the Eastern Hills via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 11,000 Volts or 33,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks distribution system via 11kV and 19kV primary distribution feeders which are connected to Zone Substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Eastern Hills Region in the next two years.

8.11.1 Eastern Hills SCADA Substations

Source Connection Point	Associated SCADA Substations
Angas Creek	<ul style="list-style-type: none"> • Birdwood • Forreton • Hermitage • Houghton • Kersbrook • Lobethal • Mount Pleasant
Mount Barker / Mount Barker South	<ul style="list-style-type: none"> • Aldgate • Balhannah 33kV • Hahndorf • Meadows • Mt Barker 11kV • Mylor • Nairne • Stirling East • Strathalbyn • Uraidla 11kV



HOUGHTON

BIRDWOOD

GUMERACHA WEIR

ANGAS CREEK

LOBETHAL

URAILDA

WOODSIDE

PICCADILLY

STIRLING EAST

BALHANNAH

VERDUN

ALDGATE

NAIRNE

MYLOR

HAHNDORF

MOUNT BARKER

MOUNT BARKER SOUTH

KANMANTOO COPPER MINE

MEADOWS

STRATHALBYN EAST

STRATHALBYN

BELVIDERE

LANGHORNE CREEK

MILANG

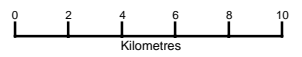
MURRAY LANDS



EASTERN HILLS

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- ✕ System Limitation



Substation: Angas Creek 132/33kV

Region: Eastern Hills

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.3	18.5	16.0	17.8	18.8
	MVAr	7.8	5.6	4.9	5.2	5.2
	MVA	21.7	19.3	16.7	18.6	19.5
	PF	0.93	0.96	0.96	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	14.8	16.4	15.4	15.1	14.9
	MVAr	2.1	2.8	0.1	0.5	0.5
	MVA	15.0	16.6	15.4	15.1	14.9
	PF	0.99	0.99	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	18.3	18.2	18.2	18.2	18.1
	MVAr	5.4	5.4	5.4	5.3	5.3
	MVA	19.1	19.0	19.0	18.9	18.9
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	31.5	31.5	31.5	31.5	31.5
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Kanmantoo 132/11kV

Region: Eastern Hills

(ETC) Transmission Category: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.7	1.6	1.4	1.4	1.7
	MVAr	0.6	0.5	0.5	0.3	0.4
	MVA	1.8	1.7	1.5	1.4	1.7
	PF	0.94	0.95	0.94	0.97	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	1.4	1.4	1.4	1.3	1.5
	MVAr	0.3	0.3	0.3	0.4	0.3
	MVA	1.4	1.4	1.4	1.4	1.5
	PF	0.98	0.98	0.98	0.97	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	1.5	1.6	1.6	1.6	1.6
	MVAr	0.5	0.5	0.5	0.5	0.5
	MVA	1.6	1.6	1.6	1.6	1.6
	PF	0.95	0.95	0.95	0.95	0.95
	Total Capacity (MVA)	3.0	3.0	3.0	3.0	3.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Mount Barker/Mount Barker South 275/66kV

Region: Eastern Hills

(ETC) Transmission Category: 4G

Number of Transformers: 3

Total Nameplate Rating (MVA): 345 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	101.6	96.5	78.7	89.2	96.3
	MVAr	40.1	33.9	30.0	32.4	33.1
	MVA	109.2	102.3	84.2	94.9	101.9
	PF	0.93	0.93	0.93	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	79.0	76.8	84.4	83.9	85.0
	MVAr	14.1	12.8	17.3	15.4	17.8
	MVA	80.3	77.9	86.2	85.3	86.8
	PF	0.98	0.99	0.98	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	97.8	99.4	101.0	102.5	103.9
	MVAr	27.0	27.4	27.9	28.3	28.7
	MVA	101.5	103.1	104.8	106.3	107.8
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	149.0	149.0	149.0	149.0	149.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	6				

Year	Former Step Change (MVA)
2011/12	30.0MVAr Capacitor Bank installed at Mount Barker South

Year	Future Step Change (10% POE MVA)

Substation: Aldgate 33/11kV

Region: Eastern Hills

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.3	10.2	9.2	9.1	7.0
	MVAr	2.8	2.8	1.9	2.0	1.2
	MVA	9.7	10.6	9.4	9.3	7.1
	PF	0.96	0.97	0.98	0.98	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	10.5	11.0	10.6	11.3	10.4
	MVAr	0.6	1.6	0.5	0.5	0.3
	MVA	10.5	11.1	10.6	11.3	10.4
	PF	1.00	0.99	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	7.1	7.2	7.3	7.4	7.5	
	MVAr	1.2	1.2	1.2	1.2	1.3	
	MVA	7.2	7.3	7.4	7.5	7.6	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	12.6	12.6	12.6	12.6	12.6	
	50% POE Forecast						
	MW	7.2	7.3	7.4	7.5	7.6	
	MVAr	1.2	1.2	1.2	1.3	1.3	
	MVA	7.3	7.4	7.5	7.6	7.7	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	7.1	7.1	7.1	7.1	7.1	
	Transfer Capacity (MVA)	5.2	5.1	5.0	5.0	4.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.7MVA from Stirling East
2011/12	+0.3MVA Customer load increase
2013/14	-3.6MVA to Stirling East

Year	Future Step Change (10% POE MVA)

Substation: Balhannah 66/33kV

Region: Eastern Hills

Number of Transformers: 3

Total Nameplate Rating (MVA): 22.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	26.0	18.4	18.3	19.4	22.5
	MVAr	11.7	8.1	7.8	7.5	8.3
	MVA	28.5	20.1	19.9	20.8	24.0
	PF	0.91	0.92	0.92	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	24.5	11.9	18.3	18.0	17.9
	MVAr	6.7	3.1	5.1	4.1	3.6
	MVA	25.4	12.3	19.0	18.4	18.3
	PF	0.96	0.97	0.96	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	21.0	22.0	22.9	23.8	24.7	
	MVAr	8.3	8.7	9.1	9.4	9.8	
	MVA	22.6	23.6	24.7	25.6	26.6	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	30.1	30.1	30.1	30.1	30.1	
	50% POE Forecast						
	MW	19.0	20.0	21.0	21.9	22.8	
	MVAr	7.5	7.9	8.3	8.7	9.0	
	MVA	20.5	21.5	22.6	23.5	24.5	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	21.4	21.4	21.4	21.4	21.4	
	Transfer Capacity (MVA)	11.5	11.0	10.4	9.9	9.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	-11.6MVA to Uraidla

Year	Future Step Change (10% POE MVA)

Substation: Birdwood 33/11kV

Region: Eastern Hills

Number of Feeders: 2

Number of Transformers: 3

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.3	2.3	2.2	2.2	2.2	
	MVAr	0.7	0.7	0.7	0.6	0.6	
	MVA	2.4	2.4	2.3	2.3	2.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	2.1	2.1	2.0	2.0	2.0	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	2.2	2.1	2.1	2.1	2.1	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	Transfer Capacity (MVA)	0.7	0.8	0.8	0.8	0.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Forreston 33/11kV

Region: Eastern Hills

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.0	1.0	0.9	0.9	0.9	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	1.0	1.0	1.0	1.0	1.0	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.9	0.9	0.9	0.9	0.8	
	MVAr	0.3	0.3	0.2	0.2	0.2	
	MVA	0.9	0.9	0.9	0.9	0.9	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Hahndorf 66/11kV

Region: Eastern Hills

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.6	5.1	4.3	4.5	4.7
	MVAr	2.1	2.2	1.7	1.8	1.5
	MVA	5.0	5.6	4.6	4.8	5.0
	PF	0.91	0.92	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	3.8	4.1	4.2	4.5	4.2
	MVAr	1.2	1.2	1.4	1.2	1.2
	MVA	4.0	4.3	4.4	4.6	4.4
	PF	0.95	0.96	0.95	0.97	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	4.5	4.5	4.4	4.3	4.3	
	MVAr	1.7	1.7	1.6	1.6	1.6	
	MVA	4.8	4.8	4.7	4.6	4.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	6.8	6.8	6.8	6.8	6.8	
	50% POE Forecast						
	MW	4.1	4.0	4.0	4.0	3.9	
	MVAr	1.5	1.5	1.5	1.5	1.5	
	MVA	4.3	4.3	4.3	4.2	4.2	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	6.2	6.2	6.2	6.2	6.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	+0.4MVA from Verdun

Year	Future Step Change (10% POE MVA)

Substation: Hermitage 33/11kV

Region: Eastern Hills

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 0.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.2	0.2	0.2	0.2	0.2	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.2	0.2	0.2	0.2	0.2	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	0.7	0.7	0.7	0.7	0.7	
	50% POE Forecast						
	MW	0.2	0.2	0.2	0.2	0.2	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.2	0.2	0.2	0.2	0.2	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Houghton 33/7.6kV

Region: Eastern Hills

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	2.0	2.1	1.8
	MVAr	N/A	N/A	1.0	0.8	0.9
	MVA	N/A	N/A	2.3	2.2	2.0
	PF	N/A	N/A	0.88	0.93	0.90
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	1.7	1.7
	MVAr	N/A	N/A	N/A	0.7	0.4
	MVA	N/A	N/A	N/A	1.8	1.8
	PF	N/A	N/A	N/A	0.93	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.0	3.0	3.1	3.2	3.2	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	3.1	3.2	3.2	3.3	3.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	3.6	3.6	3.6	3.6	3.6	
	50% POE Forecast						
	MW	2.7	2.7	2.8	2.8	2.9	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.8	2.8	2.9	3.0	3.0	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Kersbrook 33/11kV

Region: Eastern Hills

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.6	0.6	0.6	0.6	0.6	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.6	0.6	0.6	0.6	0.6	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.5	0.5	0.5	0.5	0.5	
	MVAr	0.2	0.2	0.1	0.1	0.1	
	MVA	0.5	0.5	0.5	0.5	0.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.1	0.1	0.1	0.1	0.1	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Lobethal 33/11kV

Region: Eastern Hills

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	8.3	8.2	6.1	6.3	6.7
	MVAr	2.8	2.1	1.8	2.2	1.3
	MVA	8.8	8.5	6.3	6.7	6.8
	PF	0.95	0.97	0.96	0.94	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	5.4	6.6	5.5	5.5	5.3
	MVAr	0.4	0.2	0.7	0.5	0.2
	MVA	5.4	6.6	5.5	5.5	5.3
	PF	1.00	1.00	0.99	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.7	6.6	6.4	6.3	6.2	
	MVAr	1.7	1.7	1.6	1.6	1.6	
	MVA	6.9	6.8	6.6	6.5	6.4	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	12.8	12.8	12.8	12.8	12.8	
	50% POE Forecast						
	MW	6.1	6.0	5.9	5.8	5.7	
	MVAr	1.6	1.5	1.5	1.5	1.4	
	MVA	6.3	6.2	6.1	6.0	5.9	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	6.9	6.9	6.9	6.9	6.9	
	Transfer Capacity (MVA)	1.8	1.8	1.8	1.9	1.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	+1.2MVA from Woodside
2011/12	-1.2MVA to Woodside

Year	Future Step Change (10% POE MVA)

Substation: Meadows 66/11kV

Region: Eastern Hills

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.6	6.8	4.9	5.2	5.9
	MVAr	0.5	0.3	0.6	0.3	2.5
	MVA	6.6	6.8	5.0	5.2	6.4
	PF	1.00	1.00	0.99	1.00	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	4.9	5.3	5.0	4.6	4.6
	MVAr	1.8	1.9	1.7	1.9	0.9
	MVA	5.2	5.6	5.2	5.0	4.7
	PF	0.94	0.94	0.95	0.92	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.4	5.6	5.8	6.0	6.2	
	MVAr	2.6	2.7	2.8	2.8	2.9	
	MVA	6.0	6.2	6.4	6.6	6.8	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	6.5	6.5	6.5	6.5	6.5	
	50% POE Forecast						
	MW	5.0	5.2	5.4	5.6	5.8	
	MVAr	2.3	2.4	2.5	2.6	2.7	
	MVA	5.5	5.7	5.9	6.1	6.4	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	1.6	1.5	1.4	1.4	1.3	
	System Limitation (Y/N)	Y*	Y*	Y*	Y	Y	
	Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)
2009/10	+0.2MVA from Mount Barker
2010/11	-0.2MVA to Mount Barker
2011/12	-0.7MVA to Strathalbyn

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Mount Barker 66/11kV

Region: Eastern Hills

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 64 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	23.5	24.5	18.1	19.3	21.9
	MVAr	1.8	1.8	2.6	2.6	0.2
	MVA	23.6	24.6	18.3	19.5	21.9
	PF	1.00	1.00	0.99	0.99	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	20.9	22.5	19.4	19.0	18.8
	MVAr	2.0	0.9	0.6	0.5	0.0
	MVA	21.0	22.5	19.4	19.0	18.8
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	21.4	22.3	23.3	24.1	25.0	
	MVAr	2.4	2.5	2.6	2.7	2.8	
	MVA	21.6	22.5	23.4	24.3	25.2	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	72.4	72.4	72.4	72.4	72.4	
	50% POE Forecast						
	MW	19.0	19.7	20.5	21.3	22.0	
	MVAr	2.1	2.2	2.3	2.4	2.5	
	MVA	19.1	19.9	20.7	21.4	22.2	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	38.1	38.1	38.1	38.1	38.1	
	Transfer Capacity (MVA)	1.5	1.4	1.4	1.3	1.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	-0.2MVA to Meadows
2010/11	+0.2MVA from Meadows
	-1.9MVA to Nairne

Year	Future Step Change (10% POE MVA)

Substation: Mount Pleasant 33/11kV

Region: Eastern Hills

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 2 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.6	1.6	1.6	1.5	1.5	
	MVAr	0.5	0.5	0.5	0.5	0.4	
	MVA	1.7	1.7	1.6	1.6	1.6	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	2.6	2.6	2.6	2.6	2.6	
	50% POE Forecast						
	MW	1.4	1.4	1.4	1.4	1.4	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.5	1.5	1.5	1.4	1.4	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.7	1.7	1.7	1.7	1.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Mylor 33/11kV

Region: Eastern Hills

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 3.8 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	3.3
	MVAr	N/A	N/A	N/A	N/A	1.3
	MVA	N/A	N/A	N/A	N/A	3.6
	PF	N/A	N/A	N/A	N/A	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.4	2.4	2.5	2.5	2.5	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.5	2.6	2.6	2.6	2.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	4.6	4.6	4.6	4.6	4.6	
	50% POE Forecast						
	MW	2.2	2.2	2.2	2.2	2.3	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	2.3	2.3	2.3	2.4	2.4	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	3.2	3.2	3.2	3.1	3.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Nairne 33/11kV

Region: Eastern Hills

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 7.6 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	7.2	5.9	6.4	7.2
	MVAr	N/A	2.2	2.1	2.1	2.3
	MVA	N/A	7.5	6.2	6.7	7.5
	PF	N/A	0.96	0.94	0.95	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	3.7	6.7	6.8	7.0
	MVAr	N/A	0.7	0.7	1.1	0.5
	MVA	N/A	3.7	6.8	6.9	7.0
	PF	N/A	0.98	0.99	0.99	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.5	6.5	6.5	6.6	6.6	
	MVAr	2.3	2.3	2.3	2.3	2.3	
	MVA	6.8	6.9	6.9	6.9	7.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	9.2	9.2	9.2	9.2	9.2	
	50% POE Forecast						
	MW	5.7	5.7	5.7	5.7	5.7	
	MVAr	2.0	2.0	2.0	2.0	2.0	
	MVA	6.0	6.0	6.0	6.0	6.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	4.9	4.9	4.9	4.9	4.9	
	Transfer Capacity (MVA)	2.2	2.2	2.2	2.2	2.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	+1.9MVA from Mount Barker

Year	Future Step Change (10% POE MVA)

Substation: Stirling East 33/11kV

Region: Eastern Hills

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.0	9.2	9.3	9.4	9.5	
	MVAr	3.0	3.0	3.0	3.1	3.1	
	MVA	9.5	9.6	9.8	9.9	10.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	17.7	17.7	17.7	17.7	17.7	
	50% POE Forecast						
	MW	8.1	8.2	8.3	8.4	8.6	
	MVAr	2.7	2.7	2.7	2.8	2.8	
	MVA	8.6	8.7	8.8	8.9	9.0	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	8.1	8.0	7.9	7.8	7.7	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	-0.7MVA to Aldgate
2013/14	+3.6MVA from Aldgate
	+2.1MVA from Piccadilly

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Strathalbyn 66/11kV

Region: Eastern Hills

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.1	10.3	8.8	9.6	10.3
	MVAr	2.4	2.8	2.3	2.2	2.3
	MVA	9.4	10.6	9.1	9.8	10.5
	PF	0.97	0.97	0.97	0.97	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	8.2	9.1	8.9	9.1	9.0
	MVAr	0.5	0.5	0.6	0.4	0.3
	MVA	8.2	9.1	8.9	9.1	9.0
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.2	9.3	9.4	9.4	9.5	
	MVAr	2.1	2.1	2.2	2.2	2.2	
	MVA	9.5	9.6	9.6	9.7	9.7	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	16.7	16.7	16.7	16.7	16.7	
	50% POE Forecast						
	MW	8.2	8.3	8.4	8.5	8.6	
	MVAr	1.9	1.9	1.9	2.0	2.0	
	MVA	8.4	8.5	8.6	8.7	8.8	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	11.6	11.4	11.3	11.2	11.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2011/12	+0.7MVA from Meadows
2012/13	-0.75MVA Customer load decrease

Year	Future Step Change (10% POE MVA)

Substation: Uraidla 66/33kV

Region: Eastern Hills

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	7.0	16.8	13.3	14.5	16.2
	MVAr	2.4	5.6	4.0	4.7	4.6
	MVA	7.4	17.7	13.9	15.2	16.9
	PF	0.95	0.95	0.96	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	7.8	7.1	17.4	17.6	16.8
	MVAr	0.0	0.0	5.7	4.5	3.2
	MVA	7.8	7.1	18.3	18.2	17.1
	PF	1.00	1.00	0.95	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.2	14.1	14.0	13.8	13.7	
	MVAr	4.3	4.2	4.2	4.2	4.1	
	MVA	14.9	14.7	14.6	14.5	14.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	31.4	31.4	31.4	31.4	31.4	
	50% POE Forecast						
	MW	12.7	12.6	12.4	12.3	12.1	
	MVAr	3.8	3.8	3.7	3.7	3.6	
	MVA	13.3	13.1	13.0	12.8	12.6	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	32.0	32.0	32.0	32.0	32.0	
	Transfer Capacity (MVA)	5.9	5.9	6.0	6.1	6.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	10					

Year	Former Step Change (MVA)
2010/11	+11.6MVA from Balhannah

Year	Future Step Change (10% POE MVA)

Substation: Uraidla 66/11kV

Region: Eastern Hills

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	5.3	5.3	4.3	4.8	6.0
	MVAr	2.5	2.3	2.0	2.1	2.3
	MVA	5.8	5.8	4.8	5.2	6.4
	PF	0.91	0.92	0.91	0.92	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	4.6	6.5	4.7	4.3	5.3
	MVAr	1.1	1.4	0.4	0.4	0.5
	MVA	4.7	6.6	4.7	4.3	5.3
	PF	0.97	0.98	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.5	5.6	5.6	5.7	5.7	
	MVAr	2.4	2.4	2.4	2.5	2.5	
	MVA	6.0	6.1	6.1	6.2	6.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	17.2	17.2	17.2	17.2	17.2	
	50% POE Forecast						
	MW	5.0	5.1	5.2	5.2	5.3	
	MVAr	2.2	2.2	2.2	2.3	2.3	
	MVA	5.5	5.5	5.6	5.7	5.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	9.2	9.2	9.2	9.2	9.2	
	Transfer Capacity (MVA)	2.2	2.2	2.2	2.1	2.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Woodside 33/11kV

Region: Eastern Hills

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	7.0	8.6	7.8	7.7	8.5
	MVAr	3.6	4.0	3.5	3.4	3.4
	MVA	7.9	9.4	8.5	8.4	9.1
	PF	0.89	0.91	0.91	0.92	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	6.2	5.7	6.8	6.8	6.6
	MVAr	2.1	1.8	2.0	1.9	1.4
	MVA	6.5	6.0	7.0	7.1	6.7
	PF	0.95	0.95	0.96	0.96	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.2	8.2	8.3	8.4	8.5	
	MVAr	3.5	3.6	3.6	3.6	3.7	
	MVA	8.9	9.0	9.1	9.2	9.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	13.0	13.0	13.0	13.0	13.0	
	50% POE Forecast						
	MW	7.3	7.4	7.5	7.5	7.6	
	MVAr	3.2	3.2	3.2	3.2	3.3	
	MVA	8.0	8.1	8.1	8.2	8.3	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	6.9	6.9	6.9	6.9	6.9	
	Transfer Capacity (MVA)	1.8	1.8	1.8	1.8	1.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	-1.2MVA to Lobethal
2011/12	+1.2MVA from Lobethal

Year	Future Step Change (10% POE MVA)

8.11.3 Eastern Hills Non SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Brukung	1	0.5	0.7	0.5	0.5	0.5	0.5	0.5
Chain of Ponds	1	0.5	0.6	0.5	0.5	0.5	0.5	0.5
Deloraine	1	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Gumeracha	1	0.3	0.4	0.3	0.3	0.3	0.3	0.3
Gumeracha Weir	1	0.15	0.2	0.3	0.3	0.3	0.3	0.3
Gumhaven	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1
Langhorne Creek	2	5.0	6.5	5.9	5.9	5.9	6.0	6.0
Milang	2	5.0	6.5	4.4	4.4	4.5	4.5	4.6
Palmer	1	0.3	0.4	0.03	0.03	0.03	0.03	0.03
Piccadilly	2	3.0	3.9	2.2	2.3	2.3	2.3	2.3
Verdun	1	1.0	1.3	1.1	1.2	1.2	1.2	1.3

System Limitations: Gumeracha Weir
Verdun

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the substation by increasing the capacity; or
- Power factor correction to reduce the load at the substation.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity. RIT-D's are not expected to be required for these system limitations.

8.11.4 Eastern Hills Non SCADA Substations 50% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	N-1 Emerg. Cyclic Rating (MVA)	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
				50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)
Langhorne Creek	2	5.0	3.8	5.3*	1.1	5.3*	1.1	5.4*	1.1	5.4*	1.1	5.4*	1.1
Milang	2	5.0	3.8	3.9	1.6	4.0	1.6	4.0	1.6	4.1	1.6	4.1	1.5

***Within planning criteria risk margin**

System Limitations: Nil

8.11.5 Eastern Hills 66kV Sub-transmission

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
66KV LINES ON EASTERN HILLS							
MOUNT BARKER	MT BARKER STH	137.0	51.7	52.1	52.5	52.9	53.4
MOUNT BARKER	BALHANNAH	55.4	43.5	44.3	45.1	45.9	46.7
BALHANNAH	URAILDA	40.2	20.9	20.8	20.7	20.6	20.5
URAILDA	MAGILL	40.2	0.0	0.0	0.0	0.0	0.0
MOUNT BARKER	HAHNDORF	55.4	4.8	4.7	4.7	4.6	4.6
MT BARKER STH	MEADOWS	55.4	6.0	6.2	6.3	6.5	6.7
MT BARKER STH	STRATH EAST TEE	34.8	29.3	29.5	29.7	30.0	30.2
STRATH EAST TEE	STRATHALBYN	34.8	19.8	19.9	20.0	20.1	20.2
STRATHALBYN	BELVIDERE	13.0	10.3	10.3	10.4	10.5	10.6
BELVIDERE	MILANG	10.3	4.4	4.4	4.5	4.5	4.6
BELVIDERE	LANGHORNE	13.0	5.9	5.9	5.9	6.0	6.0

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.11.6 Eastern Hills 33kV Sub-Transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Balhannah/Uraidla							
Balhannah	Woodside	20.1	8.8	8.8	8.8	8.8	8.8
Balhannah	Verdun Tee	21.4	3.9	4.0	4.1	4.1	4.2
Balhannah	Nairne	13.0	8.2	8.3	8.4	8.5	8.5
Uraidla	Piccadilly	20	19.0	19.2	19.4	19.7	19.9
Piccadilly	Stirling East	20	16.7	16.9	17.1	17.3	17.5
Verdun Tee	Aldgate	20	0.3	0.3	0.3	0.3	0.3
Stirling East	Aldgate	20	7.2	7.3	7.4	7.4	7.5
Verdun Tee	Mylor	3.4	2.5	2.6	2.6	2.6	2.7
33kV Lines ex Angas Creek							
Angas Creek	Angas Ck Tee	20.3	13.1	13.0	13.0	12.9	12.9
Angas Ck Tee	Lobethal	20.1	6.9	6.8	6.7	6.6	6.5
Lobethal Tee	Woodside	7	0.0	0.0	0.0	0.0	0.0
Angas Ck Tee	Gumeracha	7	6.2	6.2	6.3	6.3	6.4
Gumeracha	Houghton	6	3.9	4.0	4.0	4.1	4.2
Gumeracha	Kersbrook	15	2.3	2.2	2.2	2.1	2.1
Kersbrook	A4892	6	1.4	1.3	1.3	1.3	1.3
Angas Creek	Birdwood Tee	14.5	7.1	7.1	7.0	6.9	6.9
Birdwood Tee	Forreston	4.2	1.3	1.3	1.3	1.3	1.3
Forreston	LSDF4565	4.2	0.2	0.2	0.2	0.2	0.2
Birdwood Tee	Birdwood	4.2	4.9	4.9	4.8	4.7	4.7
Birdwood	Mt Pleasant Tee	4.2	2.5	2.6	2.6	2.6	2.7
Mt Pleasant Tee	Mt Pleasant	10.7	1.7	1.7	1.6	1.6	1.6
Mt Pleasant Tee	Tungkillo	4.2	0.2	0.2	0.2	0.2	0.2

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Birdwood Tee-Birdwood 33kV line

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the line by increasing conductor clearances; or
- Power factor correction to reduce the load on the line.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations.

8.12 Mid North and Yorke Peninsula Regional Development Plan

The Mid North and Yorke Peninsula

The SA Power Networks' Mid North and Yorke Peninsula region includes the region from Clare extending north to Wilmington, south to Mallala and the Yorke Peninsula. There are several main connection systems in the Mid North and Yorke Peninsula, being Dalrymple, Ardrossan West, Clare North, Hummocks, Kadina East, Brinkworth, Waterloo and Templers. A map of this region can be found at the end of this section.

SA Power Networks' Distribution Network

Electricity is supplied to the various towns and localities throughout the Mid North and Yorke Peninsula via Zone Substations. These Zone Substations are operated at 33,000 Volts stepped down to 11,000 or 7,600 Volts.

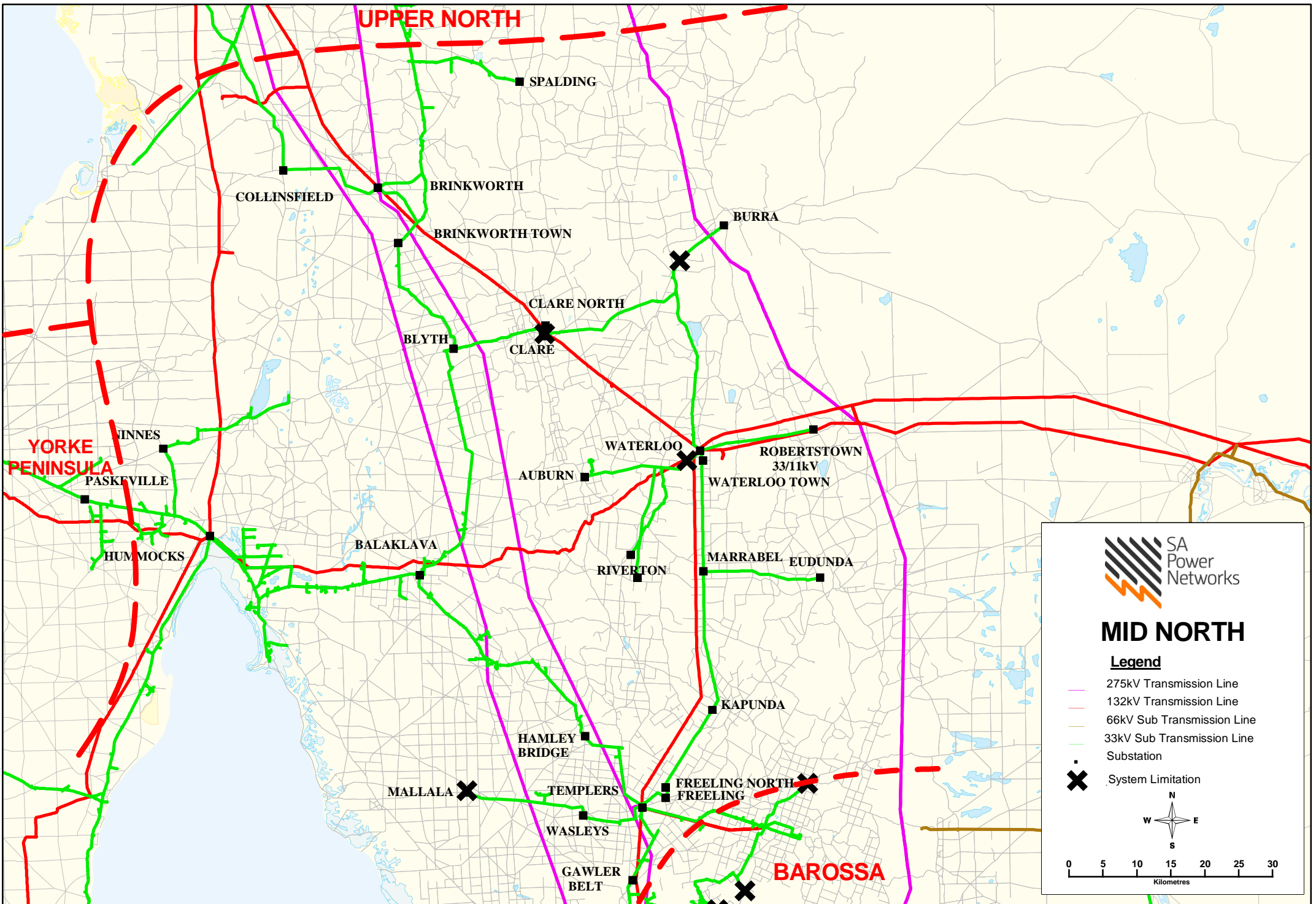
Customers are supplied from SA Power Networks distribution system via 7.6kV, 11kV and 19kV primary distribution feeders, which emanate from the Zone Substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Mid North and Yorke Peninsula Region in the next two years.

8.12.1 Mid North and Yorke Peninsula SCADA Substations

Source Connection Point	Associated SCADA Substations
Ardrossan West	<ul style="list-style-type: none"> • Ardrossan • Maitland • Minlaton • Port Vincent
Brinkworth	<ul style="list-style-type: none"> • Brinkworth Town
Clare North	<ul style="list-style-type: none"> • Burra • Clare
Dalrymple	<ul style="list-style-type: none"> • Edithburgh • Stansbury • Port Giles • Warooka • Yorketown
Hummocks	<ul style="list-style-type: none"> • Balaklava
Kadina East	<ul style="list-style-type: none"> • Moonta • Wallaroo
Templers	<ul style="list-style-type: none"> • Freeling North • Gawler Belt • Hamley Bridge • Kapunda • Sandy Creek
Waterloo	<ul style="list-style-type: none"> • Riverton • Waterloo Town

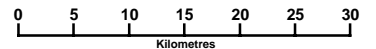
UPPER NORTH



MID NORTH

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- System Limitation





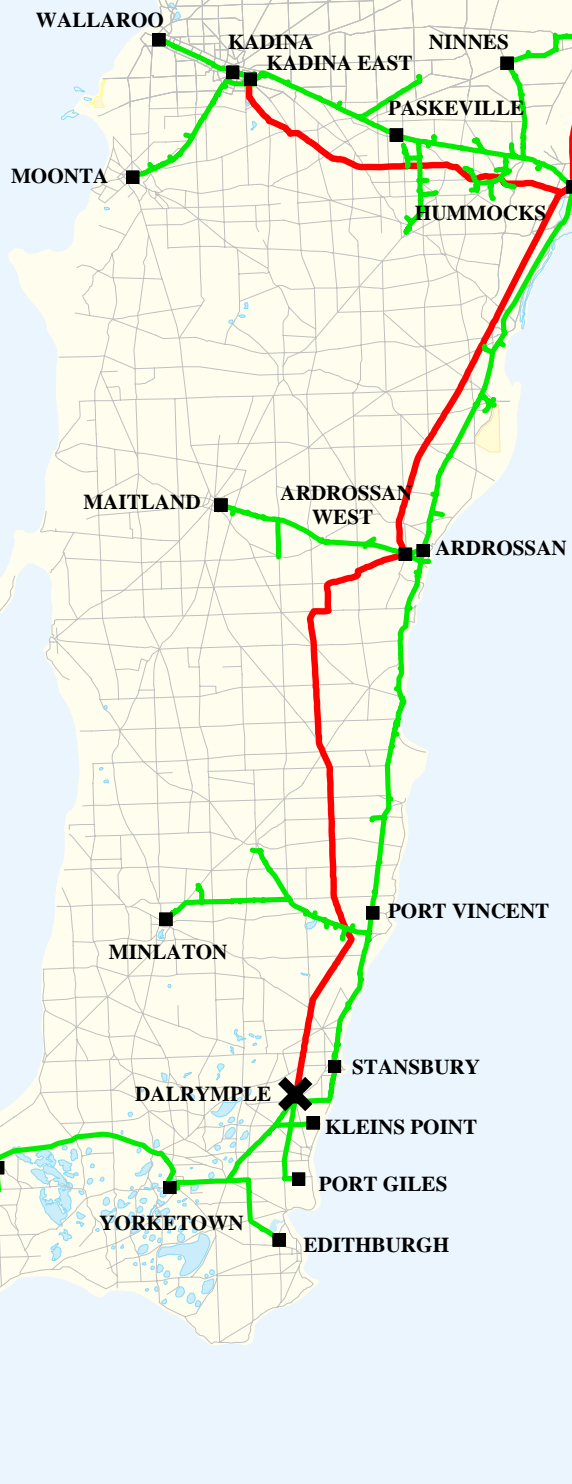
YORKE PENINSULA

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- System Limitation



MID NORTH



Substation: Ardrossan West 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	14.1	12.6	11.8	11.6	11.9
	MVAr	6.0	4.3	3.4	3.4	3.1
	MVA	15.3	13.3	12.3	12.1	12.3
	PF	0.92	0.92	0.96	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	9.4	10.5	9.8	9.2	8.8
	MVAr	1.6	2.0	1.4	0.8	0.2
	MVA	9.5	10.7	9.9	9.2	8.8
	PF	0.99	0.98	0.99	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	12.0	12.1	10.0	10.2	10.3
	MVAr	3.3	3.4	2.8	2.8	2.9
	MVA	12.4	12.5	10.4	10.6	10.7
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	32.5	32.5	32.5	32.5	32.5
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2016/17	-3.0MVA to Dalrymple

Substation: Brinkworth 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.8	5.2	4.2	4.7	4.7
	MVAr	1.0	0.6	0.1	0.2	0.1
	MVA	4.9	5.2	4.2	4.7	4.7
	PF	0.98	0.98	1.00	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	3.6	4.0	3.7	4.0	4.1
	MVAr	0.3	0.0	0.5	0.9	0.8
	MVA	3.6	4.0	3.8	4.1	4.1
	PF	1.00	1.00	0.99	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	4.6	4.6	4.5	4.5	4.4
	MVAr	0.1	0.1	0.1	0.1	0.1
	MVA	4.6	4.6	4.5	4.5	4.4
	PF	1.00	1.00	1.00	1.00	1.00
	Firm Delivery Capacity (MVA)	13.7	13.7	13.7	13.7	13.7
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	3				

Year	Former Step Change (MVA)
2009/10	+0.3MVA from Hummocks

Year	Future Step Change (10% POE MVA)

Substation: Clare North 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 80 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	9.7	10.6	12.4	12.4
	MVAr	N/A	4.3	4.1	4.2	4.4
	MVA	N/A	10.6	11.4	13.0	13.1
	PF	N/A	0.92	0.93	0.95	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	6.9	10.0	10.0	10.4
	MVAr	N/A	0.9	1.9	1.1	3.9
	MVA	N/A	6.9	10.2	10.1	11.1
	PF	N/A	0.99	0.98	0.99	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	12.7	12.6	12.6	12.6	12.6
	MVAr	4.5	4.5	4.5	4.5	4.5
	MVA	13.5	13.4	13.4	13.4	13.3
	PF	0.94	0.94	0.94	0.94	0.94
	Firm Delivery Capacity (MVA)	40.0	40.0	40.0	40.0	40.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	8				

Year	Former Step Change (MVA)
2010/11	+13.4MVA from Waterloo

Year	Future Step Change (10% POE MVA)

Substation: Dalrymple 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 1, 2 in 2016

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.7	8.6	8.5	8.0	7.9
	MVAr	3.7	3.0	2.8	1.7	1.4
	MVA	10.4	9.1	9.0	8.1	8.0
	PF	0.93	0.94	0.95	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	6.6	5.9	6.6	8.6	6.5
	MVAr	0.5	0.5	1.4	0.9	1.3
	MVA	6.6	5.9	6.8	8.7	6.6
	PF	1.00	1.00	0.98	0.99	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	7.9	7.9	10.0	9.9	9.9
	MVAr	1.9	1.9	2.4	2.4	2.4
	MVA	8.1	8.1	10.3	10.2	10.2
	PF	0.97	0.97	0.97	0.97	0.97
	Firm Delivery Capacity (MVA)	0	0	0	0	0
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*
	Hrs per annum > 95% of Peak Load (hrs)	2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2016/17	+3.0MVA from Ardrossan West

*** N-1 capacity not required by ETC until 2016**

Dalrymple 132/33kV Connection Point

System Limitation

Dalrymple 132/33kV Connection Point presently has one 25MVA 132/33kV transformer supplied by a single 132kV transmission line from Hummocks via Ardrossan West and is located approximately 5km south west of the township of Stansbury.

Version 2 of the ETC has changed the security standard for Dalrymple to Category 2 (requires N-1 Capacity) from 2016. As a consequence this connection Point Substation will not comply with the ETC from 2016 and is therefore planned to be upgraded by ElectraNet.

The Transmission Company (Electranet) are managing the RIT-T process for this Transmission Connection Point, refer to <http://www.electranet.com.au/assets/RIT-T/Dalrymple-Substation-Upgrade/11826-DalrympleSubstationUpgrade-PSCR-Apr2013.pdf>

Substation: Hummocks 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	13.9	14.7	12.7	12.6	13.1
	MVAr	5.5	6.4	6.0	5.5	5.4
	MVA	14.9	16.1	14.0	13.8	14.2
	PF	0.93	0.93	0.90	0.92	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	10.9	11.0	11.3	12.2	10.5
	MVAr	2.9	2.8	3.2	3.4	2.8
	MVA	11.2	11.3	11.8	12.6	10.9
	PF	0.97	0.97	0.96	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	13.3	13.1	13.0	12.9	12.8
	MVAr	5.8	5.7	5.7	5.6	5.6
	MVA	14.5	14.3	14.2	14.0	13.9
	PF	0.92	0.92	0.92	0.92	0.92
	Firm Delivery Capacity (MVA)	25	25	25	25	25
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	7				

Year	Former Step Change (MVA)
2009/10	-0.3MVA to Brinkworth

Year	Future Step Change (10% POE MVA)

Substation: Kadina East 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 120 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	26.2	25.1	24.8	24.8	24.8
	MVAr	9.5	7.9	8.6	8.3	7.6
	MVA	27.9	26.3	26.3	26.1	26.0
	PF	0.94	0.95	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	16.2	18.1	17.9	19.8	18.4
	MVAr	2.8	2.2	4.1	2.5	0.7
	MVA	16.5	18.2	18.3	20.0	18.4
	PF	0.99	0.99	0.97	0.99	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	24.8	25.0	25.1	25.3	25.5
	MVAr	8.2	8.2	8.3	8.3	8.4
	MVA	26.1	26.3	26.5	26.7	26.9
	PF	0.95	0.95	0.95	0.95	0.95
	Firm Delivery Capacity (MVA)	60.0	60.0	60.0	60.0	60.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	3				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Templers 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 120 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	32.1	31.0	25.9	29.3	30.2
	MVAr	14.1	12.5	9.5	11.1	10.5
	MVA	35.1	33.4	27.6	31.3	32.0
	PF	0.92	0.93	0.94	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	23.3	22.9	22.6	22.4	24.2
	MVAr	6.9	6.3	5.7	5.2	5.0
	MVA	24.3	23.8	23.3	23.0	24.7
	PF	0.96	0.96	0.97	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	29.3	29.2	29.1	29.0	28.8
	MVAr	10.7	10.6	10.6	10.5	10.5
	MVA	31.2	31.1	30.9	30.8	30.7
	PF	0.94	0.94	0.94	0.94	0.94
	Firm Delivery Capacity (MVA)	79.8	79.8	79.8	79.8	79.8
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	12				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Waterloo 132/33kV

Region: Mid North & Yorke Peninsula

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	26.6	13.2	8.1	7.7	8.2
	MVAr	10.5	3.6	3.2	2.3	2.4
	MVA	28.6	13.7	8.7	8.0	8.5
	PF	0.93	0.96	0.93	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	16.5	18.4	7.1	6.9	4.3
	MVAr	5.8	4.1	1.8	1.1	0.4
	MVA	17.5	18.8	7.3	7.0	4.3
	PF	0.94	0.98	0.97	0.99	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	8.6	8.5	8.4	8.2	8.1
	MVAr	2.8	2.7	2.7	2.7	2.6
	MVA	9.0	8.9	8.8	8.7	8.6
	PF	0.95	0.95	0.95	0.95	0.95
	Total Capacity (MVA)	50	50	50	50	50
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	3				

Year	Former Step Change (MVA)
2010/11	-13.4MVA to Clare North

Year	Future Step Change (10% POE MVA)

Substation: Ardrossan 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 3

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.7	2.5	2.1	2.2	2.3
	MVAr	1.1	1.0	0.8	0.9	0.9
	MVA	2.9	2.7	2.3	2.4	2.5
	PF	0.93	0.93	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	1.7	1.8	1.6	1.8	1.7
	MVAr	0.7	0.7	0.6	0.7	0.7
	MVA	1.8	2.0	1.7	1.9	1.9
	PF	0.93	0.93	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.0	2.0	2.0	2.0	2.0	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.2	2.2	2.1	2.2	2.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	1.7	1.8	1.7	1.7	1.7	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	1.9	1.9	1.8	1.8	1.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	3					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Balaklava 33/7.6kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.6	2.9
	MVAr	N/A	N/A	N/A	1.2	1.0
	MVA	N/A	N/A	N/A	2.9	3.1
	PF	N/A	N/A	N/A	0.90	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	2.2	2.4
	MVAr	N/A	N/A	N/A	0.4	0.4
	MVA	N/A	N/A	N/A	2.3	2.4
	PF	N/A	N/A	N/A	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.8	2.7	2.6	2.5	2.4	
	MVAr	1.2	1.1	1.1	1.0	1.0	
	MVA	3.0	2.9	2.8	2.7	2.6	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	5.0	5.0	5.0	5.0	5.0	
	50% POE Forecast						
	MW	2.6	2.5	2.3	2.3	2.2	
	MVAr	1.1	1.0	1.0	1.0	0.9	
	MVA	2.8	2.7	2.6	2.5	2.4	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	2.8	2.8	2.8	2.8	2.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	3					

Year	Former Step Change (MVA)
2011/12	+0.1MVA customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Brinkworth Town 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	0.8	0.9	0.9
	MVAr	N/A	N/A	0.2	0.2	0.2
	MVA	N/A	N/A	0.8	0.9	0.9
	PF	N/A	N/A	0.98	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	0.7	0.7	0.7
	MVAr	N/A	N/A	0.1	0.2	0.2
	MVA	N/A	N/A	0.7	0.8	0.8
	PF	N/A	N/A	0.98	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.9	0.8	0.8	0.8	0.8	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.9	0.9	0.8	0.8	0.8	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	0.8	0.8	0.8	0.8	0.8	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Burra TF2 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	2.1	N/A
	MVAr	N/A	N/A	N/A	0.9	N/A
	MVA	N/A	N/A	N/A	2.3	N/A
	PF	N/A	N/A	N/A	0.92	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.4	2.4	2.5	2.5	2.6	
	MVAr	1.0	1.0	1.1	1.1	1.1	
	MVA	2.6	2.7	2.7	2.7	2.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	5.7	5.7	5.7	5.7	5.7	
	50% POE Forecast						
	MW	2.3	2.3	2.3	2.3	2.3	
	MVAr	1.0	1.0	1.0	1.0	1.0	
	MVA	2.5	2.5	2.5	2.5	2.5	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	4.9	4.9	4.9	4.9	4.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Clare 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.4	9.6	8.0	8.6	9.6
	MVAr	2.4	4.5	3.8	3.7	4.0
	MVA	9.7	10.6	8.8	9.4	10.4
	PF	0.97	0.91	0.91	0.92	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	6.6	6.9	6.6	6.9	7.5
	MVAr	1.0	0.8	2.3	1.2	1.1
	MVA	6.6	7.0	7.0	7.0	7.5
	PF	0.99	0.99	0.95	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	10.2	10.2	10.2	10.3	10.3	
	MVAr	4.3	4.3	4.4	4.4	4.4	
	MVA	11.1	11.1	11.1	11.2	11.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	12.6	12.6	12.6	12.6	12.6	
	50% POE Forecast						
	MW	9.2	9.2	9.2	9.2	9.3	
	MVAr	3.9	3.9	3.9	3.9	3.9	
	MVA	10.0	10.0	10.0	10.0	10.1	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	7.1	7.1	7.1	7.1	7.1	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y	
	Hrs per annum > 95% of Peak Load (hrs)		9				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Clare 33/11kV Zone Substation

System Limitation

Clare 33/11kV Zone Substation has two 5MVA 33/11kV transformers and is located near the township of Clare.

In the summer of 2018/19, up to 3MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions that address the system limitation include:

- Upgrade the Clare Substation with two new 12.5MVA 33/11kV transformers (preferred option);
- Upgrade adjacent Zone Substation and construct 11kV feeder ties to enable more customer load to be transferred between substations during a contingency.

Due to the extent of the overload during a contingent event, PF correction would not defer this system limitation. A load reduction of at least 3MVA would be required to defer this system limitation for a 12 month period.

A RIT-D is expected to be required for this system limitation with a planned publication date of December 2015.

Substation: Edithburgh 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.7	1.4	1.3	1.4	1.3
	MVAr	0.7	0.6	0.5	0.5	0.5
	MVA	1.8	1.5	1.4	1.4	1.4
	PF	0.93	0.93	0.93	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	1.4	1.4	1.3	1.3	1.4
	MVAr	0.6	0.6	0.5	0.5	0.5
	MVA	1.5	1.5	1.4	1.4	1.5
	PF	0.93	0.93	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.0	1.0	1.0	1.0	1.0	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.1	1.1	1.1	1.1	1.0	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	50% POE Forecast						
	MW	0.9	0.9	0.9	0.9	0.9	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	0.9	0.9	1.0	1.0	0.9	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Freeling North 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3.8 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	1.7	2.2	2.3
	MVAr	N/A	N/A	0.6	0.9	0.9
	MVA	N/A	N/A	1.8	2.4	2.5
	PF	N/A	N/A	0.94	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	1.9	1.8
	MVAr	N/A	N/A	N/A	0.7	0.7
	MVA	N/A	N/A	N/A	2.0	2.0
	PF	N/A	N/A	N/A	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.2	2.1	2.1	2.0	2.0	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.3	2.3	2.2	2.2	2.1	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	4.3	4.3	4.3	4.3	4.3	
	50% POE Forecast						
	MW	2.0	1.9	1.9	1.8	1.8	
	MVAr	0.8	0.7	0.7	0.7	0.7	
	MVA	2.1	2.1	2.0	2.0	1.9	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	3.7	3.8	3.9	4.1	4.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Gawler Belt 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	7.2	7.3	6.4	7.6	8.1
	MVAr	2.6	2.7	2.3	2.5	2.6
	MVA	7.7	7.8	6.8	8.0	8.5
	PF	0.94	0.94	0.94	0.95	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	4.9	5.4	6.8	5.8	5.6
	MVAr	1.4	1.1	0.4	1.1	1.1
	MVA	5.1	5.5	6.8	5.9	5.7
	PF	0.96	0.98	1.00	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.0	8.0	8.0	8.0	8.0	
	MVAr	2.8	2.8	2.8	2.8	2.8	
	MVA	8.4	8.4	8.4	8.5	8.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	29.2	29.2	29.2	29.2	29.2	
	50% POE Forecast						
	MW	7.3	7.3	7.2	7.2	7.2	
	MVAr	2.5	2.5	2.5	2.5	2.5	
	MVA	7.7	7.7	7.7	7.7	7.7	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	15.7	15.7	15.7	15.7	15.7	
	Transfer Capacity (MVA)	2.6	2.6	2.6	2.7	2.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2010/11	+0.3MVA Customer load increase
2012/13	+0.2MVA from Wasleys
	+0.2MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Hamley Bridge 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	1.9	2.0
	MVAr	N/A	N/A	N/A	0.9	0.9
	MVA	N/A	N/A	N/A	2.1	2.2
	PF	N/A	N/A	N/A	0.91	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	1.4
	MVAr	N/A	N/A	N/A	N/A	0.3
	MVA	N/A	N/A	N/A	N/A	1.4
	PF	N/A	N/A	N/A	N/A	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.5	2.5	2.5	2.5	2.4	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	2.7	2.7	2.6	2.6	2.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	50% POE Forecast						
	MW	2.3	2.3	2.2	2.2	2.2	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.4	2.4	2.4	2.4	2.3	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Kadina 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	8.9	9.1	7.9	8.0	9.0
	MVAr	2.8	2.7	2.4	2.3	2.6
	MVA	9.3	9.5	8.3	8.3	9.4
	PF	0.96	0.96	0.96	0.96	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	5.9	6.3	6.2	6.3	6.4
	MVAr	0.3	0.6	0.5	0.0	0.0
	MVA	5.9	6.4	6.2	6.3	6.4
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.8	8.8	8.8	8.8	8.8	
	MVAr	2.6	2.6	2.6	2.6	2.6	
	MVA	9.2	9.2	9.2	9.1	9.1	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	16.0	16.0	16.0	16.0	16.0	
	50% POE Forecast						
	MW	7.9	7.9	7.9	7.8	7.8	
	MVAr	2.3	2.3	2.3	2.3	2.3	
	MVA	8.3	8.2	8.2	8.2	8.2	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	8.8	8.8	8.8	8.8	8.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Kapunda 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	5.5	5.8	5.3	5.3	5.7
	MVAr	2.3	2.3	2.0	1.9	1.8
	MVA	5.9	6.2	5.6	5.6	6.0
	PF	0.93	0.94	0.95	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	5.1	5.1	5.0	5.2	5.4
	MVAr	1.1	1.3	1.0	1.0	1.1
	MVA	5.2	5.3	5.1	5.3	5.5
	PF	0.98	0.97	0.98	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.5	5.5	5.5	5.4	5.4	
	MVAr	1.8	1.8	1.8	1.8	1.8	
	MVA	5.8	5.8	5.7	5.7	5.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	34.8	34.8	34.8	34.8	34.8	
	50% POE Forecast						
	MW	5.1	5.0	5.0	5.0	5.0	
	MVAr	1.7	1.7	1.6	1.6	1.6	
	MVA	5.3	5.3	5.3	5.3	5.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	18.6	18.6	18.6	18.6	18.6	
	Transfer Capacity (MVA)	0.6	0.6	0.6	0.6	0.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2012/13	+0.6MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Maitland 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.1	3.9	3.8	3.5	3.6
	MVAr	1.5	1.6	1.5	1.7	1.4
	MVA	4.4	4.2	4.1	3.9	3.9
	PF	0.94	0.93	0.93	0.90	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	2.8	3.2	2.9	3.3	2.7
	MVAr	1.1	1.3	1.1	1.5	1.3
	MVA	3.1	3.4	3.1	3.6	3.0
	PF	0.93	0.93	0.93	0.90	0.90

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.3	3.3	3.1	3.1	3.0	
	MVAr	1.4	1.4	1.3	1.3	1.3	
	MVA	3.6	3.5	3.4	3.3	3.3	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	7.1	7.1	7.1	7.1	7.1	
	50% POE Forecast						
	MW	3.0	2.9	2.7	2.7	2.6	
	MVAr	1.2	1.2	1.1	1.1	1.1	
	MVA	3.2	3.1	2.9	2.9	2.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Minlaton 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 2 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.4	1.9	2.1	1.8	2.1
	MVAr	0.5	0.4	0.4	0.3	0.5
	MVA	2.4	1.9	2.1	1.8	2.1
	PF	0.98	0.98	0.98	0.98	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	1.5	1.7	1.4	1.8	1.7
	MVAr	0.3	0.3	0.3	0.3	0.4
	MVA	1.5	1.7	1.4	1.8	1.8
	PF	0.98	0.99	0.98	0.98	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.9	1.9	1.8	1.8	1.8	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	2.0	2.0	1.9	1.9	1.9	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	2.6	2.6	2.6	2.6	2.6	
	50% POE Forecast						
	MW	1.7	1.7	1.6	1.6	1.6	
	MVAr	0.6	0.6	0.5	0.6	0.6	
	MVA	1.8	1.8	1.7	1.7	1.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	1.5	1.5	1.5	1.5	1.5	
	Transfer Capacity (MVA)	0.3	0.3	0.3	0.3	0.3	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)
2011/12	0.5MVAr Capacitor Bank installed

Year	Future Step Change (10% POE MVA)

Substation: Moonta 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.0	8.5	9.4	8.5	8.4
	MVAr	1.8	1.7	1.9	1.7	1.7
	MVA	9.2	8.7	9.6	8.7	8.6
	PF	0.98	0.98	0.98	0.98	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	5.8	5.9	6.6	7.3	6.6
	MVAr	0.0	0.0	0.0	1.2	1.6
	MVA	5.8	5.9	6.6	7.4	6.8
	PF	1.00	1.00	1.00	0.99	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.1	8.3	8.4	8.6	8.8	
	MVAr	1.9	1.9	2.0	2.0	2.1	
	MVA	8.3	8.5	8.7	8.8	9.0	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	12.8	12.8	12.8	12.8	12.8	
	50% POE Forecast						
	MW	7.1	7.3	7.4	7.6	7.8	
	MVAr	1.7	1.7	1.7	1.8	1.8	
	MVA	7.3	7.5	7.6	7.8	8.0	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	7.1	7.1	7.1	7.1	7.1	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Port Clinton 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.6	0.7	0.7	0.7	0.7	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.7	0.7	0.7	0.7	0.7	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.6	0.6	0.6	0.6	0.6	
	MVAr	0.1	0.2	0.2	0.2	0.2	
	MVA	0.6	0.6	0.6	0.6	0.6	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Port Giles 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.9	1.9	1.9	1.9	1.9	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.9	1.9	1.9	1.9	1.9	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	3.3	3.3	3.3	3.3	3.3	
	50% POE Forecast						
	MW	1.7	1.7	1.7	1.7	1.7	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	1.7	1.7	1.7	1.7	1.7	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.8	1.8	1.8	1.8	1.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Port Vincent 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 2 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	1.6	1.3	1.3	1.2
	MVAr	N/A	0.6	0.5	0.5	0.3
	MVA	N/A	1.8	1.4	1.4	1.3
	PF	N/A	0.93	0.93	0.93	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	1.1	1.0	1.2	1.1	1.0
	MVAr	0.5	0.4	0.5	0.4	0.4
	MVA	1.2	1.0	1.3	1.1	1.1
	PF	0.93	0.93	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.5	1.5	1.5	1.6	1.6	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.5	1.6	1.6	1.6	1.7	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	2.6	2.6	2.6	2.6	2.6	
	50% POE Forecast						
	MW	1.3	1.4	1.4	1.4	1.5	
	MVAr	0.3	0.3	0.3	0.4	0.4	
	MVA	1.4	1.4	1.4	1.5	1.5	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	1.5	1.5	1.5	1.5	1.5	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Riverton 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	1.7	1.8
	MVAr	N/A	N/A	N/A	0.7	0.6
	MVA	N/A	N/A	N/A	1.8	1.9
	PF	N/A	N/A	N/A	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	1.5
	MVAr	N/A	N/A	N/A	N/A	0.3
	MVA	N/A	N/A	N/A	N/A	1.5
	PF	N/A	N/A	N/A	N/A	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.3	2.3	2.2	2.3	2.3	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	2.4	2.4	2.4	2.3	2.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	2.1	2.0	2.0	2.0	2.0	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	2.2	2.1	2.1	2.1	2.1	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		2				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Sandy Creek 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	1.8	1.6	1.8	1.9
	MVAr	N/A	0.6	0.6	0.7	0.7
	MVA	N/A	1.9	1.7	1.9	2.1
	PF	N/A	0.95	0.94	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	1.3	1.2	1.3	1.2
	MVAr	N/A	0.3	0.2	0.5	0.2
	MVA	N/A	1.3	1.3	1.4	1.2
	PF	N/A	0.98	0.98	0.93	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.7	1.7	1.6	1.6	1.5	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	1.8	1.8	1.7	1.7	1.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	1.6	1.5	1.5	1.4	1.4	
	MVAr	0.6	0.5	0.5	0.5	0.5	
	MVA	1.7	1.6	1.6	1.5	1.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Stansbury 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.5	1.1	1.1	1.1	1.1
	MVAr	0.6	0.4	0.4	0.4	0.3
	MVA	1.6	1.2	1.2	1.2	1.1
	PF	0.93	0.93	0.93	0.93	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	1.0	0.9	1.0	0.9	0.9
	MVAr	0.3	0.4	0.4	0.4	0.4
	MVA	1.0	1.0	1.1	1.0	1.0
	PF	0.94	0.93	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.9	0.8	0.8	0.8	0.8	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	0.9	0.9	0.9	0.9	0.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	2.7	2.7	2.7	2.7	2.7	
	50% POE Forecast						
	MW	0.8	0.7	0.8	0.7	0.7	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.8	0.8	0.7	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Wallaroo 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	8.1	8.2	7.8	7.8	7.7
	MVAr	3.2	3.2	3.1	3.1	2.4
	MVA	8.8	8.8	8.4	8.4	8.1
	PF	0.93	0.93	0.93	0.93	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	5.2	4.9	5.4	6.4	5.4
	MVAr	2.1	1.9	2.1	2.5	2.3
	MVA	5.6	5.3	5.8	6.9	5.8
	PF	0.93	0.93	0.93	0.93	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	7.5	7.5	7.5	7.6	7.6	
	MVAr	2.9	2.9	2.9	2.9	2.9	
	MVA	8.0	8.1	8.1	8.1	8.2	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	16.2	16.2	16.2	16.2	16.2	
	50% POE Forecast						
	MW	6.7	6.7	6.7	6.7	6.7	
	MVAr	2.6	2.6	2.6	2.6	2.6	
	MVA	7.1	7.2	7.2	7.2	7.2	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	9.0	9.0	9.0	9.0	9.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2010/11	+0.4MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Warooka 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.6	2.4	2.5	2.0	1.9
	MVAr	1.0	0.9	1.0	0.8	0.6
	MVA	2.8	2.5	2.7	2.1	2.0
	PF	0.93	0.93	0.93	0.93	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	1.6	1.7	1.5	1.4	1.4
	MVAr	0.6	0.7	0.6	0.6	0.6
	MVA	1.7	1.8	1.6	1.5	1.5
	PF	0.93	0.93	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.6	1.6	1.7	1.7	1.7	
	MVAr	0.6	0.6	0.6	0.6	0.6	
	MVA	1.7	1.7	1.8	1.8	1.8	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	5.4	5.4	5.4	5.4	5.4	
	50% POE Forecast						
	MW	1.4	1.4	1.5	1.5	1.5	
	MVAr	0.5	0.5	0.6	0.6	0.6	
	MVA	1.5	1.5	1.6	1.6	1.6	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	3.0	3.0	3.0	3.0	3.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	2					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Waterloo Town 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 0.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	0.5
	MVAr	N/A	N/A	N/A	N/A	0.2
	MVA	N/A	N/A	N/A	N/A	0.6
	PF	N/A	N/A	N/A	N/A	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.5	0.5	0.5	0.5	0.5	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.5	0.5	0.5	0.5	0.5	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	0.7	0.7	0.7	0.7	0.7	
	50% POE Forecast						
	MW	0.4	0.4	0.4	0.4	0.4	
	MVAr	0.1	0.1	0.1	0.1	0.1	
	MVA	0.4	0.4	0.4	0.4	0.4	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Yorketown 33/11kV

Region: Mid North & Yorke Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 2 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.1	2.0	1.6	1.4	1.9
	MVA	0.0	0.0	0.0	0.1	0.0
	MVA	2.1	2.0	1.6	1.5	1.9
	PF	1.00	1.00	1.00	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	1.7	1.7	1.7	1.3	1.7
	MVA	0.0	0.0	0.0	0.1	0.1
	MVA	1.7	1.7	1.7	1.3	1.7
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.7	1.7	1.7	1.7	1.7	
	MVA	0.0	0.0	0.0	0.0	0.0	
	MVA	1.7	1.7	1.7	1.7	1.7	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	2.6	2.6	2.6	2.6	2.6	
	50% POE Forecast						
	MW	1.5	1.5	1.5	1.5	1.5	
	MVA	0.0	0.0	0.0	0.0	0.0	
	MVA	1.5	1.5	1.5	1.5	1.5	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	1.5	1.5	1.5	1.5	1.5	
	Transfer Capacity (MVA)	1.2	1.2	1.2	1.2	1.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

8.12.4 Mid North and Yorke Peninsula Non SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Alma	1	0.15	2.0	0.1	0.1	0.1	0.1	0.1
Auburn	2	3.0	3.9	3.5	3.4	3.4	3.3	3.3
Bowmans PT Reg		11.4	14.9	5.8	5.7	5.6	5.5	5.4
Black Point	1	1.0	1.3	0.6	0.6	0.6	0.7	0.7
Burra 33kV PT Reg		5.7	7.4	4.1	4.2	4.2	4.2	4.3
Clare 33kV PT Reg		11.4	14.9	4.1	4.2	4.2	4.2	4.3
Collinsfield	1	2.5	2.7	0.7	0.7	0.7	0.7	0.6
Curramulka	1	0.2	0.3	0.3	0.3	0.3	0.3	0.3
Curramulka South	1	0.15	0.2	0.03	0.03	0.03	0.03	0.03
Dowlingville	1	0.2	0.3	0.04	0.04	0.04	0.04	0.04
Eudunda	1	2.0	2.4	2.1	2.1	2.1	2.0	2.0
Freeling	2	3.0	3.9	0.4	0.4	0.4	0.4	0.4
Georgetown	1	0.15	0.2	0.1	0.1	0.1	0.1	0.1
Gulnare	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1
Halbury	1	0.15	0.2	0.1	0.1	0.1	0.1	0.1

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Hoyleton	1	0.15	0.2	0.1	0.1	0.1	0.1	0.1
James Well	1	0.7	0.9	0.4	0.5	0.5	0.5	0.5
Kleins Point	2	3.0	3.9	1.5	1.5	1.5	1.5	1.5
Kybunga	1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Maitland	2	5.0	6.5	3.6	3.5	3.4	3.3	3.3
Mallala	2	4.0	4.8	4.4	4.5	4.6	4.7	4.8
Marion Bay	1	1.0	1.3	0.7	0.8	0.8	0.8	0.8
Marrabel	2	3.0	3.9	2.3	2.2	2.2	2.2	2.2
Ninnes	1	1.0	1.3	0.9	0.9	0.9	0.9	0.9
Paskeville	2	1.0	1.3	0.3	0.3	0.3	0.3	0.3
Paskeville 33kV Reg		20	25.0	0.8	0.8	0.8	0.8	0.8
Port Broughton	2	5.0	5.4	3.2	3.2	3.1	3.1	3.1
Port Julia	1	1.0	1.3	0.5	0.5	0.5	0.5	0.6
Port Vincent 33kV Reg		20.0	25	3.4	3.5	3.5	3.6	3.7
Robertstown	1	1.0	1.3	1.0	1.0	1.0	1.0	1.0
Spalding	2	2.0	2.6	1.1	1.0	1.0	1.0	1.0

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Wasleys	2	2.0	2.6	2.4	2.4	2.3	2.3	2.3

System Limitations: Mallala

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the substation by upgrading the existing transformers; or
- Upgrade the substation by adding a third transformers.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations.

8.12.5 Mid North and Yorke Peninsula Non SCADA Substations 50% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	N-1 Emerg. Cyclic Rating (MVA)	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
				50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)
Auburn	2	3.0	2.3	3.1	0.0	3.1	0.0	3.0	0.0	3.0	0.0	3.0	0.0
Maitland	2	5.0	3.8	3.2	0.0	3.2	0.0	2.9	0.0	2.9	0.0	2.8	0.0
Mallala	2	4.0	2.6	4.0	0.4	4.0	0.3	4.1	0.3	4.2	0.3	4.4	0.3
Port Broughton	2	5.0	3.0	2.7	0.0	2.7	0.0	2.6	0.0	2.6	0.0	2.6	0.0

System Limitations: Nil

8.12.6 Mid North and Yorke Peninsula 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Hummocks							
Hummocks	Ninnes Tee	18	3.3	3.3	3.3	3.3	3.3
Ninnes Tee	Ninnes	3.5	1.4	1.4	1.4	1.4	1.3
Ninnes	Lochiel	3.9	0.5	0.5	0.5	0.5	0.5
Ninnes Tee	Paskeville	18	1.9	1.9	1.9	1.9	1.9
Paskeville	Kadina East	6.5	0.8	0.8	0.8	0.8	0.7
Hummocks	Ardrossan	7	1.8	1.8	1.8	1.8	1.7
Hummocks	Pt Wakefield Tee	17.6	6.6	6.6	6.5	6.5	6.5
Pt Wakefield Tee	Proof Range	9.1	2.6	2.6	2.6	2.6	2.6
Hummocks	Balaklava Tee	26.6	5.8	5.7	5.6	5.5	5.5
Balaklava Tee	LSDF4173	9.8	5.8	5.7	5.6	5.5	5.5
LSDF4173	Balaklava	5.1	3.0	2.9	2.9	2.8	2.7
33kV lines ex Kadina East							
Kadina East	Kadina	24.6	9.2	9.2	9.3	9.3	9.3
Kadina East	Kadina Tee	36.6	9.4	9.6	9.7	9.9	10.1
Kadina Tee	Moonta	13.7	9.4	9.6	9.7	9.9	10.1
Kadina	Kadina Tee	13.7	0.0	0.0	0.0	0.0	0.0
Kadina East	Wallaroo	13.7	8.0	8.1	8.1	8.2	8.2
33kV lines ex Ardrossan West							
Ardrossan West	Maitland	9.8	3.6	3.5	3.5	3.4	3.4
Ardrossan West	Ardrossan	5.1	2.2	2.2	2.2	2.3	2.3
Ardrossan West	Ardrossan BHP	27.7	8.4	8.5	8.7	8.8	8.9
Ardrossan BHP	Black Point	20.1	6.4	6.5	6.7	6.8	6.9
Black Point	Port Vincent	20.1	5.8	5.9	6.0	6.1	6.2
Port Vincent	Minlaton Tee	7	3.0	3.0	3.0	3.1	3.1
Minlaton Tee	Minlaton	4.2	3.0	3.0	3.0	3.1	3.1
Minlaton Tee	LSDF448	7	0.0	0.0	0.0	0.0	0.0
33kV lines ex Dalrymple							
Dalrymple	Port Giles Tee	20.3	4.8	4.8	4.8	4.8	4.8
Port Giles Tee	Port Giles	15.5	1.9	1.9	1.9	1.9	1.9
Port Giles Tee	Kleins Point	5.1	1.5	1.5	1.5	1.5	1.5
Port Giles Tee	Stansbury	6.1	1.3	1.3	1.3	1.3	1.3
Stansbury	LSDF448	7	0.4	0.4	0.4	0.4	0.4
Dalrymple	Wool Bay Reg	20.3	5.2	5.2	5.2	5.3	5.3
Wool Bay Reg	Edithburgh Tee	9.8	5.2	5.2	5.2	5.3	5.3

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
Edithburgh Tee	Edithburgh	15.5	1.1	1.1	1.1	1.1	1.0
Edithburgh Tee	Yorketown	9.8	4.1	4.2	4.2	4.2	4.2
Yorketown	Warooka	5.1	2.5	2.5	2.5	2.5	2.6
Warooka	Marion Bay	15.5	0.7	0.7	0.7	0.8	0.8
33kV lines ex Brinkworth							
Brinkworth	Yacka Tee	6.2	1.8	1.8	1.8	1.8	1.7
Yacka Tee	Spalding Tee	5.1	1.8	1.8	1.8	1.8	1.7
Spalding Tee	Gladstone	3.9	0.4	0.4	0.4	0.4	0.4
Spalding Tee	Spalding	3.1	1.4	1.4	1.4	1.4	1.4
Brinkworth	Collinsfield	6.2	0.7	0.7	0.7	0.6	0.6
Brinkworth	Brinkworth Tee	6.2	3.7	3.6	3.6	3.5	3.5
Brinkworth Tee	Brinkworth Town	5.1	3.7	3.6	3.6	3.5	3.5
Brinkworth Town	Blyth	5.1	2.8	2.7	2.7	2.7	2.6
Blyth	Balaklava	4	0.5	0.5	0.5	0.5	0.4
Blyth	Clare North Tee	6.2	0.1	0.1	0.1	0.1	0.1
33kV lines ex Waterloo							
Waterloo	Riverton Tee	6.2	6.6	6.5	6.5	6.4	6.3
Riverton Tee	Auburn Tee	6.2	4.3	4.3	4.2	4.2	4.1
Auburn Tee	Auburn	6.2	3.5	3.4	3.4	3.3	3.3
Auburn Tee	Auburn 33/.4	15.5	0.8	0.8	0.8	0.8	0.8
Riverton Tee	Riverton	15.5	2.3	2.3	2.2	2.2	2.2
Waterloo	Robertstown	7	1.0	1.0	1.0	1.0	0.9
Waterloo	Clare Tee	20.3	0.1	0.1	0.1	0.1	0.1
Waterloo	Marrabel	7	4.4	4.3	4.3	4.2	4.2
Marrabel	Eudunda Tee	7	2.1	2.1	2.1	2.0	2.0
Eudunda Tee	Eudunda	5.1	2.1	2.1	2.1	2.0	2.0
33kV lines ex Templers							
Templers	Wasleys	13	8.7	8.8	8.8	8.9	9.0
Wasleys	Mallala	5.1	4.4	4.5	4.6	4.7	4.8
Templers	Hamley Bridge	5.1	4.9	4.9	4.8	4.8	4.8
Hamley Bridge	Balaklava	5.1	2.2	2.2	2.2	2.2	2.2
Templers	Freeling	13.2	8.5	8.5	8.4	8.4	8.3
Freeling	Kapunda	7	5.8	5.8	5.8	5.8	5.7
Kapunda	Eudunda Tee	7	0.0	0.0	0.0	0.0	0.0
Templers	Daveyston	21.4	1.8	1.8	1.8	1.8	1.8
Templers	Gawler Belt Tee	20.3	8.4	8.4	8.5	8.5	8.5
Gawler Belt Tee	Evanston Tee	6.5	0.0	0.0	0.0	0.0	0.0

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
Evanston Tee	Evanston	6.5	0.0	0.0	0.0	0.0	0.0
33kV lines ex Clare North							
Clare North	Clare No1	36.6	7.6	7.6	7.7	7.7	7.8
Clare North	Clare North Tee	36.6	7.6	7.6	7.7	7.7	7.8
Clare North Tee	Clare No2	36.6	7.6	7.6	7.7	7.7	7.8
Clare	Clare Tee	13	4.1	4.2	4.2	4.3	4.3
Clare Tee	Burra	3.9	4.1	4.2	4.2	4.3	4.3

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Waterloo-Riverton Tee
Clare Tee-Burra

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the line by increasing conductor clearances.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations.

8.13 Murraylands Regional Development Plan

The Murraylands

The SA Power Networks' Murraylands Region includes the region from Punyelroo in the North to Coonalpyn in the south and extends westwards to Pinnaroo and eastwards to Narrung. There are three main connection systems in the Murraylands, being Mannum, Mobilong and Tailem Bend.

SA Power Networks' Distribution Network

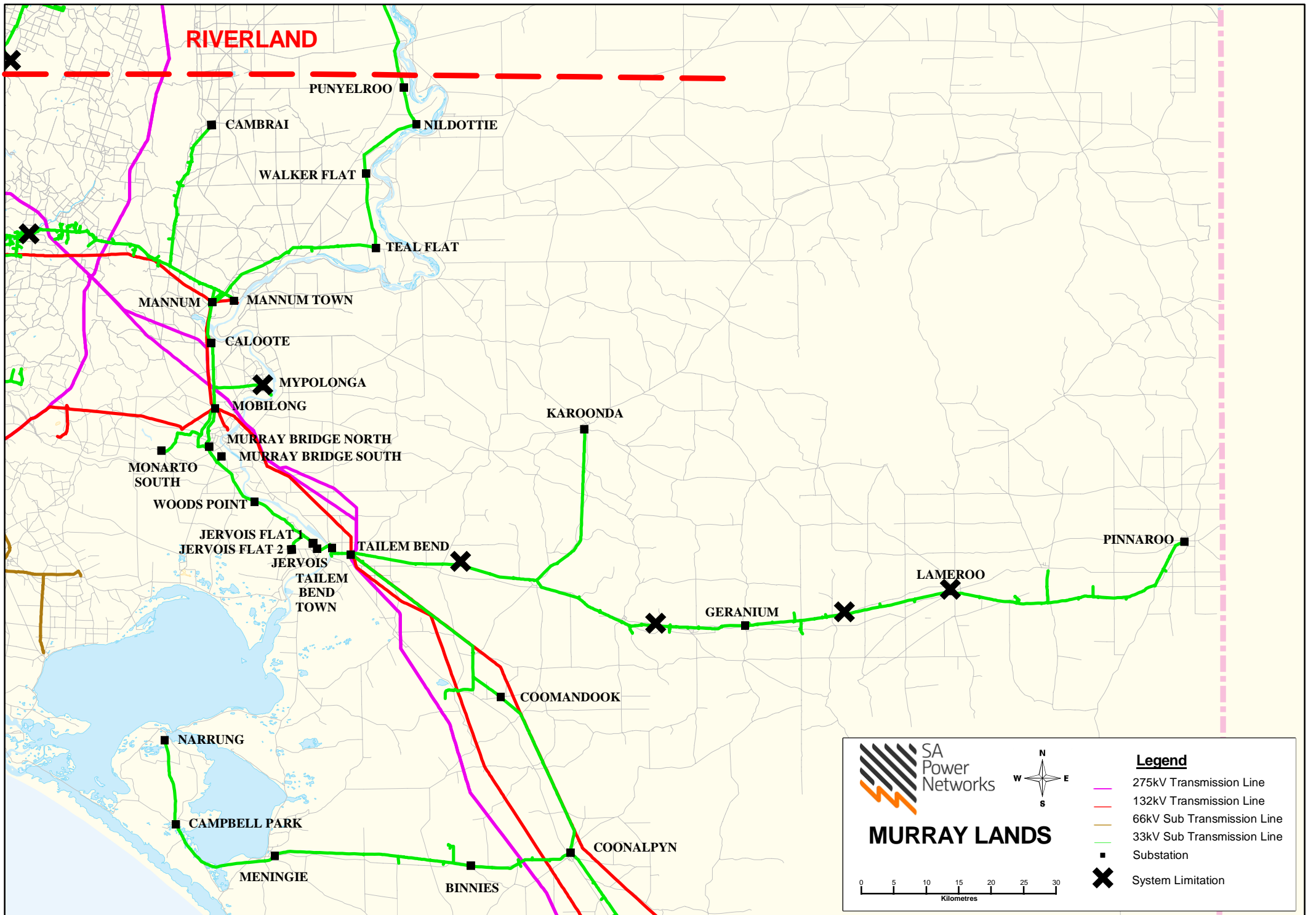
Electricity is supplied to the various towns and localities throughout the Murraylands region directly from the 33kV sub-transmission network or via Zone Substations. These Zone Substations are operated at 33,000 Volts stepped down to 11,000 Volts (7,600 Volts at Mannum) and are upgraded when load exceeds capacity.

Customers are supplied from SA Power Networks distribution system via 33kV lines and 7.6kV, 11kV and 19kV primary distribution feeders, which emanate from Zone Substations. These lines and feeders are extended and upgraded as required to meet customer demand, customer connection requests and to maintain QoS. Large customer projects may require a Zone Substation upgrade as well as 11kV feeder or 33kV line modifications. Therefore, SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are system limitations forecast for the primary distribution feeders under normal conditions in the Murraylands Region in the next two years.

8.13.1 Murraylands SCADA Substations

Source Connection Point	Associated SCADA Substations
Mannum	<ul style="list-style-type: none"> • Caloote • Nildottie • Mannum Town
Mobilong	<ul style="list-style-type: none"> • Monarto South • Murray Bridge North • Murray Bridge South • Mypolonga
Tailem Bend	<ul style="list-style-type: none"> • Jervois • Meningie • Woods Point • Narrung • Parilla



RIVERLAND

PUNYELROO

CAMBRAI

NILDOTTIE

WALKER FLAT

TEAL FLAT

MANNUM

MANNUM TOWN

CALOOTE

MYPOLONGA

MOBILONG

MURRAY BRIDGE NORTH

MURRAY BRIDGE SOUTH

MONARTO SOUTH

WOODS POINT

JERVOIS FLAT 1

JERVOIS FLAT 2

JERVOIS

TAILEM BEND

TAILEM BEND TOWN

KAROONDA

PINNAROO

LAMEROO

GERANIUM

COOMANDOOK

NARRUNG

CAMPBELL PARK

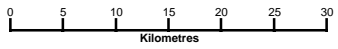
MENINGIE

BINNIES

COONALPYN



MURRAY LANDS



Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- ✕ System Limitation

Substation: Mannum 132/33kV

Region: Murraylands

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 40 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	14.3	10.1	13.3	12.6	12.6
	MVAr	6.5	5.0	4.7	4.2	3.9
	MVA	15.7	11.2	14.1	13.3	13.2
	PF	0.91	0.91	0.94	0.95	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	7.9	8.3	7.1	8.4	7.5
	MVAr	1.6	1.8	2.3	2.4	0.7
	MVA	8.1	8.5	7.5	8.7	7.5
	PF	0.98	0.98	0.95	0.96	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	12.3	12.4	12.5	12.5	12.5
	MVAr	4.1	4.2	4.2	4.2	4.2
	MVA	13.0	13.1	13.1	13.2	13.2
	PF	0.95	0.95	0.95	0.95	0.95
	Firm Delivery Capacity (MVA)	21.0	21.0	21.0	21.0	21.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	1				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Mobilong 132/33kV

Region: Murraylands

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 120 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	39.9	41.2	37.3	36.6	41.0
	MVAr	16.3	16.9	17.1	12.0	15.3
	MVA	43.1	44.6	41.0	38.6	43.8
	PF	0.93	0.93	0.91	0.95	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	30.3	28.9	28.2	28.4	28.1
	MVAr	9.2	8.8	7.8	6.9	5.9
	MVA	31.6	30.2	29.2	29.3	28.7
	PF	0.96	0.96	0.96	0.97	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	40.1	40.3	40.3	40.5	40.7
	MVAr	16.0	16.0	16.1	16.1	16.2
	MVA	43.2	43.3	43.4	43.6	43.8
	PF	0.93	0.93	0.93	0.93	0.93
	Firm Delivery Capacity (MVA)	57.2	57.2	57.2	57.2	57.2
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	11				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Tailem Bend 132/33kV

Region: Murraylands

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	25.3	23.3	19.8	20.4	21.8
	MVAr	9.2	7.2	5.4	5.9	5.5
	MVA	26.9	24.4	20.6	21.2	22.5
	PF	0.94	0.96	0.96	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	14.7	15.5	15.4	15.1	15.1
	MVAr	0.5	0.2	1.0	0.6	0.1
	MVA	14.7	15.5	15.4	15.2	15.1
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	21.3	21.1	20.9	20.7	20.5
	MVAr	5.8	5.8	5.7	5.6	5.6
	MVA	22.1	21.9	21.7	21.4	21.2
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	32.5	32.5	32.5	32.5	32.5
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Caloote 33/11kV

Region: Murraylands

Number of Feeders: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.9	2.0	1.8	1.8	1.8
	MVAr	0.7	0.8	0.7	0.7	0.9
	MVA	2.0	2.2	1.9	2.0	2.0
	PF	0.93	0.93	0.93	0.93	0.89
Year		2009	2010	2011	2012	2013
Winter	MW	1.3	1.3	1.6	1.5	1.5
	MVAr	0.5	0.5	0.6	0.6	0.6
	MVA	1.4	1.4	1.7	1.6	1.6
	PF	0.93	0.93	0.93	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.8	1.8	1.8	1.7	1.7	
	MVAr	0.8	0.8	0.8	0.8	0.7	
	MVA	1.9	1.9	1.9	1.9	1.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	1.6	1.6	1.6	1.6	1.6	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	1.8	1.7	1.7	1.7	1.7	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	2.3	2.3	2.3	2.3	2.3	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Coonalpyn 33/11kV

Region: Murraylands

Number of Feeders: 1

Number of Transformers: 2

Total Nameplate Rating (MVA): 1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	0.4	0.4	0.4	0.3	0.3
	MVAr	0.2	0.2	0.1	0.1	0.1
	MVA	0.5	0.5	0.4	0.4	0.4
	PF	0.86	0.90	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	0.3	0.3	0.3	0.3	0.3
	MVAr	0.1	0.1	0.1	0.1	0.1
	MVA	0.4	0.3	0.3	0.3	0.3
	PF	0.94	0.97	0.93	0.93	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.4	0.3	0.3	0.3	0.3	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.4	0.4	0.4	0.4	0.4	
	PF	0.88	0.88	0.88	0.88	0.88	
	Total Capacity (MVA)	1.3	1.3	1.3	1.3	1.3	
	50% POE Forecast						
	MW	0.3	0.3	0.3	0.3	0.3	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.3	0.3	0.3	0.3	0.3	
	PF	0.88	0.88	0.88	0.88	0.88	
	Firm Delivery Capacity (MVA)	0.8	0.8	0.8	0.8	0.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	1					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Jervois 33/11kV

Region: Murraylands

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.0	3.0	2.5	2.6	2.4
	MVAr	1.0	1.0	0.9	0.8	0.7
	MVA	3.2	3.2	2.7	2.7	2.6
	PF	0.95	0.95	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	2.0	2.0	2.0	2.1	2.2
	MVAr	0.7	0.7	0.7	0.7	0.5
	MVA	2.2	2.2	2.2	2.2	2.2
	PF	0.94	0.94	0.94	0.95	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.4	2.3	2.3	2.3	2.2	
	MVAr	0.8	0.8	0.7	0.7	0.7	
	MVA	2.5	2.5	2.4	2.4	2.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	8.9	8.9	8.9	8.9	8.9	
	50% POE Forecast						
	MW	2.4	2.3	2.3	2.2	2.2	
	MVAr	0.8	0.7	0.7	0.7	0.7	
	MVA	2.5	2.4	2.4	2.3	2.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.5	0.5	0.5	0.5	0.5	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Mannum Town 33/7.6kV

Region: Murraylands

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2009	2010	2011	2012
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	4.1	4.1	4.1	4.1	4.1	
	MVAr	1.3	1.3	1.3	1.4	1.4	
	MVA	4.3	4.3	4.3	4.3	4.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	6.5	6.5	6.5	6.5	6.5	
	50% POE Forecast						
	MW	3.7	3.7	3.7	3.7	3.7	
	MVAr	1.2	1.2	1.2	1.2	1.2	
	MVA	3.9	3.9	3.9	3.9	3.9	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk

Substation: Meningie 33/11kV

Region: Murraylands

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.3	2.3	2.1	2.1	2.2
	MVAr	0.0	0.1	0.3	0.2	0.2
	MVA	2.3	2.3	2.1	2.1	2.3
	PF	1.00	1.00	0.99	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	1.6	1.9	1.9	2.0	2.0
	MVAr	0.9	0.7	0.8	0.8	0.3
	MVA	1.9	2.0	2.0	2.1	2.0
	PF	0.88	0.94	0.91	0.93	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.1	2.1	2.1	2.1	2.1	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	2.2	2.2	2.1	2.1	2.1	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	6.5	6.5	6.5	6.5	6.5	
	50% POE Forecast						
	MW	2.0	2.0	2.0	2.0	2.0	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	2.0	2.0	2.0	2.1	2.1	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	10					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Monarto South 33/11kV

Region: Murraylands

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.7	5.0	4.5	5.0	4.8
	MVAr	2.9	3.0	2.8	2.0	2.8
	MVA	5.5	5.8	5.3	5.4	5.6
	PF	0.85	0.86	0.85	0.93	0.86
Year		2009	2010	2011	2012	2013
Winter	MW	4.0	4.0	4.1	5.0	4.0
	MVAr	2.0	2.0	2.0	2.0	2.0
	MVA	4.5	4.5	4.6	5.4	4.5
	PF	0.89	0.89	0.90	0.93	0.89

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.0	4.9	4.8	4.7	4.6	
	MVAr	2.9	2.9	2.8	2.8	2.7	
	MVA	5.8	5.6	5.5	5.4	5.3	
	PF	0.86	0.86	0.86	0.86	0.86	
	Total Capacity (MVA)	14.5	14.5	14.5	14.5	14.5	
	50% POE Forecast						
	MW	4.6	4.5	4.4	4.3	4.3	
	MVAr	2.7	2.7	2.6	2.6	2.5	
	MVA	5.3	5.2	5.1	5.0	4.9	
	PF	0.86	0.86	0.86	0.86	0.86	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.8	1.8	1.8	1.9	1.9	
	System Limitation (Y/N)	Y	Y	Y	Y	Y	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	+0.6MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Monarto South Substation

System Limitation

Monarto South 33/11kV Substation has one 12.5MVA 33/11kV transformer and is located approximately 7km west of the rural city of Murray Bridge.

In the summer of 2014/15, up to 3.5MVA of customer load is forecasted to be unsupplied during a contingent event after all available load transfers have been implemented.

Potential solutions that address the system limitation include:

- Upgrade 11kV feeder ties back to Monarto South Substation (preferred option);
- Upgrade the Monarto South Substation with a second transformer;

A RIT-D is not expected to be required for this system limitation.

Substation: Murray Bridge North 33/11kV

Region: Murraylands

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	19.4	19.9	16.7	16.2	17.6
	MVAr	2.8	3.2	5.3	4.5	2.5
	MVA	19.6	20.1	17.5	16.8	17.8
	PF	0.99	0.99	0.95	0.96	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	12.9	13.7	13.9	13.9	12.5
	MVAr	3.1	5.8	2.8	2.1	1.4
	MVA	13.2	14.9	14.1	14.0	12.6
	PF	0.97	0.92	0.98	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	17.4	17.6	17.8	18.0	18.2	
	MVAr	3.2	3.2	3.3	3.3	3.3	
	MVA	17.7	17.9	18.1	18.3	18.5	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	26.0	26.0	26.0	26.0	26.0	
	50% POE Forecast						
	MW	15.9	16.0	16.2	16.3	16.5	
	MVAr	2.9	2.9	3.0	3.0	3.0	
	MVA	16.1	16.3	16.4	16.6	16.8	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	14.8	14.8	14.8	14.8	14.8	
	Transfer Capacity (MVA)	12.4	12.3	12.1	12.0	11.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	+1.2MVA from Murray Bridge South
2010/11	+0.3MVA Customer load increase
	-1.4MVA to Murray Bridge South
2012/13	-1MVA to Murray Bridge South

Year	Future Step Change (10% POE MVA)

Substation: Murray Bridge South 33/11kV

Region: Murraylands

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	12.6	12.2	12.6	14.7	14.7
	MVA	5.6	5.8	5.5	5.4	6.6
	MVA	13.8	13.5	13.7	15.7	16.1
	PF	0.91	0.90	0.92	0.94	0.91
Year		2009	2010	2011	2012	2013
Winter	MW	12.0	10.9	11.1	11.7	12.9
	MVA	2.4	1.9	2.1	1.8	1.6
	MVA	12.2	11.0	11.3	11.8	12.9
	PF	0.98	0.99	0.98	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.8	14.7	14.7	14.6	14.6	
	MVA	6.1	6.1	6.1	6.1	6.0	
	MVA	16.0	16.0	15.9	15.8	15.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	28.5	28.5	28.5	28.5	28.5	
	50% POE Forecast						
	MW	13.0	13.0	12.9	12.8	12.7	
	MVA	5.4	5.4	5.3	5.3	5.3	
	MVA	14.1	14.0	13.9	13.9	13.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	4.5	4.5	4.6	4.6	4.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2009/10	-1.2MVA to Murray Bridge North
2010/11	+1.4MVA from Murray Bridge North
2011/12	+1.4MVA Customer load increase
2012/13	+1MVA from Murray Bridge North

Year	Future Step Change (10% POE MVA)

Substation: Mypolonga 33/11kV

Region: Murraylands

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 2 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.2	2.2
	MVAr	N/A	N/A	N/A	0.8	0.8
	MVA	N/A	N/A	N/A	2.3	2.3
	PF	N/A	N/A	N/A	0.93	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	1.1
	MVAr	N/A	N/A	N/A	N/A	0.1
	MVA	N/A	N/A	N/A	N/A	1.1
	PF	N/A	N/A	N/A	N/A	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.3	2.3	2.4	2.4	2.5	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.4	2.5	2.5	2.6	2.7	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	2.6	2.6	2.6	2.6	2.6	
	50% POE Forecast						
	MW	2.1	2.1	2.1	2.2	2.2	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	2.2	2.2	2.3	2.3	2.4	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	1.5	1.5	1.5	1.5	1.5	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	4					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	+0.1MVA customer load increase

*Within planning criteria risk margin

Mypolonga 33/11kV Substation

System Limitation

Mypolonga 33/11kV Substation has two 1MVA 33/11kV transformer and is located near the township of Mypolonga.

In the summer of 2018/2019, the substation transformer is forecast to be overloaded by up to 0.1MVA during 10% POE conditions.

Potential solutions that address the system limitation include:

- Upgrade the Mypolonga Substation with a larger transformer or a third transformer (preferred option); or
- Upgrade the Mypolonga Substation with a third transformer.

A RIT-D is not expected to be required for this system limitation.

Substation: Narrung 33/11kV

Region: Murraylands

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.6	1.6	1.6	1.6	1.6	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.7	1.7	1.6	1.6	1.6	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	1.5	1.4	1.4	1.4	1.4	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.5	1.5	1.5	1.5	1.4	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	2.3	2.3	2.3	2.3	2.3	
	Transfer Capacity (MVA)	0.4	0.4	0.4	0.4	0.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	10					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Nildottie 33/11kV

Region: Murraylands

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.4	2.0	2.1	2.2	2.2
	MVAr	0.8	0.6	0.4	0.9	0.3
	MVA	2.5	2.1	2.2	2.4	2.2
	PF	0.95	0.96	0.98	0.92	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	1.1	1.6	1.9	1.6	1.2
	MVAr	0.0	0.5	0.2	0.0	0.1
	MVA	1.1	1.6	1.9	1.6	1.2
	PF	1.00	0.96	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.6	2.6	2.6	2.6	2.6	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.7	2.7	2.7	2.7	2.7	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	8.9	8.9	8.9	8.9	8.9	
	50% POE Forecast						
	MW	2.4	2.4	2.4	2.3	2.3	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	2.5	2.5	2.5	2.4	2.4	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Woods Point 33/11kV

Region: Murraylands

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.0	3.4	3.3	3.1	3.1
	MVAr	1.2	1.3	1.3	1.2	1.6
	MVA	3.2	3.7	3.6	3.4	3.5
	PF	0.93	0.89	0.93	0.93	0.89
Year		2009	2010	2011	2012	2013
Winter	MW	1.9	2.3	2.2	2.4	2.3
	MVAr	0.7	0.9	0.9	1.0	0.9
	MVA	2.1	2.4	2.4	2.6	2.5
	PF	0.93	0.89	0.93	0.93	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.0	2.9	2.9	2.8	2.7	
	MVAr	1.4	1.4	1.4	1.3	1.3	
	MVA	3.3	3.2	3.2	3.1	3.0	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	8.1	8.1	8.1	8.1	8.1	
	50% POE Forecast						
	MW	2.8	2.7	2.7	2.6	2.5	
	MVAr	1.3	1.3	1.3	1.2	1.2	
	MVA	3.1	3.0	2.9	2.9	2.8	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.8	0.9	0.9	0.9	0.9	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2010/11	+0.5MVA customer load increase

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

8.13.3 Murraylands Non SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Belvedere Road	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1
Binnies	2	0.6	0.8	0.3	0.3	0.3	0.3	0.3
Cambrai	2	1.0	1.3	1.0	1.0	1.0	1.0	1.0
Campbell Park	3	1.5	2.0	1.5	1.5	1.4	1.4	1.4
Campbell Pk 33kV PT Reg		5.7	7.4	3.2	3.1	3.1	3.1	3.0
Coomandook	1	0.5	0.7	0.5	0.5	0.5	0.5	0.5
Coonalpyn 33kV Reg		10.0	12.5	6.3	6.2	6.2	6.1	6.1
Geranium	1	0.15	0.2	0.1	0.1	0.1	0.1	0.1
Geranium 33kV Reg		10.0	12.5	5.5	5.4	5.4	5.3	5.2
Jabuk	1	0.2	0.3	0.1	0.1	0.1	0.1	0.1
Karoonda	2	1.0	1.3	0.8	0.8	0.8	0.8	0.8
Ki Ki	1	0.2	0.3	0.1	0.1	0.1	0.1	0.1
Lameroo	2	2.0	2.6	1.3	1.3	1.3	1.3	1.3
Peake	1	0.3	0.4	0.2	0.2	0.2	0.2	0.2
Pellaring Flat	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Pinnaroo	2	2.0	2.6	1.6	1.6	1.6	1.6	1.6
Pinnaroo South	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1
Punyelroo	1	0.5	0.7	0.5	0.5	0.5	0.5	0.5
Sherlock	1	0.15	0.2	0.03	0.03	0.03	0.03	0.03
Sherlock 33kV Reg		20.0	25.0	7.6	7.5	7.4	7.4	7.3
Tailem Bend Town	2	3.0	3.9	3.2	3.1	3.1	3.1	3.0
Teal Flat	3	3.0	3.9	3.4	3.4	3.5	3.5	3.6
Walker Flat	2	2.0	2.6	1.8	1.8	1.8	1.8	1.9

System Limitations: Nil

8.13.4 Murraylands Non SCADA Substations 50% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	N-1 Emerg. Cyclic Rating (MVA)	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
				50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)
Tailem Bend Town	2	3.0	2.3	2.9	0.0	2.8	0.0	2.8	0.0	2.7	0.0	2.7	0.0
Teal Flat	3	3.0	3.0	3.1*	0.0	3.1*	0.0	3.1*	0.0	3.2*	0.0	3.2*	0.0

System Limitations: Nil

***Within planning criteria risk margin**

8.13.5 Murraylands 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Mannum							
Mannum	Mannum Tee	4.2	1.5	1.5	1.5	1.5	1.4
Mannum Tee	Cambrai Tee	4.2	1.5	1.5	1.5	1.5	1.4
Cambrai Tee	Cambrai	3.9	1.2	1.2	1.2	1.2	1.2
Cambrai Tee	Palmer	4.2	0.2	0.2	0.2	0.2	0.2
Palmer	Tungkillo	4.2	0.1	0.1	0.1	0.1	0.1
Mannum	Teal Flat	9.8	8.5	8.6	8.6	8.7	8.7
Teal Flat	Walker Flat	5.1	5.0	5.0	5.0	5.0	5.0
Walker Flat	Nildottie	5.1	3.2	3.2	3.2	3.2	3.2
Nildottie	Punyelroo	5.1	0.5	0.5	0.5	0.5	0.5
Punyelroo	Swan Reach	5.1	0.0	0.0	0.0	0.0	0.0
Mannum	Caloote Tee	13.7	6.8	6.7	6.7	6.7	6.7
Caloote Tee	Caloote	13.7	1.9	1.9	1.9	1.9	1.9
Caloote Tee	Mannum Tee	7.1	4.8	4.8	4.8	4.8	4.9
Mannum Tee	Mannum Town	7.1	4.8	4.8	4.8	4.8	4.9
33kV lines ex Mobilong							
Mobilong	Mobilong Tee	40.4	19.7	19.7	19.8	19.9	19.9
Mobilong Tee	Mypolonga Tee	6.5	2.8	2.9	3.0	3.0	3.1
Mypolonga Tee	Mypolonga	20.3	2.8	2.9	3.0	3.0	3.1
Mypolonga Tee	Caloote	6.5	0.0	0.0	0.0	0.0	0.0
Mobilong Tee	M Bridge Nth	21.3	16.8	16.8	16.8	16.8	16.8
Monarto South Tee	M Bridge Nth	55	17.6	17.9	18.2	18.4	18.7
M Bridge Nth	M B South Tee	21.3	16.0	16.0	16.0	16.0	16.0
M B South Tee	M B South	21.3	16.0	16.0	16.0	16.0	16.0
M B South Tee	LSDF4636	6.5	0.0	0.0	0.0	0.0	0.0
Mobilong	Monarto South Tee	55	23.4	23.6	23.7	23.9	24.1
Monarto South Tee	Monarto South	20.3	5.7	5.7	5.6	5.5	5.4
33kV lines ex Taillem Bend							
Taillem Bend	Taillem Bend Tee	21.4	10.6	10.5	10.3	10.1	10.0
Taillem Bend Tee	Taillem Bend Town	21.4	10.6	10.4	10.2	10.0	9.9
Taillem Bend Tee	Taillem Bend Pump Stn	5.1	0.1	0.1	0.1	0.1	0.1
Taillem Bend Town	Jervois	21.4	7.4	7.3	7.1	7.0	6.8
Jervois	Jervois Flat 1 Tee	21.4	4.9	4.8	4.7	4.6	4.5
Jervois Flat 1 Tee	Jervois Flat 2 Tee	21.4	3.3	3.2	3.2	3.1	3.0
Jervois Flat 2 Tee	Jervois Flat 2	15.5	0.0	0.0	0.0	0.0	0.0
Jervois Flat 2 Tee	Woods Point	6.5	3.3	3.2	3.2	3.1	3.0
Woods Point	LSDF4636	6.5	0.0	0.0	0.0	0.0	0.0

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
Tailem Bend	Coomandook	18.5	7.2	7.1	7.0	7.0	6.9
Coomandook	Coonalpyn	6.7	6.7	6.6	6.6	6.5	6.4
Coonalpyn	Binnies	6.2	6.3	6.2	6.2	6.1	6.1
Binnies	Meningie	6.2	5.3	5.3	5.2	5.2	5.2
Meningie	Campbell Park	6.2	3.2	3.1	3.1	3.1	3.0
Campbell Park	Narrung	6.2	1.7	1.7	1.6	1.6	1.6
Tailem Bend	Sherlock	6.5	7.6	7.5	7.4	7.3	7.2
Sherlock	Karoonda	3.9	0.8	0.8	0.8	0.8	0.8
Sherlock	Geranium	5.1	6.4	6.3	6.3	6.2	6.1
Geranium	Lameroo	5.1	5.4	5.3	5.3	5.2	5.1
Lameroo	Pinnaroo	3.9	3.3	3.2	3.2	3.1	3.1

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Tailem Bend-Sherlock
 Sherlock-Geranium
 Geranium-Lameroo

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the line by increasing conductor clearances; or
- Upgrade the line capacity by replacing the conductor.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations.

8.13.6 Murraylands Primary Distribution Feeders

Murray Bridge North Substation 11kV Feeder Upgrade

System Limitation

The Meatworks 11kV feeder (MB-21) is supplied from the Murray Bridge North 33/11kV Zone Substation and in 2017/2018 will have an N-1 offload capacity of 265A. Meatworks 11kV feeder mainly feeds industrial customers and has a forecast growth rate of 0.9%. Under 50% PoE conditions, the feeder's N-1 offload capacity will be exceeded in 2017/2018.

Potential solutions that address the system limitation include:

- Upgrade the backbone of the Northern Heights 11kV feeder (MB-20) from Murray Bridge North 33/11kV Zone Substation.
- Establish a new 11kV feeder from Murray Bridge North 33/11kV Zone Substation.

Due to the large amount of load at risk, demand side participation is not expected to achieve a large enough reduction of load to defer the constraint on Meatworks 11kV feeder.

A RIT-D is not expected to be required for this system limitation.

8.14 South East Regional Development Plan

The South East

The SA Power Networks' South East Region includes the region from Tintinara in the North to Port MacDonnell in the south and extends westwards to the coast and eastwards to the Victorian border. There are six main connection systems in the South East, being Keith, Kincaig, Snuggery, Mount Gambier, Blanche and Penola West. A map of this region can be found at the end of this section.

SA Power Networks' Distribution Network

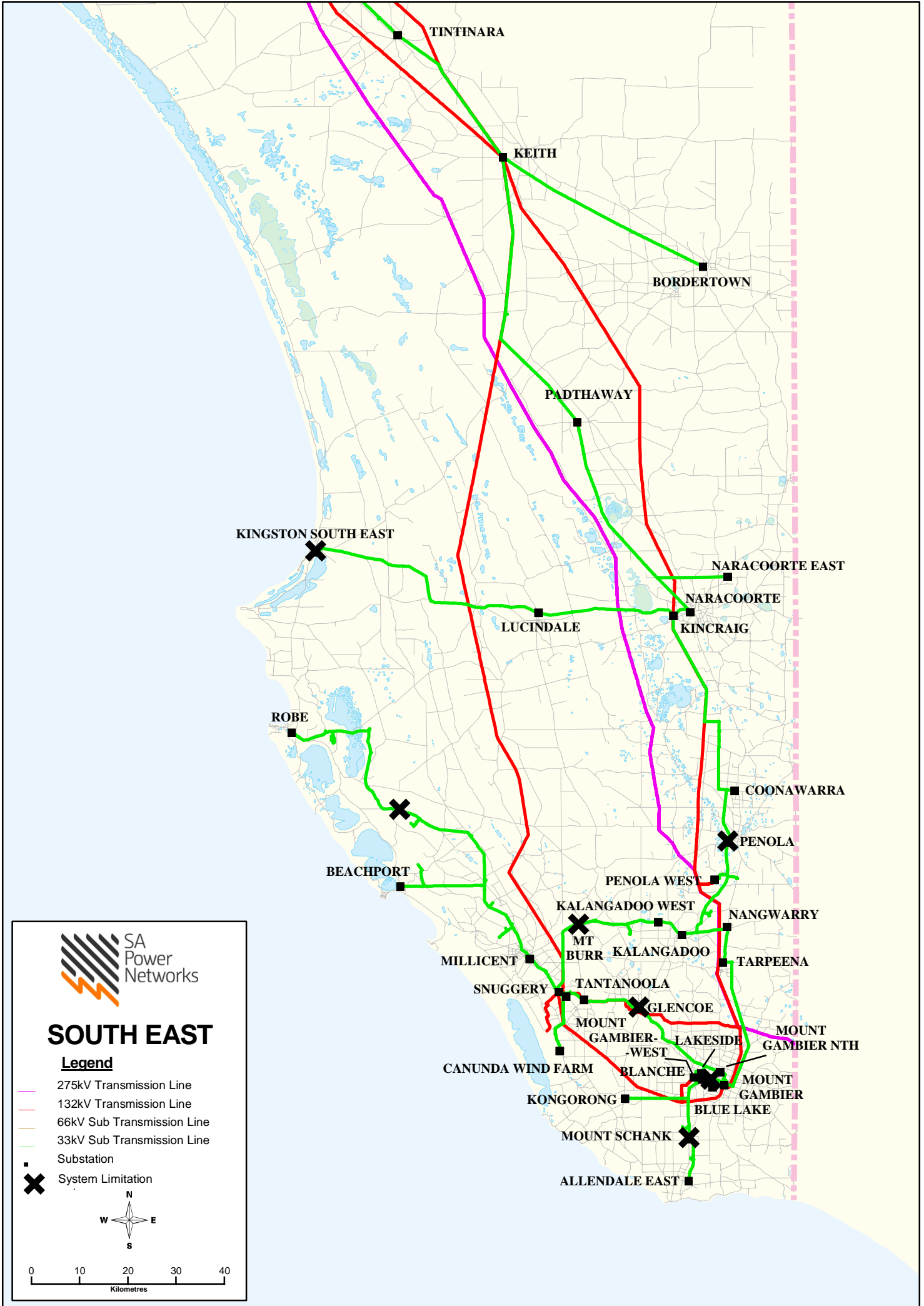
Electricity is supplied to the various towns and localities throughout the South East directly from the 33kV sub-transmission network or via Zone Substations. These Zone Substations are operated at 33,000 Volts stepped down to 11,000 Volts (7,600 Volts at Robe) and are upgraded when load exceeds capacity.

Customers are supplied from SA Power Networks' distribution system via 33kV lines and 11kV and 19kV primary distribution feeders. These lines and feeders are extended and upgraded as required to meet customer demand, customer connection requests and to maintain QoS. Large customer projects may require a Zone Substation upgrade as well as 11kV feeder or 33kV line modifications. Therefore, SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the South East Region in the next two years.

8.14.1 South East SCADA Substations

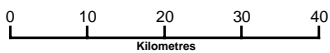
Source Connection Point	Associated SCADA Substations
Blanche	<ul style="list-style-type: none"> Allendale East Mount Gambier North Mount Gambier West
Keith	<ul style="list-style-type: none"> Bordertown Keith 11kV
Kincaig	<ul style="list-style-type: none"> Naracoorte Naracoorte East
Mount Gambier	<ul style="list-style-type: none"> Mount Gambier 11kV
Penola West	<ul style="list-style-type: none"> Coonawarra Nangwarry Penola
Snuggery	<ul style="list-style-type: none"> Millicent Robe



SOUTH EAST

Legend

- 275kV Transmission Line
- 132kV Transmission Line
- 66kV Sub Transmission Line
- 33kV Sub Transmission Line
- Substation
- ✕ System Limitation



TINTINARA
 KEITH
 BORDERTOWN
 PADTHAWAY
 KINGSTON SOUTH EAST
 NARACOOORTE EAST
 NARACOOORTE
 LUCINDALE
 KINCRAIG
 ROBE
 BEACHPORT
 COONAWARRA
 PENOLA
 PENOLA WEST
 KALANGADOO WEST
 NANGWARRY
 MILLICENT
 MT BURR
 KALANGADOO
 TARPEENA
 SNUGGERY
 TANTANOOLA
 GLENCOE
 MOUNT GAMBIER WEST
 LAKESIDE
 MOUNT GAMBIER NTH
 CANUNDA WIND FARM
 BLANCHE
 MOUNT GAMBIER
 KONGORONG
 BLUE LAKE
 MOUNT SCHANK
 ALLENDALE EAST

Substation: Blanche 132/33kV

Region: South East

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 110 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	35.7	32.6	35.1	32.2	34.0
	MVAr	15.4	12.5	14.5	12.7	11.0
	MVA	38.9	34.9	37.9	34.7	35.7
	PF	0.92	0.93	0.92	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	33.9	34.4	34.0	32.7	28.4
	MVAr	10.8	9.9	9.8	9.7	7.7
	MVA	35.6	35.8	35.4	34.1	29.4
	PF	0.95	0.96	0.96	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	32.1	32.4	32.7	33.0	33.3
	MVAr	12.1	12.2	12.3	12.4	12.5
	MVA	34.3	34.6	35.0	35.3	35.6
	PF	0.94	0.94	0.94	0.94	0.94
	Firm Delivery Capacity (MVA)	61.5	61.5	61.5	61.5	61.5
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	19				

Year	Former Step Change (MVA)
2009/10	+1.0MVA from Mount Gambier
2013/14	+3.9MVA from Mount Gambier

Year	Future Step Change (10% POE MVA)

Substation: Keith 132/33kV

Region: South East

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 51 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	29.5	21.8	20.6	20.9	25.6
	MVAr	14.9	7.5	3.2	3.1	6.1
	MVA	33.1	23.1	20.8	21.1	26.3
	PF	0.89	0.94	0.99	0.99	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	14.8	14.5	13.3	14.1	13.0
	MVAr	2.4	4.1	1.0	2.2	2.1
	MVA	15.0	15.0	13.3	14.3	13.2
	PF	0.99	0.96	1.00	0.99	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	24.8	24.8	25.0	25.0	25.1
	MVAr	4.8	4.8	4.9	4.9	4.9
	MVA	25.2	25.3	25.4	25.5	25.6
	PF	0.98	0.98	0.98	0.98	0.98
	Firm Delivery Capacity (MVA)	37.0	37.0	37.0	37.0	37.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	8				

Year	Former Step Change (MVA)
2011/12	3.0MVAr Capacitor Bank installed

Year	Future Step Change (10% POE MVA)

***Potential Impact of below embedded generation has been removed from the Actuals and excluded from the Forecast: (i.e. generation output = 0)**

- Up to 4MW of diesel export generation at 11kV

Substation: Kinraig 132/33kV

Region: South East

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	27.4	24.1	25.9	20.1	21.8
	MVAr	15.1	12.8	14.5	8.9	7.9
	MVA	31.3	27.3	29.7	22.0	23.2
	PF	0.88	0.88	0.87	0.91	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	19.4	20.1	19.8	18.6	14.3
	MVAr	6.4	5.7	6.5	5.1	2.9
	MVA	20.4	20.9	20.9	19.2	14.6
	PF	0.95	0.96	0.95	0.96	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	22.2	22.3	22.4	22.6	22.7
	MVAr	9.5	9.6	9.7	9.7	9.8
	MVA	24.1	24.3	24.4	24.6	24.7
	PF	0.92	0.92	0.92	0.92	0.92
	Firm Delivery Capacity (MVA)	30.5	30.5	30.5	30.5	30.5
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	3				

Year	Former Step Change (MVA)
2012/13	-8.1MVA to Penola West

Year	Future Step Change (10% POE MVA)

Substation: Mount Gambier 132/33kV

Region: South East

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 66.1 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	28.3	27.3	26.9	25.2	22.4
	MVAr	11.6	7.8	9.7	8.7	6.1
	MVA	30.6	28.4	28.6	26.7	23.2
	PF	0.92	0.96	0.94	0.95	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	29.9	27.7	29.2	28.2	26.4
	MVAr	9.0	19.2	7.8	7.5	4.6
	MVA	31.2	33.7	30.2	29.2	26.8
	PF	0.96	0.82	0.97	0.97	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	21.3	21.1	20.8	20.5	20.3
	MVAr	6.3	6.2	6.1	6.1	6.0
	MVA	22.2	22.0	21.7	21.4	21.2
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	32.5	32.5	32.5	32.5	32.5
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	13				

Year	Former Step Change (MVA)
2009/10	-1.0MVA to Blanche
	-2.0MVA Customer load decrease
2012/13	-5.3MVA to Penola West
2013/14	-3.9MVA to Blanche

Year	Future Step Change (10% POE MVA)

Substation: Penola West 132/33kV

Region: South East

(ETC) Transmission Category: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	9.8	6.2
	MVAr	N/A	N/A	N/A	2.9	2.1
	MVA	N/A	N/A	N/A	10.2	6.5
	PF	N/A	N/A	N/A	0.96	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	6.6	6.6
	MVAr	N/A	N/A	N/A	2.6	2.7
	MVA	N/A	N/A	N/A	7.1	7.1
	PF	N/A	N/A	N/A	0.93	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	6.1	6.0	5.9	5.8	5.7
	MVAr	1.9	1.9	1.8	1.8	1.8
	MVA	6.4	6.3	6.2	6.1	6.0
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	25.0	25.0	25.0	25.0	25.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	1				

Year	Former Step Change (MVA)
2012/13	+5.3MVA from Mount Gambier
	+8.1MVA from Kincaig

Year	Future Step Change (10% POE MVA)

Substation: Snuggery Rural 132/33kV

Region: South East

(ETC) Transmission Category: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	16.2	12.2	13.8	14.1	15.7
	MVAr	6.9	5.5	5.5	5.8	6.6
	MVA	17.6	13.4	14.8	15.2	17.0
	PF	0.92	0.91	0.93	0.92	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	13.3	13.4	13.0	13.2	12.3
	MVAr	3.0	3.1	2.7	2.6	3.9
	MVA	13.7	13.7	13.3	13.5	12.9
	PF	0.98	0.97	0.98	0.98	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	15.8	15.9	16.1	16.2	16.3
	MVAr	6.4	6.5	6.5	6.6	6.6
	MVA	17.1	17.2	17.3	17.5	17.6
	PF	0.93	0.93	0.93	0.93	0.93
	Firm Delivery Capacity (MVA)	28.8	28.8	28.8	28.8	28.8
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	4				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Allendale East 33/11kV

Region: South East

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.3	4.3	4.3	4.2	4.1
	MVAr	2.1	2.1	2.1	2.1	2.0
	MVA	4.8	4.8	4.8	4.7	4.6
	PF	0.90	0.90	0.90	0.90	0.90
Year		2009	2010	2011	2012	2013
Winter	MW	3.1	3.1	3.2	3.1	2.9
	MVAr	1.5	1.5	1.6	1.5	1.4
	MVA	3.5	3.5	3.6	3.4	3.3
	PF	0.90	0.90	0.90	0.90	0.90

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	4.0	4.0	4.0	4.0	4.0	
	MVAr	1.9	1.9	1.9	1.9	1.9	
	MVA	4.5	4.5	4.5	4.4	4.4	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	6.8	6.8	6.8	6.8	6.8	
	50% POE Forecast						
	MW	3.7	3.7	3.7	3.7	3.7	
	MVAr	1.8	1.8	1.8	1.8	1.8	
	MVA	4.1	4.1	4.1	4.1	4.1	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Bordertown 33/11kV

Region: South East

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	10.3	9.9	9.1	9.5	11.4
	MVAr	2.0	0.0	0.0	0.9	2.3
	MVA	10.5	9.9	9.1	9.5	11.7
	PF	0.98	1.00	1.00	1.00	0.98
Year		2009	2010	2011	2012	2013
Winter	MW	7.3	7.6	6.9	7.1	6.3
	MVAr	0.5	1.7	1.2	0.7	1.7
	MVA	7.3	7.8	7.0	7.1	6.6
	PF	1.00	0.98	0.99	1.00	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	11.3	11.4	11.4	11.5	11.6	
	MVAr	1.5	1.5	1.5	1.6	1.6	
	MVA	11.4	11.5	11.6	11.6	11.7	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	15.9*	16.4*	16.9*	17.4*	17.4*	
	50% POE Forecast						
	MW	10.4	10.5	10.6	10.6	10.7	
	MVAr	1.4	1.4	1.4	1.4	1.4	
	MVA	10.5	10.6	10.7	10.7	10.8	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	7.2	7.2	7.2	7.2	7.2	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	+0.3MVA Customer load increase

Year	Future Step Change (10% POE MVA)

* Up to 4MW of third party generation installed at Bordertown Substation with a staged network support contract commencing in 2013.

Substation: Coonawara 33/11kV

Region: South East

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.0	2.6	3.1	3.9	2.7
	MVAr	2.0	2.3	2.4	2.1	1.2
	MVA	3.6	3.5	3.9	4.4	3.0
	PF	0.83	0.75	0.80	0.88	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	8.0	5.6	2.4	1.5	1.5
	MVAr	4.1	2.3	0.0	1.3	1.3
	MVA	9.0	6.0	2.4	2.0	2.0
	PF	0.89	0.93	1.00	0.76	0.75

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.2	3.1	3.1	3.0	3.0	
	MVAr	1.6	1.5	1.5	1.5	1.5	
	MVA	3.5	3.5	3.4	3.4	3.3	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	13.5	13.5	13.5	13.5	13.5	
	50% POE Forecast						
	MW	3.1	3.1	3.0	3.0	3.0	
	MVAr	1.5	1.5	1.5	1.5	1.4	
	MVA	3.5	3.4	3.4	3.3	3.3	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	7.2	7.2	7.2	7.2	7.2	
	Transfer Capacity (MVA)	0.7	0.7	0.7	0.7	0.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Keith 33/11kV

Region: South East

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	5.6	5.3	5.0	5.1	5.9
	MVAr	3.1	2.6	0.0	0.3	0.3
	MVA	6.4	5.9	5.0	5.2	5.9
	PF	0.87	0.90	1.00	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	3.4	3.3	3.0	2.8	3.0
	MVAr	1.9	1.4	1.1	0.3	0.2
	MVA	3.9	3.6	3.2	2.8	3.0
	PF	0.87	0.91	0.94	0.99	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.8	5.8	5.8	5.8	5.8	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	5.8	5.8	5.8	5.8	5.8	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	16.6	16.6	16.6	16.6	16.6	
	50% POE Forecast						
	MW	5.2	5.2	5.2	5.2	5.2	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	5.2	5.2	5.2	5.2	5.3	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	8.8	8.8	8.8	8.8	8.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2011/12	3.0MVAr Capacitor Bank installed

Year	Future Step Change (10% POE MVA)

Substation: Millicent 33/11kV

Region: South East

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.6	5.6	5.6	5.7	6.4
	MVAr	2.9	2.4	2.4	2.8	2.7
	MVA	7.2	6.1	6.1	6.4	7.0
	PF	0.92	0.92	0.92	0.90	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	6.4	6.8	6.5	6.7	6.5
	MVAr	0.9	2.2	2.0	1.5	1.5
	MVA	6.5	7.1	6.8	6.8	6.6
	PF	0.99	0.95	0.96	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.6	5.5	5.5	5.4	5.4	
	MVAr	2.3	2.3	2.3	2.3	2.2	
	MVA	6.0	6.0	5.9	5.9	5.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	13.2	13.2	13.2	13.2	13.2	
	50% POE Forecast						
	MW	5.1	5.0	4.9	4.9	4.8	
	MVAr	2.1	2.1	2.0	2.0	2.0	
	MVA	5.5	5.4	5.3	5.3	5.2	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	7.1	7.1	7.1	7.1	7.1	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)		6				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Mount Gambier 33/11kV

Region: South East

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	17.7	15.9	16.7	18.8	15.7
	MVAr	5.2	2.5	4.1	3.8	2.2
	MVA	18.5	16.1	17.2	19.2	15.8
	PF	0.96	0.99	0.97	0.98	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	17.6	18.1	17.6	17.2	17.3
	MVAr	2.5	4.5	1.9	1.7	1.1
	MVA	17.8	18.6	17.7	17.3	17.3
	PF	0.99	0.97	0.99	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.2	14.0	13.7	13.5	13.3	
	MVAr	3.0	2.9	2.9	2.8	2.8	
	MVA	14.5	14.3	14.0	13.8	13.6	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	25.4	25.4	25.4	25.4	25.4	
	50% POE Forecast						
	MW	13.3	12.9	12.6	12.3	12.0	
	MVAr	2.8	2.7	2.6	2.6	2.5	
	MVA	13.6	13.2	12.8	12.5	12.2	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	9.3	9.4	9.6	9.7	9.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2009/10	-1.0MVA to Mount Gambier West
2011/12	+3.4MVA Customer load increase
2013/14	-3.9MVA to Mount Gambier North

Year	Future Step Change (10% POE MVA)

Substation: Mount Gambier North 33/11kV

Region: South East

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	8.7
	MVAr	N/A	N/A	N/A	N/A	3.8
	MVA	N/A	N/A	N/A	N/A	9.5
	PF	N/A	N/A	N/A	N/A	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	N/A
	MVAr	N/A	N/A	N/A	N/A	N/A
	MVA	N/A	N/A	N/A	N/A	N/A
	PF	N/A	N/A	N/A	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.8	8.8	8.9	8.9	9.0	
	MVAr	3.8	3.9	3.9	3.9	4.0	
	MVA	9.6	9.6	9.7	9.8	9.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	17.0	17.0	17.0	17.0	17.0	
	50% POE Forecast						
	MW	7.9	7.9	8.0	8.1	8.1	
	MVAr	3.5	3.5	3.5	3.5	3.6	
	MVA	8.6	8.7	8.7	8.8	8.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	8.1	8.1	8.0	8.0	7.9	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2013/14	+3.9MVA from Mount Gambier
	+3.4MVA from Mount Gambier West

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Mount Gambier West 33/11kV

Region: South East

Number of Feeders: 5

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	21.9	19.6	21.3	21.9	15.5
	MVAr	8.3	6.7	7.6	6.7	3.9
	MVA	23.4	20.7	22.6	22.9	16.0
	PF	0.94	0.95	0.94	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	20.1	20.9	20.3	19.9	19.6
	MVAr	4.5	5.3	4.0	3.5	3.7
	MVA	20.6	21.6	20.7	20.2	19.9
	PF	0.98	0.97	0.98	0.99	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	15.7	15.9	16.0	16.2	16.4	
	MVAr	4.9	4.9	5.0	5.0	5.1	
	MVA	16.4	16.6	16.8	17.0	17.1	
	PF	0.96	0.96	0.96	0.96	0.96	
	Total Capacity (MVA)	25.6	25.6	25.6	25.6	25.6	
	50% POE Forecast						
	MW	15.4	15.4	15.5	15.5	15.5	
	MVAr	4.8	4.8	4.8	4.8	4.8	
	MVA	16.1	16.1	16.2	16.2	16.3	
	PF	0.96	0.96	0.96	0.96	0.96	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	16.2	16.2	16.1	16.1	16.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	+1.0MVA from Mount Gambier
2012/13	+0.7MVA Customer load increase
2013/14	-3.4MVA to Mount Gambier North

Year	Future Step Change (10% POE MVA)

Substation: Nangwarry 33/11kV

Region: South East

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	1.0	1.0
	MVAr	N/A	N/A	N/A	0.6	0.3
	MVA	N/A	N/A	N/A	1.1	1.0
	PF	N/A	N/A	N/A	0.87	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	1.0	1.1
	MVAr	N/A	N/A	N/A	0.5	0.4
	MVA	N/A	N/A	N/A	1.1	1.1
	PF	N/A	N/A	N/A	0.91	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.0	0.9	0.9	0.8	0.8	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	1.0	1.0	0.9	0.9	0.9	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	1.0	1.0	1.0	0.9	0.9	
	MVAr	0.4	0.4	0.4	0.3	0.3	
	MVA	1.1	1.1	1.0	1.0	1.0	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Naracoorte 33/11kV

Region: South East

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	15.8	14.5	15.8	14.6	10.8
	MVAr	8.4	8.1	8.2	7.1	4.5
	MVA	17.9	16.6	17.8	16.2	11.7
	PF	0.88	0.87	0.89	0.90	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	11.4	11.8	11.3	10.9	10.5
	MVAr	4.6	4.5	4.9	4.1	2.9
	MVA	12.3	12.6	12.3	11.6	10.9
	PF	0.93	0.94	0.92	0.94	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	11.0	11.0	11.0	11.0	11.0	
	MVAr	5.2	5.2	5.2	5.2	5.2	
	MVA	12.2	12.2	12.2	12.2	12.2	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	27.8	27.8	27.8	27.8	27.8	
	50% POE Forecast						
	MW	9.9	9.9	9.9	9.9	9.9	
	MVAr	4.7	4.7	4.7	4.7	4.7	
	MVA	11.0	11.0	11.0	11.0	11.0	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	14.8	14.8	14.8	14.8	14.8	
	Transfer Capacity (MVA)	4.5	4.5	4.4	4.4	4.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)
2013/14	-7.1MVA to Naracoorte East

Year	Future Step Change (10% POE MVA)

Substation: Naracoorte East 33/11kV

Region: South East

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	N/A	5.2
	MVAr	N/A	N/A	N/A	N/A	2.8
	MVA	N/A	N/A	N/A	N/A	5.9
	PF	N/A	N/A	N/A	N/A	0.88
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	3.4
	MVAr	N/A	N/A	N/A	N/A	1.8
	MVA	N/A	N/A	N/A	N/A	3.8
	PF	N/A	N/A	N/A	N/A	0.89

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.2	5.2	5.3	5.3	5.3	
	MVAr	2.8	2.8	2.8	2.8	2.8	
	MVA	5.9	5.9	6.0	6.0	6.0	
	PF	0.88	0.88	0.88	0.88	0.88	
	Total Capacity (MVA)	17.2	17.2	17.2	17.2	17.2	
	50% POE Forecast						
	MW	4.7	4.7	4.7	4.7	4.7	
	MVAr	2.5	2.5	2.5	2.5	2.5	
	MVA	5.3	5.4	5.4	5.4	5.4	
	PF	0.88	0.88	0.88	0.88	0.88	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	7.4	7.4	7.4	7.4	7.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2013/14	+7.1MVA from Naracoorte

Year	Future Step Change (10% POE MVA)

Substation: Penola 33/11kV

Region: South East

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	2.7	2.7
	MVAr	N/A	N/A	N/A	1.3	1.1
	MVA	N/A	N/A	N/A	3.0	2.9
	PF	N/A	N/A	N/A	0.90	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	2.2	2.2
	MVAr	N/A	N/A	N/A	0.7	0.6
	MVA	N/A	N/A	N/A	2.3	2.3
	PF	N/A	N/A	N/A	0.96	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.6	2.6	2.6	2.6	2.6	
	MVAr	1.1	1.1	1.1	1.1	1.1	
	MVA	2.8	2.8	2.8	2.8	2.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	2.6	2.6	2.6	2.6	2.6	
	MVAr	1.1	1.1	1.1	1.1	1.1	
	MVA	2.8	2.8	2.8	2.8	2.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	2.3	2.3	2.3	2.3	2.3	
	Transfer Capacity (MVA)	0.7	0.7	0.7	0.7	0.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Robe 33/7.6kV

Region: South East

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.5	3.2	3.6	3.5	3.9
	MVAr	1.0	0.9	1.1	0.7	1.1
	MVA	3.7	3.3	3.8	3.5	4.1
	PF	0.96	0.96	0.96	0.98	0.96
Year		2009	2010	2011	2012	2013
Winter	MW	2.5	2.3	2.8	2.8	2.4
	MVAr	0.7	0.7	0.8	0.6	0.5
	MVA	2.6	2.4	2.9	2.9	2.5
	PF	0.96	0.96	0.96	0.98	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.3	3.4	3.4	3.4	3.4	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	3.4	3.5	3.5	3.5	3.6	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	6.5	6.5	6.5	6.5	6.5	
	50% POE Forecast						
	MW	2.9	3.0	3.0	3.0	3.1	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	3.0	3.1	3.1	3.1	3.2	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	3.8	3.8	3.8	3.8	3.8	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

8.14.3 South East Non SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Beachport	1	2.5	2.7	1.2	1.2	1.2	1.2	1.3
Desert Camp	1	0.5	0.7	0.1	0.1	0.1	0.1	0.1
Glencoe	2	1.0	1.3	1.3	1.3	1.3	1.4	1.4
Hatherleigh	1	0.3	0.4	0.1	0.1	0.1	0.1	0.1
Hatherleigh Regulator		10.0	12.5	6.5	6.7	6.9	7.0	7.2
Inverness	1	1.0	1.3	1.0	1.0	1.0	1.0	1.0
Kalangadoo West	2	1.0	1.3	1.1	1.1	1.1	1.1	1.1
Kalangadoo	1	0.5	0.7	0.6	0.6	0.6	0.6	0.6
Kingston	2	3.0	3.9	3.9	3.9	4.0	4.0	4.0
Kingston PT Reg 33kV		11.4	14.9	4.9	4.9	5.0	5.0	5.0
Kongorong	2	1.0	1.3	1.0	1.0	1.0	1.0	1.0
Kumorna	1	1.0	1.3	0.6	0.6	0.6	0.6	0.6
Lucindale	2	3.0	3.9	1.6	1.6	1.6	1.6	1.6
Mount Burr	1	0.3	0.4	0.4	0.4	0.4	0.4	0.4
Mount Schank	3	3.0	3.9	3.6	3.6	3.7	3.8	3.9

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Padthaway	2	10.0	13.8	4.9	4.8	4.8	4.8	4.7
Robe 33kV PT Reg		5.7	7.4	4.5	4.5	4.5	4.5	4.6
South End	2	0.6	0.8	0.5	0.6	0.6	0.6	0.6
Tantanoola	1	1.0	1.3	0.8	0.8	0.8	0.8	0.8
Tarpeena	2	10.0	9.5	4.6	4.6	4.5	4.5	4.5
Tintinara	2	1.0	1.3	1.2	1.2	1.2	1.2	1.2
Wirrega 33kV Reg		20.0	25.0	12.6	12.7	12.8	12.8	12.9

System Limitations: Kingston
Glencoe
Mount Burr

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the Zone Substation by increasing the capacity; or
- Power factor correction to reduce the load at the Zone Substation.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations.

8.14.4 South East Non SCADA Substations 50% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	N-1 Emerg. Cyclic Rating (MVA)	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
				50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)
Kingston	2	3.0	2.3	3.5	0.0	3.5	0.0	3.6	0.0	3.6	0.0	3.6	0.0
Mount Schank	3	3.0	3.0	3.2	0.1	3.3	0.1	3.3	0.1	3.4	0.1	3.5	0.1
Padthaway	2	10.0	7.4	4.4	0.0	4.3	0.0	4.3	0.0	4.3	0.0	4.3	0.0
Tarpeena	2	10.0	5.0	4.1	0.0	4.1	0.0	4.1	0.0	4.0	0.0	4.0	0.0

System Limitations: Nil

8.14.5 South East 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Keith							
Keith	Tintinara	5.1	1.8	1.8	1.8	1.8	1.8
Tintinara	Coonalpyn	5.1	0.1	0.1	0.1	0.1	0.1
Keith	Padthaway	7	5.2	5.1	5.1	5.0	5.0
Keith	Bordertown	17 [#]	15.7	15.2	14.8	14.3	13.9
[#] Up to 4MW of third party generation installed at Bordertown Substation with a network support contract commencing in 2013.							
33kV lines ex Snuggery							
Snuggery	Millicent	20.3	12.9	12.9	12.9	12.9	12.9
Millicent	Hatherleigh	12.7	6.8	6.9	6.9	6.9	7.0
Hatherleigh	Beachport Tee	13	6.2	6.2	6.2	6.3	6.3
Beachport Tee	Beachport	3.9	1.6	1.7	1.7	1.7	1.7
Beachport Tee	Robe	5.1	4.5	4.6	4.6	4.6	4.6
Snuggery	APM Tee 1	40.5	7.7	7.7	7.7	7.7	7.7
APM Tee 1	KCA 1	36.6	7.7	7.7	7.7	7.7	7.7
APM Tee 1	Apcel Pulp Mill	40.5	0.0	0.0	0.0	0.0	0.0
Snuggery	APM Tee 2	36.6	10.6	10.6	10.6	10.6	10.6
APM Tee 2	Apcel Pulp Mill	36.6	2.9	2.9	2.9	2.9	2.9
APM Tee 2	KCA 2	36.6	7.7	7.7	7.7	7.7	7.7
Snuggery	Apcel	40.5	10.6	10.6	10.6	10.6	10.6
Apcel	KCA 3	36.6	7.7	7.7	7.7	7.7	7.7
Snuggery	Woakwine Mill	7	1.0	1.0	1.0	1.0	1.0
Snuggery	Mt Burr	27.7	2.2	2.2	2.2	2.2	2.2
Mt Burr	Kalangadoo	6.2	1.7	1.7	1.7	1.7	1.7
33kV lines ex Blanche							
Blanche [#]	Mt Gambier West	25.1	17.0	17.2	17.4	17.5	17.7
Mt Gambier West [#]	Blue Lake Tee	0	0.6	0.6	0.6	0.6	0.6
Blue Lake Tee [#]	Mt Gambier Term.	0	0.0	0.0	0.0	0.0	0.0
Blanche [#]	Lakeside Tee	54.6	16.9	16.9	17.0	17.0	17.1
Lakeside Tee [#]	Lakeside	54.6	4.3	4.3	4.2	4.2	4.1
Lakeside Tee [#]	Glencoe Tee	54.6	12.6	12.7	12.8	12.9	12.9
Glencoe Tee	Glencoe	7	2.3	2.3	2.4	2.4	2.4
Glencoe	Tantanoola	7	1.0	1.0	1.0	1.0	1.0
Tantanoola	Apcel	7	0.2	0.2	0.2	0.2	0.2
Glencoe Tee [#]	Mt Gambier Nth	27.7	9.6	9.6	9.7	9.8	9.8
Mt Gambier Nth [#]	Mt Gambier Term.	27.7	0.0	0.0	0.0	0.0	0.0
Blanche	Kongorong Tee	15	9.8	9.9	10.0	10.1	10.2
Kongorong Tee	Kongorong	5.1	1.0	1.0	1.0	1.0	1.0
Kongorong Tee	Mt Schank	12.7	8.9	8.9	9.0	9.1	9.2
Mt Schank	Allendale East	5.1	4.5	4.4	4.4	4.4	4.4

Line Name - From	To	Total Capacity [^] (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
# = Industrial Weathered Line							
33kV lines ex Mt Gambier							
Mt Gambier Term.	Tarpeena	17.4	4.9	4.9	4.8	4.8	4.8
Tarpeena	Nangwarry	7	0.0	0.0	0.0	0.0	0.0
Mt Gambier Term. #	CHH	20.3	4.6	4.6	4.6	4.6	4.6
Mt Gambier Term. #	Mt G City 33/11 No 1	27.7	7.3	7.2	7.1	7.1	7.0
Mt Gambier Term. #	Mt G City 33/11 No 2	27.7	7.3	7.2	7.1	7.1	7.0
# = Industrial Weathered Line							
33kV lines ex Kincaig							
Kincaig	Lucindale	6.2	6.4	6.5	6.6	6.6	6.7
Lucindale	Kingston	5.1	3.9	3.9	4.0	4.0	4.0
Kincaig	Naracoorte	30	19.5	19.5	19.6	19.6	19.6
Naracoorte	Naracoorte East Tee	7	5.9	5.9	6.0	6.0	6.0
Naracoorte East Tee	Naracoorte East	27.7	5.9	5.9	6.0	6.0	6.0
Naracoorte East Tee	Padthaway	7	0.0	0.0	0.0	0.0	0.0
Kincaig	Inverness	27.7	1.0	1.0	1.0	1.0	1.0
Inverness	Coonawarra	27.7	0.0	0.0	0.0	0.0	0.0
33kV lines ex Penola West							
Penola West 1	Penola Tee	20.3	6.4	6.3	6.2	6.2	6.1
Penola Tee	Penola	6.2	6.4	6.3	6.2	6.2	6.1
Penola	Coonawarra	6.7	3.5	3.5	3.4	3.4	3.3
Penola West 2	Penola Tee	20.3	3.6	3.5	3.4	3.4	3.3
Penola Tee	SAFRIES	6.2	2.5	2.5	2.5	2.4	2.4
Penola Tee	Kalangadoo Tee	6.2	1.0	1.0	0.9	0.9	0.9
Kalangadoo Tee	Nangwarry	6.2	1.0	1.0	0.9	0.9	0.9
Nangwarry	Tarpeena	7	0.0	0.0	0.0	0.0	0.0

[^] The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Mt Gambier West-Blue Lake Tee
Penola Tee-Penola

The extent and timing of the system limitations are outlined in the table above. Potential solutions that address the system limitations include:

- Upgrade the line by increasing conductor clearances; or

- Power factor correction to reduce the load on the line.

The load reduction required to defer the system limitation is the difference between the Forecast and the Total Capacity.

RIT-D's are not expected to be required for these system limitations.

8.15 Fleurieu Peninsula Regional Development Plan

The Fleurieu Peninsula

The SA Power Networks' Fleurieu Peninsula Region includes the region South of Willunga extending south-east to Goolwa, south-west to Cape Jervis, and further south-west to Kangaroo Island. The Fleurieu Peninsula is supplied via the Southern Suburbs meshed network.

SA Power Networks' Distribution Network

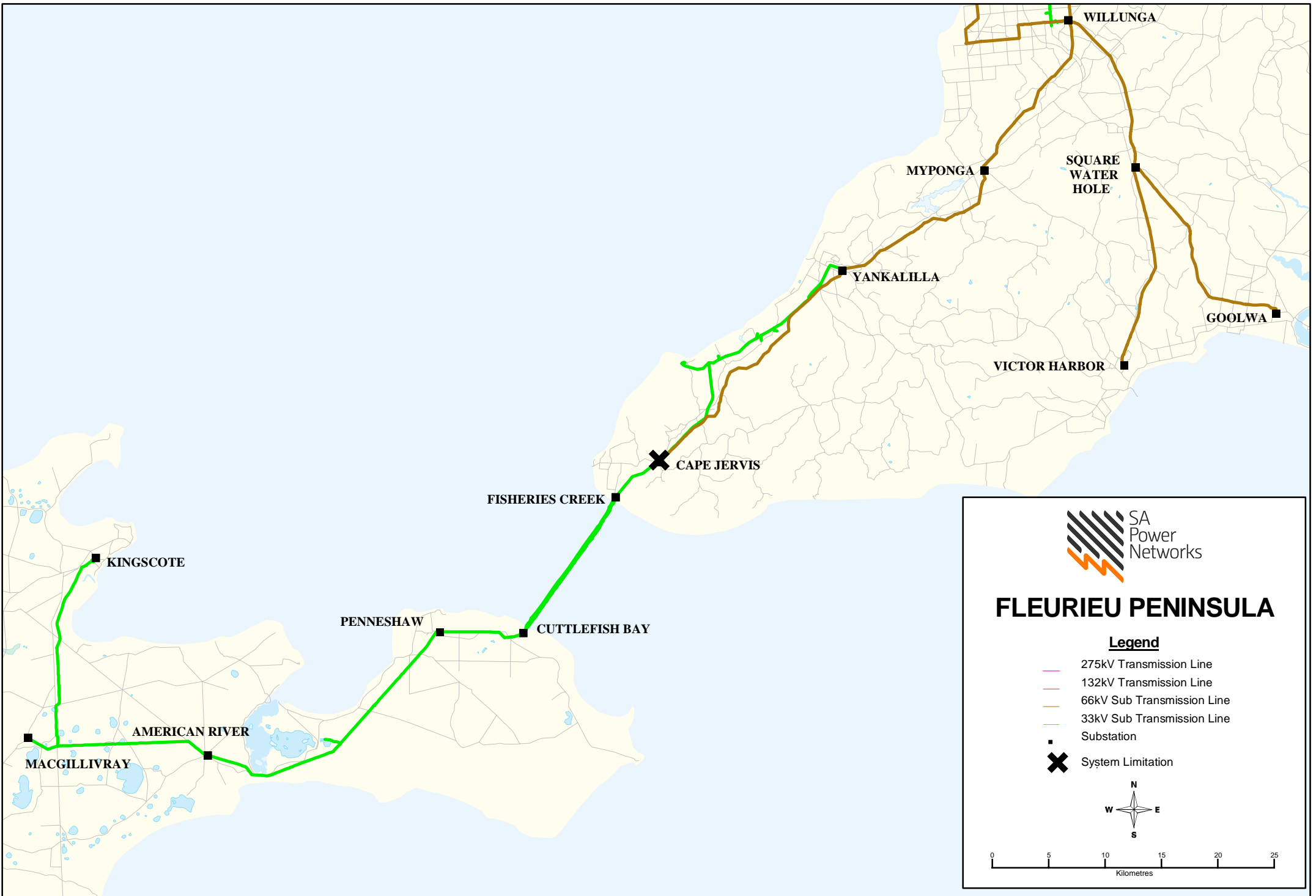
Electricity is supplied to the various towns and localities throughout the Fleurieu Peninsula via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 11,000 Volts or 33,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks distribution system via 11kV and 19kV primary distribution feeders, which are connected to Zone substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a distribution substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Fleurieu Peninsula in the next two years.

8.15.1 Fleurieu Peninsula SCADA Substations

Source Connection Point	Associated SCADA Substations
Southern Suburbs Meshed 66kV Network (Refer to 8.6 Southern Suburbs Regional Development Plan)	<ul style="list-style-type: none"> • American River • Cape Jervis 33kV • Cape Jervis 11kV • Goolwa • Kingscote • MacGillivray • Myponga • Penneshaw • Square Water Hole • Victor Harbor • Yankalilla 33kV • Yankalilla 11kV



KINGSCOTE

MACGILLIVRAY

AMERICAN RIVER

PENNESHAW

CUTTLEFISH BAY

FISHERIES CREEK

CAPE JERVIS

YANKALILLA

MYPONGA

WILLUNGA

SQUARE WATER HOLE

GOOLWA

VICTOR HARBOR

Substation: American River 33/11kV

Region: Fleurieu Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	0.6	0.5	0.5	0.5	0.5
	MVAr	0.2	0.2	0.2	0.2	0.1
	MVA	0.6	0.5	0.5	0.5	0.5
	PF	0.93	0.93	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	0.4	0.5	0.4	0.5	0.4
	MVAr	0.2	0.2	0.2	0.2	0.1
	MVA	0.4	0.5	0.5	0.5	0.4
	PF	0.93	0.93	0.93	0.93	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.4	0.4	0.4	0.4	0.4	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	0.4	0.4	0.4	0.4	0.4	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	0.3	0.3	0.3	0.3	0.3	
	MVAr	0.2	0.2	0.1	0.1	0.1	
	MVA	0.4	0.4	0.4	0.4	0.4	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Cape Jervis 33/11kV

Region: Fleurieu Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 0.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	0.6	0.5	0.6	0.5	0.6
	MVA	0.3	0.2	0.3	0.2	0.2
	MVA	0.7	0.5	0.7	0.5	0.6
	PF	0.93	0.93	0.93	0.93	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	0.5	0.4	0.5	0.5	0.5
	MVA	0.2	0.2	0.2	0.2	0.2
	MVA	0.6	0.5	0.6	0.5	0.5
	PF	0.93	0.93	0.93	0.91	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.5	0.5	0.6	0.6	0.6	
	MVA	0.2	0.2	0.2	0.3	0.3	
	MVA	0.7	0.7	0.8	0.8	0.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	0.7	0.7	0.7	0.7	0.7	
	50% POE Forecast						
	MW	0.5	0.5	0.5	0.5	0.5	
	MVA	0.2	0.2	0.2	0.2	0.2	
	MVA	0.6	0.6	0.7	0.7	0.7	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y	Y	Y	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)
2014/15	+0.15 customer load increase

Cape Jervis 33/11kV Zone Substation

System Limitation

Cape Jervis 33/11kV Zone Substation has one 0.5MVA 33/11kV transformer and is located near the township of Cape Jervis.

In the summer of 2016/17, the substation transformer is forecast to be overloaded by up to 0.1MVA during 10% POE conditions.

Potential solutions that address the system limitation include:

- Upgrade the Cape Jervis Zone Substation with a larger transformer (preferred solution); or
- Upgrade the Cape Jervis Zone Substation with a second transformer.

A RIT-D is not expected to be required for this system limitation.

Substation: Cape Jervis 66/33kV

Region: Fleurieu Peninsula

Number of Transformers: 1

Total Nameplate Rating (MVA): 40 MVA

Actuals*

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	7.0	6.7	6.7	7.6	8.2
	MVAr	2.5	1.2	1.2	1.0	2.2
	MVA	7.4	6.8	6.8	7.7	8.5
	PF	0.94	0.99	0.99	0.99	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	6.6	7.1	7.1	7.2	7.7
	MVAr	0.0	0.1	0.1	0.4	1.0
	MVA	6.6	7.1	7.1	7.2	7.8
	PF	1.00	1.00	1.00	1.00	0.99

Forecast*

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.3	8.4	8.5	8.6	8.7	
	MVAr	1.2	1.2	1.2	1.2	1.3	
	MVA	8.4	8.5	8.6	8.7	8.8	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	40.0	40.0	40.0	40.0	40.0	
	50% POE Forecast						
	MW	7.5	7.6	7.7	7.8	7.9	
	MVAr	1.1	1.1	1.1	1.1	1.1	
	MVA	7.5	7.7	7.8	7.9	8.0	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	13.5	13.4	13.3	13.1	13.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

***Impact of below embedded generation removed from Actuals & excluded from Forecast:**

Approximately 35MW of export embedded wind generation at 33kV.

Substation: Goolwa 66/11kV

Region: Fleurieu Peninsula

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	16.7	12.4	12.5	15.3	14.8
	MVAr	5.9	4.2	1.9	4.6	0.9
	MVA	17.7	13.1	12.6	16.0	14.9
	PF	0.94	0.95	0.99	0.96	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	13.7	14.3	14.0	14.5	13.2
	MVAr	1.9	2.2	1.8	1.5	1.3
	MVA	13.9	14.4	14.1	14.6	13.3
	PF	0.99	0.99	0.99	1.00	1.00

Forecast*

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	14.6	14.5	14.4	14.4	14.3	
	MVAr	2.9	2.9	2.9	2.8	2.8	
	MVA	14.9	14.8	14.7	14.6	14.6	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	33.4	33.4	33.4	33.4	33.4	
	50% POE Forecast						
	MW	13.1	13.0	13.0	12.9	12.8	
	MVAr	2.6	2.6	2.6	2.5	2.5	
	MVA	13.4	13.3	13.2	13.1	13.1	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	17.8	17.8	17.8	17.8	17.8	
	Transfer Capacity (MVA)	0.5	0.5	0.5	0.5	0.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

***NOTE:** Forecast includes a post model adjustment to take into account holiday peak loads

Substation: Kingscote 33/11kV

Region: Fleurieu Peninsula

Number of Feeders: 2

Number of Transformers: 1

Total Nameplate Rating (MVA): 6.25 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	3.2	3.2	3.0	3.5	3.2
	MVAr	1.7	0.4	0.0	0.4	1.3
	MVA	3.6	3.2	3.0	3.5	3.5
	PF	0.89	0.99	1.00	0.99	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	3.0	3.3	3.2	3.3	3.2
	MVAr	1.1	1.1	0.0	0.2	0.7
	MVA	3.2	3.5	3.2	3.3	3.3
	PF	0.93	0.95	1.00	1.00	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.0	3.1	3.2	3.3	3.4	
	MVAr	0.7	0.8	0.8	0.8	0.8	
	MVA	3.1	3.2	3.3	3.4	3.5	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	8.0	8.0	8.0	8.0	8.0	
	50% POE Forecast						
	MW	2.8	2.9	3.1	3.2	3.3	
	MVAr	0.7	0.7	0.7	0.8	0.8	
	MVA	2.9	3.0	3.2	3.3	3.4	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	5.4*	5.4*	5.4*	5.4*	5.4*	
	Transfer Capacity (MVA)	0.1	0.1	0.1	0.1	0.1	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2010/11	1MVAr capacitor bank installed

Year	Future Step Change (10% POE MVA)

* Back up provided by embedded generation exported at 11kV of 5.4MVA (6MW Standby)

Substation: MacGillivray 33/11kV

Region: Fleurieu Peninsula

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 2 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.9	1.7	1.5	1.7	2.1
	MVAr	0.5	0.4	0.9	0.4	0.9
	MVA	1.9	1.7	1.8	1.7	2.3
	PF	0.96	0.98	0.86	0.98	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	1.7	1.8	1.6	1.6	1.8
	MVAr	0.3	0.3	0.2	0.4	0.5
	MVA	1.7	1.8	1.6	1.6	1.8
	PF	0.99	0.99	1.00	0.97	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.9	1.9	1.9	1.9	1.9	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	2.0	2.1	2.1	2.1	2.1	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	2.6	2.6	2.6	2.6	2.6	
	50% POE Forecast						
	MW	1.7	1.7	1.8	1.8	1.8	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	1.9	1.9	1.9	2.0	2.0	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	1.5	1.5	1.5	1.5	1.5	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)		0.5				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Myponga 66/11kV

Region: Fleurieu Peninsula

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	7.1	5.2	5.2
	MVAr	N/A	N/A	2.7	2.3	2.1
	MVA	N/A	N/A	7.6	5.6	5.6
	PF	N/A	N/A	0.93	0.91	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	4.5	4.4
	MVAr	N/A	N/A	N/A	0.9	1.1
	MVA	N/A	N/A	N/A	4.6	4.5
	PF	N/A	N/A	N/A	0.98	0.97

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	5.1	5.1	5.1	5.0	5.0	
	MVAr	2.1	2.1	2.1	2.1	2.1	
	MVA	5.5	5.5	5.5	5.5	5.4	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	14.2	14.2	14.2	14.2	14.2	
	50% POE Forecast						
	MW	4.6	4.5	4.5	4.5	4.5	
	MVAr	1.9	1.9	1.9	1.9	1.9	
	MVA	4.9	4.9	4.9	4.9	4.8	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	7.5	7.5	7.5	7.5	7.5	
	Transfer Capacity (MVA)	1.4	1.4	1.4	1.4	1.5	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	+0.3MVA from Aldinga

Year	Future Step Change (10% POE MVA)

Substation: Penneshaw 33/11kV

Region: Fleurieu Peninsula

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 1.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	0.7	0.6	0.7	0.6	0.7
	MVA	0.3	0.3	0.3	0.2	0.3
	MVA	0.7	0.7	0.7	0.6	0.8
	PF	0.93	0.93	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	0.6	0.7	0.7	0.6	0.7
	MVA	0.3	0.3	0.3	0.2	0.3
	MVA	0.7	0.7	0.7	0.7	0.8
	PF	0.93	0.93	0.93	0.93	0.92

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	0.7	0.7	0.7	0.7	0.8	
	MVA	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	2.0	2.0	2.0	2.0	2.0	
	50% POE Forecast						
	MW	0.7	0.7	0.7	0.7	0.8	
	MVA	0.3	0.3	0.3	0.3	0.3	
	MVA	0.8	0.8	0.8	0.8	0.8	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.7	0.7	0.7	0.7	0.7	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	7					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Square Water Hole 66/11kV

Region: Fleurieu Peninsula

Number of Feeders: 4

Number of Transformers: 1

Total Nameplate Rating (MVA): 5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	4.0	4.4	3.7	3.9	4.2
	MVAr	1.7	1.7	1.3	1.5	1.4
	MVA	4.4	4.7	3.9	4.2	4.4
	PF	0.92	0.94	0.94	0.94	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	3.2	3.3	3.3	3.5	3.3
	MVAr	0.0	0.3	0.3	0.0	0.2
	MVA	3.2	3.3	3.4	3.5	3.3
	PF	1.00	1.00	1.00	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	3.9	4.0	4.0	4.1	4.1	
	MVAr	1.4	1.4	1.4	1.4	1.4	
	MVA	4.2	4.2	4.3	4.3	4.3	
	PF	0.95	0.95	0.95	0.95	0.95	
	Total Capacity (MVA)	7.1	7.1	7.1	7.1	7.1	
	50% POE Forecast						
	MW	3.5	3.6	3.6	3.7	3.7	
	MVAr	1.2	1.2	1.3	1.3	1.3	
	MVA	3.7	3.8	3.8	3.9	3.9	
	PF	0.95	0.95	0.95	0.95	0.95	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	1.2	1.2	1.2	1.2	1.2	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Victor Harbor 66/11kV

Region: Fleurieu Peninsula

Number of Feeders: 6

Number of Transformers: 2

Total Nameplate Rating (MVA): 50 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	26.4	20.9	22.2	23.8	25.3
	MVAr	1.3	2.0	0.8	0.7	3.3
	MVA	26.4	21.0	22.2	23.8	25.5
	PF	1.00	1.00	1.00	1.00	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	20.9	22.2	22.3	22.5	21.4
	MVAr	1.8	1.6	0.6	0.7	1.6
	MVA	21.0	22.3	22.3	22.5	21.4
	PF	1.00	1.00	1.00	1.00	1.00

Forecast*

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	25.4	25.3	25.2	25.1	25.0	
	MVAr	2.0	2.0	2.0	2.0	2.0	
	MVA	25.5	25.4	25.3	25.2	25.1	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	62.7	62.7	62.7	62.7	62.7	
	50% POE Forecast						
	MW	22.8	22.8	22.7	22.6	22.5	
	MVAr	1.8	1.8	1.8	1.8	1.8	
	MVA	22.9	22.8	22.7	22.7	22.6	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	36.9	36.9	36.9	36.9	36.9	
	Transfer Capacity (MVA)	0.6	0.6	0.6	0.6	0.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)
2009/10	9.0MVAr Capacitor Bank installed
2012/13	+0.6MVA Customer load increase

Year	Future Step Change (10% POE MVA)

***NOTE:** Forecast includes a post model adjustment to take into account holiday peak loads

Substation: Yankalilla 66/33kV

Region: Fleurieu Peninsula

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	1.3	1.2	1.4	1.2	1.1
	MVAr	0.6	0.4	0.4	0.3	0.1
	MVA	1.4	1.3	1.5	1.2	1.1
	PF	0.90	0.95	0.97	0.97	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	1.1	1.3	1.4	1.3	1.0
	MVAr	0.3	0.4	0.3	0.1	0.0
	MVA	1.1	1.4	1.4	1.3	1.0
	PF	0.96	0.97	0.98	1.00	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.5	1.5	1.5	1.5	1.5	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	1.5	1.5	1.5	1.5	1.5	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	17.7	17.7	17.7	17.7	17.7	
	50% POE Forecast						
	MW	1.3	1.3	1.3	1.3	1.3	
	MVAr	0.2	0.2	0.2	0.2	0.2	
	MVA	1.4	1.4	1.4	1.4	1.4	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	8.6	8.6	8.6	8.6	8.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Yankalilla 66/11kV

Region: Fleurieu Peninsula

Number of Feeders: 3

Number of Transformers: 1

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.5	5.1	8.0	6.3	6.3
	MVAr	2.9	2.3	2.0	3.4	2.9
	MVA	7.1	5.6	8.2	7.1	7.0
	PF	0.91	0.91	0.97	0.88	0.91
Year		2009	2010	2011	2012	2013
Winter	MW	5.0	6.0	5.0	6.0	5.0
	MVAr	0.9	0.0	1.0	1.0	1.0
	MVA	5.1	6.0	5.1	6.1	5.1
	PF	0.98	1.00	0.98	0.99	0.98

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.1	6.1	6.1	6.1	6.1	
	MVAr	2.9	2.9	2.9	2.9	2.9	
	MVA	6.7	6.7	6.7	6.7	6.7	
	PF	0.90	0.90	0.90	0.90	0.90	
	Total Capacity (MVA)	16.6	16.6	16.6	16.6	16.6	
	50% POE Forecast						
	MW	5.2	5.2	5.2	5.2	5.2	
	MVAr	2.5	2.5	2.5	2.5	2.5	
	MVA	5.8	5.8	5.8	5.8	5.8	
	PF	0.90	0.90	0.90	0.90	0.90	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	7.5	7.6	7.7	7.8	7.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

8.15.3 Fleurieu Peninsula Non SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
American River Reg	1	10.0	12.5	5.2	5.3	5.4	5.5	5.6
Hay Flat	1	0.2	0.3	0.1	0.1	0.1	0.1	0.1
Salt Cliffs	1	0.5	0.7	0.2	0.2	0.2	0.2	0.2
Second Valley	1	0.5	0.7	0.3	0.3	0.3	0.3	0.3
Wirrina Cove	1	1.5	2.0	0.7	0.7	0.7	0.7	0.7
Yankalilla Hill	1	0.3	0.4	0.02	0.02	0.02	0.02	0.02

System Limitations: Nil

8.15.4 Fleurieu Peninsula 66kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
66KV LINES ON FLEURIEU PENINSULA							
WILLUNGA	MYPONGA	71.8	22.1	22.2	22.3	22.3	22.4
MYPONGA	YANKALILLA	71.8	16.6	16.7	16.8	16.9	17.0
YANKALILLA	CAPE JERVIS	61.0	7.0	7.0	7.1	7.2	7.3
WILLUNGA	SQWATER HOLE	71.8	44.5	44.4	44.3	44.2	44.0
SQWATER HOLE	VICTOR HARBOR	40.6	25.5	25.4	25.3	25.2	25.1
SQWATER HOLE	GOOLWA	53.2	14.9	14.8	14.7	14.6	14.6

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.15.5 Fleurieu Peninsula 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Yankalilla							
Yankalilla	Cape Jervis	5.1	1.5	1.5	1.5	1.5	1.5
Cape Jervis	Fisheries Creek	13	7.8	7.9	8.0	8.1	8.2
Fisheries Creek	Cuttlefish Bay	10	7.8	7.9	8.0	8.1	8.2
Cuttlefish Bay	Penneshaw	13.0	7.8	7.9	8.0	8.1	8.2
Penneshaw	American River	13	5.6	5.7	5.7	5.8	5.9
American River	Macgillivray	6.2	5.2	5.2	5.3	5.4	5.5
Macgillivray	Kingscote	15	3.1	3.2	3.3	3.3	3.4

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.16 Riverland Regional Development Plan

The Riverland

The SA Power Networks' Riverland region includes the region from Berri extending north-west to Morgan, south-west to Swan Reach, and north-east to Renmark and Paringa. There are two main connection points in the Riverland, being Berri/Monash and North West Bend.

SA Power Networks' Distribution Network

Electricity is supplied to the various towns and localities throughout the Riverland region via Zone Substations. These Zone Substations are operated at either 66,000 Volts stepped down to 11,000 or 33,000 Volts, or 33,000 Volts stepped down to 11,000 Volts.

Customers are supplied from SA Power Networks distribution system via 33kV, 11kV and 19kV primary distribution feeders, which are connected to distribution substations. These feeders are extended and upgraded as required to meet customer demand and customer connection requests. Large customer projects may require a Zone Substation upgrade as well as feeder modifications, therefore SA Power Networks should be notified as early as possible during the planning stages of a project so that customer connection requirements can be met.

There are no system limitations forecast for the primary distribution feeders under normal conditions in the Riverland Region in the next two years.

8.16.1 Riverland SCADA Substations

Source Connection Point	Associated SCADA Substations
Berri / Monash	<ul style="list-style-type: none"> • Berri 11kV • Glossop • Loveday • Loxton • Paringa 11kV • Paringa 33kV • Pyap • Remark • Woolpunda
North West Bend	<ul style="list-style-type: none"> • Ramco • Swan Reach 11kV • Waikerie



RIVERLAND

Legend

- 275kV Transmission Line
 - 132kV Transmission Line
 - 66kV Sub Transmission Line
 - 33kV Sub Transmission Line
 - Substation
 - System Limitation
-

MID NORTH

NORTH WEST BEND

MORGAN

CADELL

QUALCO

RAMCO

WAIKERIE

WOOLPUNDA

MONASH

RENMARK

PARINGA

CORDOLA

ROONKA

LOVEDAY

GLOSSOP

BERRI

LYRUP

LOXTON

PYAP

PORTEE

SWAN REACH 66/33KV

SWAN REACH 33/11KV

MURRAY LANDS

Substation: Berri / Monash 132/66kV

Region: Riverland

(ETC) Transmission Category: 4

Number of Transformers: 3

Total Nameplate Rating (MVA): 160 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	94.0	84.5	79.1	85.0	92.9
	MVAr	19.1	26.5	21.8	24.8	23.0
	MVA	95.9	88.5	82.0	88.5	95.7
	PF	0.98	0.98	0.96	0.96	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	49.5	46.7	36.5	30.1	34.5
	MVAr	5.0	0.4	0.3	12.2	1.7
	MVA	49.7	46.7	36.5	32.5	34.5
	PF	0.99	1.00	1.00	0.93	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	94.9	93.9	92.9	91.9	91.0
	MVAr	27.3	27.0	26.7	26.4	26.2
	MVA	98.8	97.7	96.7	95.7	94.7
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	140.0	140.0	140.0	140.0	140.0
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	13				

Year	Former Step Change (MVA)
2009/10	-2.0MW Customer shutdown
2012/13	+2.0MW Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: North West Bend 132/66kV

Region: Riverland

(ETC) Transmission Category: 4

Number of Transformers: 3

Total Nameplate Rating (MVA): 65 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	28.8	24.1	25.5	25.7	26.9
	MVAr	5.8	7.8	7.7	7.6	8.7
	MVA	29.4	25.3	26.6	26.8	28.3
	PF	0.98	0.95	0.96	0.96	0.95
Year		2009	2010	2011	2012	2013
Winter	MW	14.0	15.8	13.8	13.0	10.2
	MVAr	0.9	0.6	4.6	3.4	3.8
	MVA	14.1	15.8	14.5	13.5	10.9
	PF	1.00	1.00	0.95	0.97	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
Summer	MW	27.2	26.9	26.6	26.3	25.9
	MVAr	8.3	8.2	8.1	8.0	7.9
	MVA	28.5	28.1	27.8	27.5	27.1
	PF	0.96	0.96	0.96	0.96	0.96
	Firm Delivery Capacity (MVA)	55.6	55.6	55.6	55.6	55.6
	System Limitation (Y/N)	N	N	N	N	N
	Hrs per annum > 95% of Peak Load (hrs)	4				

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Berri 66/11kV

Region: Riverland

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 20 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	12.6	12.4	10.4	11.8	11.5
	MVAr	1.3	1.1	0.6	0.0	0.3
	MVA	12.7	12.4	10.4	11.8	11.5
	PF	0.99	0.99	0.99	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	8.6	9.0	7.5	7.4	7.2
	MVAr	3.8	3.4	2.8	2.6	2.2
	MVA	9.4	9.7	8.0	7.8	7.5
	PF	0.91	0.94	0.94	0.94	0.96

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	11.5	11.2	10.8	10.5	10.1	
	MVAr	2.6	2.5	2.4	2.4	2.3	
	MVA	11.8	11.4	11.1	10.7	10.4	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	28.0	28.0	28.0	28.0	28.0	
	50% POE Forecast						
	MW	10.6	10.2	9.8	9.5	9.2	
	MVAr	2.4	2.3	2.2	2.2	2.1	
	MVA	10.8	10.5	10.1	9.8	9.4	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	15.0	15.0	15.0	15.0	15.0	
	Transfer Capacity (MVA)	2.5	2.6	2.7	2.8	2.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Glossop 66/11kV

Region: Riverland

Number of Feeders: 4

Number of Transformers: 2

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	9.9	7.3	8.3	9.0	9.2
	MVAr	3.8	3.0	3.6	4.4	4.4
	MVA	10.6	7.9	9.0	10.0	10.2
	PF	0.93	0.92	0.92	0.90	0.90
Year		2009	2010	2011	2012	2013
Winter	MW	6.0	4.7	4.5	5.0	4.5
	MVAr	0.7	0.3	0.9	1.8	2.1
	MVA	6.0	4.7	4.6	5.3	5.0
	PF	0.99	1.00	0.98	0.94	0.90

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	9.1	9.0	8.9	8.8	8.8	
	MVAr	4.2	4.2	4.2	4.1	4.1	
	MVA	10.0	9.9	9.9	9.7	9.6	
	PF	0.91	0.91	0.91	0.91	0.91	
	Total Capacity (MVA)	15.4	15.4	15.4	15.4	15.4	
	50% POE Forecast						
	MW	9.1	9.1	9.0	8.9	8.8	
	MVAr	4.2	4.2	4.2	4.1	4.1	
	MVA	10.1	10.0	9.9	9.8	9.7	
	PF	0.91	0.91	0.91	0.91	0.91	
	Firm Delivery Capacity (MVA)	7.5	7.5	7.5	7.5	7.5	
	Transfer Capacity (MVA)	3.0	3.1	3.1	3.1	3.2	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2011/12	+1.5MVA from Loveday

Year	Future Step Change (10% POE MVA)

Substation: Loveday 66/11kV

Region: Riverland

Number of Feeders: 5

Number of Transformers: 3

Total Nameplate Rating (MVA): 15 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	13.5	11.6	11.3	11.8	12.3
	MVAr	0.0	0.0	2.9	3.1	0.5
	MVA	13.5	11.6	11.7	12.2	12.3
	PF	1.00	1.00	0.97	0.97	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	6.4	7.3	7.1	6.8	6.2
	MVAr	3.1	0.1	1.9	2.7	0.6
	MVA	7.1	7.3	7.4	7.3	6.2
	PF	0.90	1.00	0.97	0.93	1.00

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	12.0	11.8	11.6	11.4	11.2	
	MVAr	2.6	2.5	2.5	2.4	2.4	
	MVA	12.3	12.1	11.9	11.7	11.4	
	PF	0.98	0.98	0.98	0.98	0.98	
	Total Capacity (MVA)	20.4	20.4	20.4	20.4	20.4	
	50% POE Forecast						
	MW	10.8	10.6	10.5	10.3	10.1	
	MVAr	2.3	2.3	2.2	2.2	2.1	
	MVA	11.1	10.9	10.7	10.5	10.3	
	PF	0.98	0.98	0.98	0.98	0.98	
	Firm Delivery Capacity (MVA)	14.6	14.6	14.6	14.6	14.6	
	Transfer Capacity (MVA)	0.4	0.4	0.4	0.4	0.4	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)
2011/12	-1.5MVA to Glossop
	+0.5MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Loxton 66/11kV

Region: Riverland

Number of Feeders: 4

Number of Transformers: 3

Total Nameplate Rating (MVA): 18.75 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	11.8	11.2	11.4	9.0	12.6
	MVAr	0.0	0.0	1.0	4.3	1.9
	MVA	11.8	11.2	11.4	10.0	12.7
	PF	1.00	1.00	1.00	0.90	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	6.6	5.7	6.8	6.2	6.1
	MVAr	2.3	1.4	1.6	1.6	0.7
	MVA	7.0	5.9	7.0	6.4	6.2
	PF	0.94	0.97	0.97	0.97	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	13.0	12.8	12.6	12.4	12.3	
	MVAr	1.5	1.5	1.4	1.4	1.4	
	MVA	13.1	12.9	12.7	12.5	12.4	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	19.9	19.9	19.9	19.9	19.9	
	50% POE Forecast						
	MW	11.9	11.7	11.6	11.5	11.3	
	MVAr	1.4	1.3	1.3	1.3	1.3	
	MVA	12.0	11.8	11.7	11.5	11.4	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	14.6	14.6	14.6	14.6	14.6	
	Transfer Capacity (MVA)	0.8	0.8	0.9	0.9	0.9	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	8					

Year	Former Step Change (MVA)
2009/10	-0.5MVA to Lyrup

Year	Future Step Change (10% POE MVA)

Substation: Paringa 66/33kV

Region: Riverland

Number of Transformers: 1

Total Nameplate Rating (MVA): 32 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	8.7	8.2	8.6	10.0	9.8
	MVAr	3.8	3.5	3.4	4.1	3.8
	MVA	9.5	8.9	9.3	10.8	10.6
	PF	0.92	0.92	0.93	0.93	0.93
Year		2009	2010	2011	2012	2013
Winter	MW	3.7	3.5	4.1	4.6	5.8
	MVAr	1.2	1.1	1.8	1.4	2.3
	MVA	3.9	3.7	4.4	4.8	6.2
	PF	0.95	0.95	0.92	0.96	0.93

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	11.6	14.2	14.4	14.5	14.6	
	MVAr	4.7	5.6	5.7	5.8	5.8	
	MVA	12.5	15.2	15.4	15.6	15.8	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	34.0	34.0	34.0	34.0	34.0	
	50% POE Forecast						
	MW	10.6	12.8	13	13.1	13.2	
	MVAr	4.2	5.1	5.2	5.2	5.3	
	MVA	11.4	13.8	14	14	14.2	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	14.8	14.8	14.8	14.8	14.8	
	System Limitation (Y/N)	Y	Y	Y	Y	Y	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2009/10	+1.2MVA Customer load increase

Year	Future Step Change (10% POE MVA)

Substation: Paringa 33/11kV

Region: Riverland

Number of Feeders:2

Number of Transformers: 1

Total Nameplate Rating (MVA): 2.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	2.3	2.4	2.1	2.2	2.4
	MVAr	1.0	1.0	0.8	0.7	0.9
	MVA	2.5	2.6	2.3	2.3	2.6
	PF	0.92	0.93	0.94	0.96	0.94
Year		2009	2010	2011	2012	2013
Winter	MW	1.3	1.4	1.5	1.5	1.4
	MVAr	0.3	0.3	0.5	0.0	0.5
	MVA	1.3	1.4	1.5	1.5	1.5
	PF	0.97	0.97	0.95	1.00	0.94

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	2.4	2.4	2.4	2.3	2.3	
	MVAr	0.9	0.9	0.9	0.9	0.9	
	MVA	2.5	2.5	2.5	2.5	2.5	
	PF	0.94	0.94	0.94	0.94	0.94	
	Total Capacity (MVA)	3.3	3.3	3.3	3.3	3.3	
	50% POE Forecast						
	MW	2.1	2.1	2.1	2.1	2.1	
	MVAr	0.8	0.8	0.8	0.8	0.8	
	MVA	2.3	2.3	2.3	2.2	2.2	
	PF	0.94	0.94	0.94	0.94	0.94	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	3.7	3.7	3.7	3.8	3.8	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Pyap 66/11kV

Region: Riverland

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 12.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	8.2	7.8	7.1	7.5	8.1
	MVAr	0.0	0.0	0.5	0.5	1.0
	MVA	8.2	7.8	7.1	7.5	8.2
	PF	1.00	1.00	1.00	1.00	0.99
Year		2009	2010	2011	2012	2013
Winter	MW	4.6	5.4	6.1	4.7	4.8
	MVAr	2.6	1.0	0.9	1.3	0.9
	MVA	5.3	5.5	6.2	4.9	4.9
	PF	0.87	0.99	0.99	0.96	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	8.3	8.1	8.0	7.8	7.7	
	MVAr	0.8	0.8	0.8	0.8	0.7	
	MVA	8.3	8.2	8.0	7.9	7.7	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	15.2	15.2	15.2	15.2	15.2	
	50% POE Forecast						
	MW	7.4	7.2	7.1	6.9	6.8	
	MVAr	0.7	0.7	0.7	0.7	0.7	
	MVA	7.4	7.3	7.1	7.0	6.8	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	7.5	7.5	7.5	7.5	7.5	
	Transfer Capacity (MVA)	1.9	1.9	1.9	2.0	2.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Ramco 66/11kV

Region: Riverland

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 7 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	5.3	5.9
	MVAr	N/A	N/A	N/A	0.8	2.5
	MVA	N/A	N/A	N/A	5.3	6.4
	PF	N/A	N/A	N/A	0.99	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	N/A	3.0
	MVAr	N/A	N/A	N/A	N/A	1.5
	MVA	N/A	N/A	N/A	N/A	3.3
	PF	N/A	N/A	N/A	N/A	0.89

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.0	6.0	5.9	5.8	5.7	
	MVAr	2.6	2.6	2.6	2.5	2.5	
	MVA	6.6	6.5	6.4	6.3	6.3	
	PF	0.92	0.92	0.92	0.92	0.92	
	Total Capacity (MVA)	8.4	8.4	8.4	8.4	8.4	
	50% POE Forecast						
	MW	5.5	5.5	5.5	5.5	5.4	
	MVAr	2.4	2.4	2.4	2.4	2.4	
	MVA	6.1	6.0	6.0	6.0	5.9	
	PF	0.92	0.92	0.92	0.92	0.92	
	Firm Delivery Capacity (MVA)	4.8	4.8	4.8	4.8	4.8	
	Transfer Capacity (MVA)	1.6	1.7	1.7	1.7	1.7	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	5					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Renmark 66/11kV

Region: Riverland

Number of Feeders: 6

Number of Transformers: 3

Total Nameplate Rating (MVA): 22.5 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	20.7	18.6	16.0	17.2	19.3
	MVAr	0.0	3.9	2.0	3.3	0.9
	MVA	20.7	19.0	16.1	17.5	19.3
	PF	1.00	0.98	0.99	0.98	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	11.1	12.1	11.0	11.8	11.4
	MVAr	4.3	1.6	1.0	0.3	1.3
	MVA	11.9	12.2	11.0	11.8	11.5
	PF	0.93	0.99	1.00	1.00	0.99

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	19.4	19.3	19.2	19.1	19.0	
	MVAr	3.4	3.3	3.3	3.3	3.3	
	MVA	19.7	19.6	19.5	19.4	19.2	
	PF	0.99	0.99	0.99	0.99	0.99	
	Total Capacity (MVA)	28.5	28.5	28.5	28.5	28.5	
	50% POE Forecast						
	MW	17.9	17.7	17.6	17.5	17.4	
	MVAr	3.1	3.1	3.0	3.0	3.0	
	MVA	18.1	18.0	17.9	17.7	17.6	
	PF	0.99	0.99	0.99	0.99	0.99	
	Firm Delivery Capacity (MVA)	21.2	21.2	21.2	21.2	21.2	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Swan Reach 33/11kV

Region: Riverland

Number of Feeders: 1

Number of Transformers: 1

Total Nameplate Rating (MVA): 3 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	N/A	N/A	N/A	1.3	1.2
	MVAr	N/A	N/A	N/A	0.5	0.5
	MVA	N/A	N/A	N/A	1.4	1.3
	PF	N/A	N/A	N/A	0.93	0.92
Year		2009	2010	2011	2012	2013
Winter	MW	N/A	N/A	N/A	0.9	0.8
	MVAr	N/A	N/A	N/A	0.4	0.6
	MVA	N/A	N/A	N/A	1.0	0.9
	PF	N/A	N/A	N/A	0.90	0.81

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	1.2	1.2	1.2	1.2	1.2	
	MVAr	0.5	0.5	0.5	0.5	0.5	
	MVA	1.3	1.3	1.3	1.3	1.3	
	PF	0.93	0.93	0.93	0.93	0.93	
	Total Capacity (MVA)	3.9	3.9	3.9	3.9	3.9	
	50% POE Forecast						
	MW	1.1	1.1	1.1	1.1	1.1	
	MVAr	0.4	0.4	0.4	0.4	0.4	
	MVA	1.2	1.2	1.2	1.2	1.2	
	PF	0.93	0.93	0.93	0.93	0.93	
	Firm Delivery Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	Y*	Y*	Y*	Y*	Y*	
	Hrs per annum > 95% of Peak Load (hrs)	4					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

*Within planning criteria risk margin

Substation: Waikerie 66/11kV

Region: Riverland

Number of Feeders: 3

Number of Transformers: 2

Total Nameplate Rating (MVA): 10 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	7.8	7.6	6.8	7.0	8.0
	MVAr	0.0	2.5	0.0	0.0	0.4
	MVA	7.8	8.0	6.8	7.0	8.0
	PF	1.00	0.95	1.00	1.00	1.00
Year		2009	2010	2011	2012	2013
Winter	MW	4.6	5.1	5.7	4.8	4.7
	MVAr	1.6	1.6	1.0	1.4	1.6
	MVA	4.8	5.3	5.7	5.0	5.0
	PF	0.94	0.95	0.98	0.96	0.95

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	7.6	7.5	7.4	7.4	7.3	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	7.6	7.5	7.5	7.4	7.3	
	PF	1.00	1.00	1.00	1.00	1.00	
	Total Capacity (MVA)	12.0	12.0	12.0	12.0	12.0	
	50% POE Forecast						
	MW	7.0	6.9	6.8	6.7	6.6	
	MVAr	0.3	0.3	0.3	0.3	0.3	
	MVA	7.0	6.9	6.8	6.7	6.6	
	PF	1.00	1.00	1.00	1.00	1.00	
	Firm Delivery Capacity (MVA)	6.7	6.7	6.7	6.7	6.7	
	Transfer Capacity (MVA)	1.6	1.6	1.6	1.6	1.6	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	6					

Year	Former Step Change (MVA)

Year	Future Step Change (10% POE MVA)

Substation: Woolpunda 66/11kV

Region: Riverland

Number of Feeders: 2

Number of Transformers: 2

Total Nameplate Rating (MVA): 15 MVA

Actuals

Year		2009/2010	2010/2011	2011/2012	2012/2013	2013/2014
Summer	MW	6.5	5.4	5.9	5.7	6.3
	MVAr	1.6	1.4	1.6	1.5	1.6
	MVA	6.7	5.6	6.1	5.9	6.5
	PF	0.97	0.97	0.97	0.97	0.97
Year		2009	2010	2011	2012	2013
Winter	MW	3.4	3.2	3.0	N/A	N/A
	MVAr	0.9	0.8	0.8	N/A	N/A
	MVA	3.5	3.3	3.1	N/A	N/A
	PF	0.97	0.97	0.97	N/A	N/A

Forecast

10% POE Forecast		2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	
Summer	MW	6.3	6.3	6.2	6.2	6.1	
	MVAr	1.6	1.6	1.6	1.5	1.5	
	MVA	6.5	6.5	6.4	6.4	6.3	
	PF	0.97	0.97	0.97	0.97	0.97	
	Total Capacity (MVA)	18.8	18.8	18.8	18.8	18.8	
	50% POE Forecast						
	MW	5.7	5.7	5.6	5.5	5.5	
	MVAr	1.4	1.4	1.4	1.4	1.4	
	MVA	5.9	5.8	5.8	5.7	5.7	
	PF	0.97	0.97	0.97	0.97	0.97	
	Firm Delivery Capacity (MVA)	10.6	10.6	10.6	10.6	10.6	
	Transfer Capacity (MVA)	0.0	0.0	0.0	0.0	0.0	
	System Limitation (Y/N)	N	N	N	N	N	
	Hrs per annum > 95% of Peak Load (hrs)	9					

Year	Former Step Change (MVA)
2012/13	+1.9MVA Customer load increase

Year	Future Step Change (10% POE MVA)

8.16.3 Riverland Non SCADA Substations 10% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	Total Capacity (MVA)	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019
				10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)	10% POE Forecast (MVA)
Cadell	2	2.0	2.6	2.5	2.4	2.4	2.4	2.3
Cordola	2	2.0	2.6	2.1	2.0	2.0	2.0	2.0
Lyrup	2	5.0	6.5	5.3	5.3	5.2	5.2	5.1
Morgan	1	1.0	1.3	1.1	1.1	1.1	1.0	1.0
Paringa 11kV	1	2.5	3.3	2.5	2.5	2.5	2.5	2.5
Portee	1	0.5	0.7	0.2	0.2	0.2	0.2	0.2
Qualco	1	2.5	3.3	2.9	2.8	2.8	2.8	2.7
Ramco	2	7.0	8.2	6.6	6.5	6.4	6.3	6.2
Roonka	1	6.25	8.0	2.8	2.7	2.7	2.7	2.7

System Limitations: Nil

8.16.4 Riverland Non SCADA Substations 50% POE Forecast

Substation	No of TFs	TF Nameplate Rating (MVA)	N-1 Emerg. Cyclic Rating (MVA)	2014/2015		2015/2016		2016/2017		2017/2018		2018/2019	
				50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)	50% POE F'cast (MVA)	T'fer Cap (MVA)
Lyrup	2	5.0	3.8	4.8	1.2	4.8	1.2	4.7	1.1	4.7	1.1	4.6	1.1
Ramco	2	7.0	4.8	6.1	1.6	6.0	1.6	6.0	1.6	6.0	1.6	5.9	1.6

System Limitations: Nil

8.16.5 Riverland 66kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
66KV LINES IN THE RIVERLAND							
NORTHWEST BEND	MORGAN TEE	19.3	13.6	13.5	13.4	13.3	13.2
MORGAN TEE	CORDOLA	19.6	12.5	12.4	12.4	12.3	12.2
CORDOLA	ROONKA	19.3	10.4	10.4	10.3	10.3	10.2
ROONKA	PORTEE	19.6	8.3	8.3	8.3	8.3	8.3
PORTEE	SWAN REACH	10.3	8.1	8.1	8.1	8.1	8.0
SWAN REACH	STOCKWELL	10.3	5.6	5.6	5.6	5.6	5.6
NORTHWEST BEND	CADELL	26.0	19.5	19.3	19.1	18.9	18.7
CADELL	QUALCO	26.0	17.0	16.9	16.7	16.5	16.3
QUALCO	RAMCO	26.0	14.2	14.0	13.9	13.7	13.6
RAMCO	WAIKERIE	26.0	7.6	7.5	7.5	7.4	7.4
BERRI	GLOSSOP	40.2	28.9	28.5	28.1	27.7	27.3
GLOSSOP	LOVEDAY	26.4	18.9	18.6	18.3	18.0	17.7
LOVEDAY	WOOLPUNDA	14.1	6.5	6.5	6.4	6.4	6.3
WOOLPUNDA	WAIKERIE	14.1	0.0	0.0	0.0	0.0	0.0
BERRI	LOXTON	44.0	23.7	23.4	23.1	22.7	22.4
LOXTON	PYAP	14.1	10.6	10.5	10.3	10.1	10.0
BERRI	RENMARK	42.7	34.8	34.8	34.8	34.9	34.9
RENMARK	PARINGA	25.9	15.1	15.2	15.3	15.4	15.6
BERRI	LYRUP	12.3	5.3	5.3	5.2	5.2	5.2

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

8.16.6 Riverland 33kV Sub-transmission Lines

Line Name - From	To	Total Capacity^ (MVA)	Forecast 2014/2015 MVA	Forecast 2015/2016 MVA	Forecast 2016/2017 MVA	Forecast 2017/2018 MVA	Forecast 2018/2019 MVA
33kV lines ex Paringa							
Paringa	Murtho	15.0	12.5	12.7	12.8	12.9	13.1
Murtho	Lindsay Pt Tee	10.3	7.5	7.6	7.7	7.7	7.8
Lindsay Pt Tee	Chowilla Group	10.3	4.5	4.6	4.6	4.7	4.7
Lindsay Pt Tee	Vic Border	10.3	3.0	3.0	3.0	3.1	3.1
Vic Border	Lindsay Pt Group	2.0	1.8	1.8	1.8	1.8	1.8
33kV lines ex Swan Reach							
Swan Reach	Swan Reach Filtration Tee	5.1	2.5	2.5	2.5	2.5	2.4
Swan Reach	Swan Reach Town	5.1	1.3	1.3	1.3	1.3	1.2

^ The published rating is based on a thermal limit or a limit required to maintain adequate clearances and does not take into account voltage limitations on the network which may further reduce the published rating.

System Limitations: Nil

Appendix A: Threshold at each Substation for Individual Augmentation Calculation

The standard unit charge for augmentation is \$154/kVA in 2014/15. For load increases greater than the below thresholds an individual calculation will apply and the customer may be subject to a higher augmentation charge. For further information on SA Power Networks customer connection policy, refer to <http://www.sapowernetworks.com.au/centric/customers/necfconnections.jsp>

Substation Name	Threshold (kVA)
Aldgate	500
Aldinga	1250
Allendale East	250
Alma	10
American River	150
Angas Creek 33kV	300
Angaston	1250
Angle Vale	1130
Ardrossan	150
Ardrossan West 33kV	300
Arno Bay	150
Ascot Park	1050
Athol Park	1000
Auburn	150
Balaklava	250
Balhannah 33kV	300
Baroota 11kV	30
Baroota 33kV	300
Barossa South	310
Beachport	130
Belvedere Road	20
Berri 11kV	1000
Binnies	30
Birdwood	150
Black Point	50
Blackpool	800
Blackwood	2500
Blanche 33kV	300
Blue Lake 3.3kV	200
Bolivar 11kV	630
Booleroo Centre	50
Booyoolie	10
Bordertown	500
Brinkworth 33kV	300
Brinkworth Town	150
Brukung	30
Bungama	50
Bungama Rural 33kV	300
Burnside	1250
Burra	500
Cadell	100

Substation Name	Threshold (kVA)
Caloote	150
Caltowie	10
Cambrai	50
Campbell Park	80
Campbelltown	2400
Cape Jervis	30
Cape Jervis 33kV	2000
Caralue	130
Cavan	2500
Ceduna	500
Chain of Ponds	20
Cheltenham 33kV	1000
Cheltenham 7.6kV	250
Cheltenham 11kV	1250
Clare	500
Clare North 33kV	300
Clarence Gardens	1600
Clarendon 11kV	130
Clearview	1000
Cleve	250
Cleve 33kV	300
Coffin Bay	130
Collinsfield	130
Coomandook	30
Coonalpyn	50
Coonawarra	500
Cordola	100
Coromandel Place	2750
Cowell	150
Croydon	2100
Croydon Park	1000
Crystal Brook	130
Cudmore Park	1000
Cummins	150
Curramulka	10
Curramulka South	10
Dalrymple 33kV	300
Darke Peake	50
Davenport West 33kV	300
Deloraine	20
Desert Camp	30
Direk	2500
Dorrien 1	630
Dorrien 2	630
Dorrien 33kV	300
Dowlingville	10
East Tce 11kV	2750
East Tce 33kV	3000
Edinburgh	3750
Edithburgh	130

Substation Name	Threshold (kVA)
Elizabeth Downs	2500
Elizabeth Heights	1000
Elizabeth South TF 1&2	1000
Eudunda	100
Evanston	2500
Findon	1000
Flinders Park	1000
Forreston	50
Freeling	150
Freeling North	190
Fulham Gardens	2100
Fullarville	10
Gawler Belt 1	630
Gawler Belt 2	630
Georgetown	10
Geranium	10
Gladstone	200
Glanville	800
Glencoe	50
Glenelg North	1000
Glossop	630
Glynde	1600
Golden Grove	3750
Gomersal North	50
Goolwa	1250
Gulnare	20
Gumeracha	15
Gumeracha Weir	10
Gumhaven	20
Hackham	1250
Hahndorf	250
Halbury	10
Hamley Bridge	130
Happy Valley	2500
Happy Valley SAW TF1	250
Harrow	1000
Hatherleigh	20
Hawker	50
Hay Flat	10
Henley South	2400
Hermitage	30
Hillcrest	2500
Hindley Street 11kV	2750
Hindley Street 33kV	3000
Holden Hill	2100
Hope Valley	1250
Houghton	150
Hoyleton	10
Hummocks 33kV	300
Ingle Farm	2100

Substation Name	Threshold (kVA)
Inverness	50
Jabuk	10
James Well	40
Jamestown	150
Jervois	310
Jervois Flat 1	150
Jervois Flat 2	150
Kadina	630
Kadina East 33kV	300
Kalangadoo	30
Kalangadoo West	50
Kanmantoo	250
Kapunda 1	630
Kapunda 2	630
Karoonda	50
Keith 11kV	630
Keith 33kV	300
Kent Town	2500
Kersbrook	50
Keswick	2100
Ki Ki	10
Kilburn	3150
Kilburn Bus A	1150
Kilburn South	1600
Kilkenny	2500
Kincaig 33kV	300
Kingscote	310
Kingston (SE)	150
Kingswood	3200
Kleins Point	150
Kongorong	50
Kumorna	50
Kybunga	10
Lakeside	630
Lameroo	100
Langhorne Creek	250
Largs North	1000
Lefevre	3200
Leigh Creek South	250
Linden Park	2500
Little Swamp	10
Lobethal	500
Lock	50
Lonsdale	10200
Loveday	750
Lower Mitcham	1000
Loxton	940
Lucindale	150
Lyndoch	190
Lyndoch South	30

Substation Name	Threshold (kVA)
Lyrup	250
MacGillivray	100
Maitland	250
Mallala	200
Mannum 33kV	300
Mannum Town	250
Marion Bay	50
Marrabel	150
McLaren Flat 1	630
McLaren Flat 2	630
McLaren Vale	250
Meadows	250
Melrose	30
Meningie	250
Milang	250
Millicent	500
Minlaton	100
Mobilong 33kV	300
Monarto South	600
Moonta	500
Moorkitabie	50
Morgan	50
Morphett Vale East	2400
Morphettville	1000
Mount Barker	3200
Mount Burr	20
Mount Gambier 33kV	300
Mount Gambier City 11kV	1000
Mount Gambier North	630
Mount Gambier West	1000
Mount Gunson 33kV	300
Mount Pleasant	100
Mount Schank	150
Murray Bridge North	1250
Murray Bridge South	1250
Mylor	190
Mypolonga	100
Myponga	500
Nairne	380
Nangwarry	150
Naracoorte	1250
Naracoorte East	630
Narrung	150
Neuroodla	250
New Osborne	500
New Richmond	2100
Nildottie	310
Ninnes	50
Noarlunga Centre	1000
North Adelaide	3200

Substation Name	Threshold (kVA)
North Unley	1000
Northfield	1000
Norwood	3150
Nuriootpa	630
Oaklands	2400
Orroroo	100
Padthaway	500
Palmer	20
Panorama	2500
Parafield Gardens	3200
Paralowie	1000
Parilla	50
Paringa 11kV	130
Paringa 33kV	630
Paskeville	50
Peake	20
Pellaring Flat	20
Penfield 11kV	2500
Penneshaw	80
Penola	150
Penola West 33kV	300
Peterborough	250
Piccadilly	150
Pinnaroo	100
Pinnaroo South	20
Playford	150
Plympton	1000
Point Boston	310
Polda	50
Poonindie	80
Port Adelaide	800
Port Adelaide North	2100
Port Augusta	1250
Port Augusta West TF1	630
Port Augusta West TF2	630
Port Broughton	250
Port Clinton	50
Port Germein	50
Port Giles	130
Port Julia	50
Port Lincoln 33kV	300
Port Lincoln City	1250
Port Lincoln Docks	630
Port Lincoln Marina	630
Port Noarlunga	2500
Port Pirie	1500
Port Pirie South	1880
Port Stanvac	3750
Port Vincent	100
Portee	30

Substation Name	Threshold (kVA)
Prospect	2100
Punyelroo	30
Pyap	630
Qualco	130
Queenstown	800
Quorn	130
Ramco	350
Rapid Bay	20
Rapid Bay 3.3kV	90
Renmark	1130
Riverton	150
Robe	250
Robertstown	50
Roonka	320
Rudall	30
Salisbury	3150
Salt Cliffs	30
Sandy Creek	150
Seacombe	2500
Seaford	630
Second Valley	30
Sheidow Park	1250
Sherlock	10
Smithfield West	1250
Snuggery Industrial 33kV	300
Snuggery Rural 33kV	300
South End	30
Spalding	100
Square Water Hole	250
Stansbury	130
Stirling East	630
Stirling North Old	130
Stirling North New	150
Stockwell	310
Stony Point	130
Strathalbyn	630
Strathalbyn East	500
Streaky Bay	250
Swan Reach 11kV	150
Swan Reach 33kV	300
Tailem Bend 33kV	300
Tailem Bend Town	150
Tantanoola	50
Tarltan	50
Tarpeena	320
Tea Tree Gully	2100
Teal Flat	150
Templers 33kV	300
Thebarton	2100
Tintinara	50

Substation Name	Threshold (kVA)
Tonsley Park	1500
Tumby Bay	250
Two Wells	630
Uley	50
Uley South	80
Uraidla 11kV	630
Uraidla 33kV	1250
Valente	20
Verdun	50
Victor Harbor	2500
Virginia	630
Waikerie	500
Walker Flat	100
Wallaroo	630
Warooka	250
Wasleys	100
Waterloo 33kV	300
Waterloo 11kV	30
Whitmore Square	2750
Whyalla City	1000
Whyalla North	150
Whyalla Stuart	1250
Whyalla Terminal 33kV	300
Williamstown	130
Williamstown South	190
Willunga 11kV	250
Willunga 33kV	380
Wilmington	50
Wirrabara Forest	50
Wirrabara South	10
Wirrina Cove	80
Wongyarra	10
Woodforde	2100
Woods Point	310
Woodside	500
Woodville 33kV	2000
Woodville 7.6kV	500
Woolpunda	750
Wudinna 11kV	200
Yankalilla 11KV	630
Yankalilla 33kV	630
Yankalilla Hill	20
Yongala	20
Yorketown	100