

EnergyAustralia™

**Transmission Annual
Planning Report
2008**



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EXECUTIVE SUMMARY

The Annual Planning Report provides information to Registered Participants and interested parties on the nature and location of emerging constraints in the EnergyAustralia electricity transmission network.

The timely identification of emerging constraints allows the market to identify potential demand management solutions and EnergyAustralia to develop and implement appropriate and timely network solutions to them.

EnergyAustralia is registered as both a Transmission Network Service Provider and a Distribution Network Service Provider in the National Electricity Market. As a state-owned corporation, EnergyAustralia is predominantly an electricity distribution and retail business that also owns, develops, operates and maintains a transmission network in NSW. The transmission assets provide support to the TransGrid network.

Development of the EnergyAustralia transmission network is driven by:

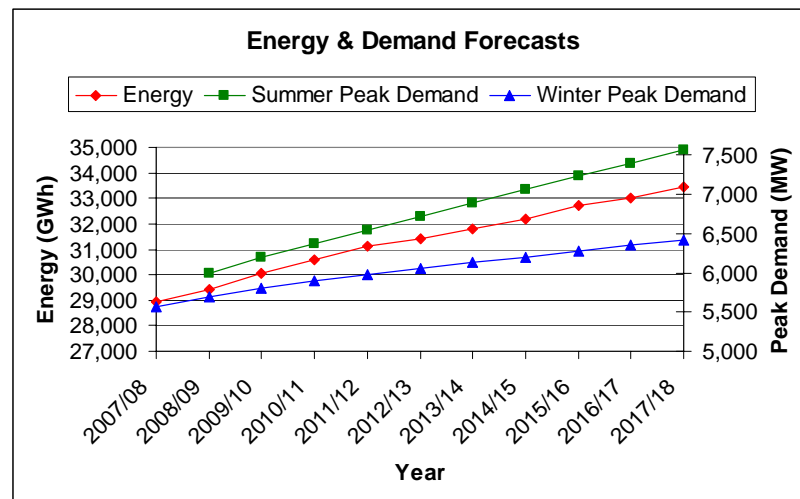
- Customer electricity demand growth;
- Replacement of ageing assets;
- Support to the TransGrid network; and
- Impact of demand side programs.

Overall, the need for augmentations on the EnergyAustralia network will continue to be the requirement to provide an adequate, safe and reliable electricity network of appropriate quality.

Energy and Demand Growth

The global forecast energy and demand growth figures used in APR 2008 are based on loads at Bulk Supply Points excluding the direct loads of Hydro Aluminium, BHP Billiton and inter-distributor transfers. The peak demand figures are weather corrected 50% PoE.

For the period 2007-2018, the forecast average growth in energy consumption is 1.4%; the forecast average growth in the summer peak demand is 2.7% and the forecast average growth in the winter peak demand is 1.4%.



Future Development

EnergyAustralia's transmission network is complex and well utilised. This means that there is limited capacity within the existing network to facilitate the demands placed on the network – either by customers through increasing capacity requirements, or in its supporting role to the TransGrid network. Consequently, there is an emerging need for the construction of major new infrastructure.

EnergyAustralia's plans for the future development of the transmission network are detailed in this Annual Planning Report.

The proposed network developments are current as at May 2008 and costs are expressed in 08/09 real dollars.

None of the constraints or projects highlighted in this report has a material inter-network impact.

Structure of the Annual Planning Report

The Annual Planning Report follows a structure that has been approved by the Ministerial Council on Energy. It aligns the Annual Planning Report with the Annual National Transmission Statement (ANTS) prepared by NEMMCO. The structure is:

- Section 1 - table of contents;
- Section 2 - annual planning review and supply reliability;
- Section 3 - relevant national transmission flow path developments;
- Section 4 - energy and demand forecasts;
- Section 5 - committed augmentations and recently completed augmentations;
- Section 6 - emerging constraints;
- Section 7 - other transmission planning issues; and
- Section 8 - appendices.

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2 INTRODUCTION

2.1 ANNUAL PLANNING REVIEW

The Transmission Annual Planning Report 2008 (APR 2008) documents processes and outcomes of the transmission annual planning review carried out since the publication of APR 2007. The purpose of the annual planning review and the Annual Planning Report is to:

- Identify emerging constraints in EnergyAustralia's transmission network over appropriate planning horizons;
- Provide advance information on the nature and location of the constraints;
- Discuss options for relieving identified constraints;
- Comply with National Electricity Rules (NER) requirements in respect of preparation of a Transmission Network Service Provider's Annual Planning Report and the associated consultation on proposed New Small Transmission Network Augmentations; and
- Provide details on load forecast information.

The annual planning review for 2008 includes:

- Ongoing planning, analysis and identification of network constraints including an examination of options for relieving the constraints; and
- Publication of APR 2008.

The Annual Planning Report provides information to Registered Participants and interested parties on the nature and location of emerging constraints in the EnergyAustralia electricity transmission network.

The timely identification of emerging constraints allows the market to identify potential demand management solutions and EnergyAustralia to develop and implement appropriate and timely network solutions to them.

2.2 DEVELOPMENTS SINCE PUBLICATION OF APR 2007

This section provides a commentary on a number of augmentations which were described in EnergyAustralia's APR 2007. However, due to developments over the past twelve months, they are not included in APR 2008. Nonetheless, they are mentioned for completeness.

2.2.1 Inner Sydney Metropolitan 132kV System Augmentation

As reported in APR 2007, increasing demand in the CBD and Inner Metropolitan area of Sydney is forecast to continue for the foreseeable future. Joint planning with TransGrid has proposed a number of augmentations to address these issues.

Upon review, it was felt that these augmentations should be considered as individual projects rather than being covered in the generic section Inner Sydney Metropolitan 132kV System Augmentation.

Therefore, the section Inner Sydney Metropolitan 132kV System Augmentation will not be included in APR 2008.

2.2.2 Central Coast 132kV System Augmentation

As reported in APR 2007, increasing demand in the Gosford / Ourimbah area is forecast to present medium term constraints on the Lower Central Coast 132kV transmission system. Joint planning with TransGrid has proposed a number of augmentations to address these issues.

Upon review, it was felt that these augmentations should be considered as individual projects rather than being covered in the generic section Central Coast 132kV System Augmentation.

Therefore, the section Central Coast 132kV System Augmentation will not be included in APR 2008.

2.2.3 Lower Hunter 132kV System Augmentation

As reported in APR 2007, the 132kV network which supplies Beresfield, Tomago and Country Energy on the lower mid north coast, has reached the stage where reinforcement is required. Joint planning with TransGrid has proposed that the most likely option is the establishment of a new 330/132kV substation in the Tomago area.

Upon review, it was felt that the section Lower Hunter 132kV System Augmentation should be renamed Tomago Bulk Supply Point 132kV Connections in order to reflect the proposed augmentation.

Therefore, the section Lower Hunter 132kV System Augmentation has been renamed Tomago Bulk Supply Point 132kV Connections in APR 2008.

2.2.4 Waverley 132/11kV Zone Substation

As reported in the APR 2007, the replacement of the existing Waverley 33/11kV zone substation (distribution asset) with a 132/11kV substation may require the installation of 132kV cables from the Alexandria area leading to a change in classification from distribution asset to transmission asset.

Joint planning with EnergyAustralia DNSP has proposed that an alternative option for supplying the new substation would be to install a new 132kV feeder from Belmore Park zone substation.

Under this option, Waverley and the new 132kV feeder will be a new large distribution asset. Therefore, the section Waverley 132/11kV Zone Substation will not be included in APR 2008.

2.2.5 Alexandria Sub-Transmission Switching Substation

As reported in APR 2007, continued development in the Sydney Eastern Suburbs would necessitate the provision of alternate connections for the proposed Waverley substation and other 132kV transmission and distribution feeders.

Joint planning with TransGrid and EnergyAustralia DNSP has proposed that alternative options for connecting the 132kV feeders would be to make use of Belmore Park zone substation in addition to augmentation works at Beaconsfield West BSP.

Under this option, a sub-transmission switching substation will not be required at Alexandria. Therefore, the section Alexandria Sub-Transmission Switching Substation will not be included in APR 2008.

2.2.6 Sydney Olympic Park 132/11kV Substation

As reported in APR 2007, the Homebush Bay area is experiencing high load growth due to substantial new commercial developments both within Sydney Olympic Park and the surrounding areas. A new zone substation in the Sydney Olympic Park area was identified as a possible option, however due to the uncertainty of load requirements the project was identified only as a possible new connection point.

Joint planning with EnergyAustralia DNSP has proposed that an alternative option for supplying this load would be to construct a new 132/11kV zone substation in the Homebush Bay area.

Under this option, the new zone substation will be a new large distribution asset. Therefore, the section Sydney Olympic Park 132/11kV Substation will not be included in APR 2008.

2.3 SUPPLY RELIABILITY

2.3.1 EnergyAustralia's Responsibility

EnergyAustralia is registered as both a Transmission Network Service Provider (TNSP) and a Distribution Network Service Provider (DNSP) in the National Electricity Market. As a state-owned corporation, EnergyAustralia is predominantly an electricity distribution and retail business that also owns, develops, operates and maintains a transmission network in NSW. The transmission assets provide support to the TransGrid network.

The NER require a TNSP to:

- Analyse the future operation of its transmission network to determine the extent of any future network constraints;
- Conduct annual planning reviews with distributors to determine the extent of any emerging constraints ;
- Carry out joint planning with distributors to determine options for the relief of constraints;
- Coordinate a consultative process for consideration and economic analysis of the options, if required, in accordance with the Australian Energy Regulator's (AER) regulatory test;
- Determine the recommended option for network augmentation;
- Arrange for implementation of the network option; and
- Prepare and publish an Annual Planning Report.

The NER require that the Annual Planning Report must include:

- Results of annual planning reviews with distributors during the current year;
- Load forecasts submitted by distributors;

- Planning proposals for future connection points;
- Forecasts of constraints over 5 years;
- Summary information for proposed augmentations; and
- Consultation on proposed New Small Transmission Network Augmentations.

The NER require a DNSP to:

- Analyse the future operation of its distribution network to determine the extent of any future network constraints;
- Extrapolate forecasts provided by Registered Participants to determine the extent of any emerging constraints ;
- Consult with Registered Participants, NEMMCO and interested parties on the possible options including demand side options to address the projected limitation;
- Carry out economic cost effectiveness analysis of the options;
- Determine the recommended option for network augmentation; and
- Arrange for implementation of the network option.

As detailed in the NER, New Small Transmission Network Augmentations are augmentations which have an estimated capital cost of between \$1M and \$10M for which the Annual Planning Report forms the basis of the formal consultation. Further, New Large Transmission Network Augmentations are augmentations which have an estimated capital cost greater than \$10M and require a separate and more detailed regulatory test application and consultation.

2.3.2 Joint Planning

The network limitations and development augmentation proposals contained in the Annual Planning Report have been identified in conjunction with TransGrid and relevant DNSPs as a result of the joint planning process undertaken in accordance with the NER.

The augmentation proposals described in this report are reliability projects and do not have a material inter-network impact.

2.3.3 Investing for Future Generations

EnergyAustralia publishes two Investing for Future Generations documents, namely the Electricity System Development Review (ESDR) and Our Five Year Network Plan.

The Electricity System Development Review contains forecast demand and capacity data for all sub-transmission substations and zone substations based on the most recent summer and winter loads. Information is also provided for all locations as having forecast demands meeting criteria for augmentation.

Our Five Year Network Plan outlines the network capital investment program to renew, replace or upgrade system elements. While demand management and other initiatives contribute to more efficient use of electricity, the demand for power continues to grow. The plan outlines initiatives for the transmission (and distribution) systems.

A copy of the ESDR and Our Five Year Network Plan is available on EnergyAustralia's website at www.energy.com.au.

2.3.4 Network Management Plan

Separately, EnergyAustralia publishes an annual Network Management Plan detailing the management framework which assists in providing an adequate, reliable and safe electricity network of appropriate quality.

The Network Management Plan documents the objectives, strategies and initiatives developed for the management of EnergyAustralia's transmission (and distribution) systems. It does this by providing:

- Description of the asset investment and management strategies, procedures, processes and standards used to manage EnergyAustralia's network;
- Description of the initiatives to improve existing processes and in particular demand management and reliability improvements; and
- Details on how EnergyAustralia complies with the Codes, Standards and Guidelines nominated by the NSW Department of Water and Energy (DWE).

A copy of the Network Management Plan is available on EnergyAustralia's website at www.energy.com.au.

2.3.5 Licence Conditions

On 1 August 2005, the then Minister for Energy imposed additional conditions relating to reliability performance on licences held by DNSPs under the Electricity Supply Act 1995. Following a review of the licence conditions conducted by the Minister, those conditions were replaced with updated and revised conditions relating to reliability performance, with effect from 1 December 2007.

The licence conditions are to facilitate the delivery of a safe and reliable supply of electricity. The licence conditions impose design, reliability and performance standards on DNSPs. The new standards are:

- Design planning criteria which set out input standards to be used in planning the network, a requirement for load forecasting and contingency planning, and baseline levels of planned redundancy;
- Reliability standards which define minimum average reliability performance, by feeder type, for a DNSP across its distribution network;
- Individual feeder standards specify minimum standards of reliability performance for individual feeders; and
- Customer service standards which provide financial recognition to eligible customers who have experienced poor reliability of supply from a DNSP.

2.3.6 Planning Process

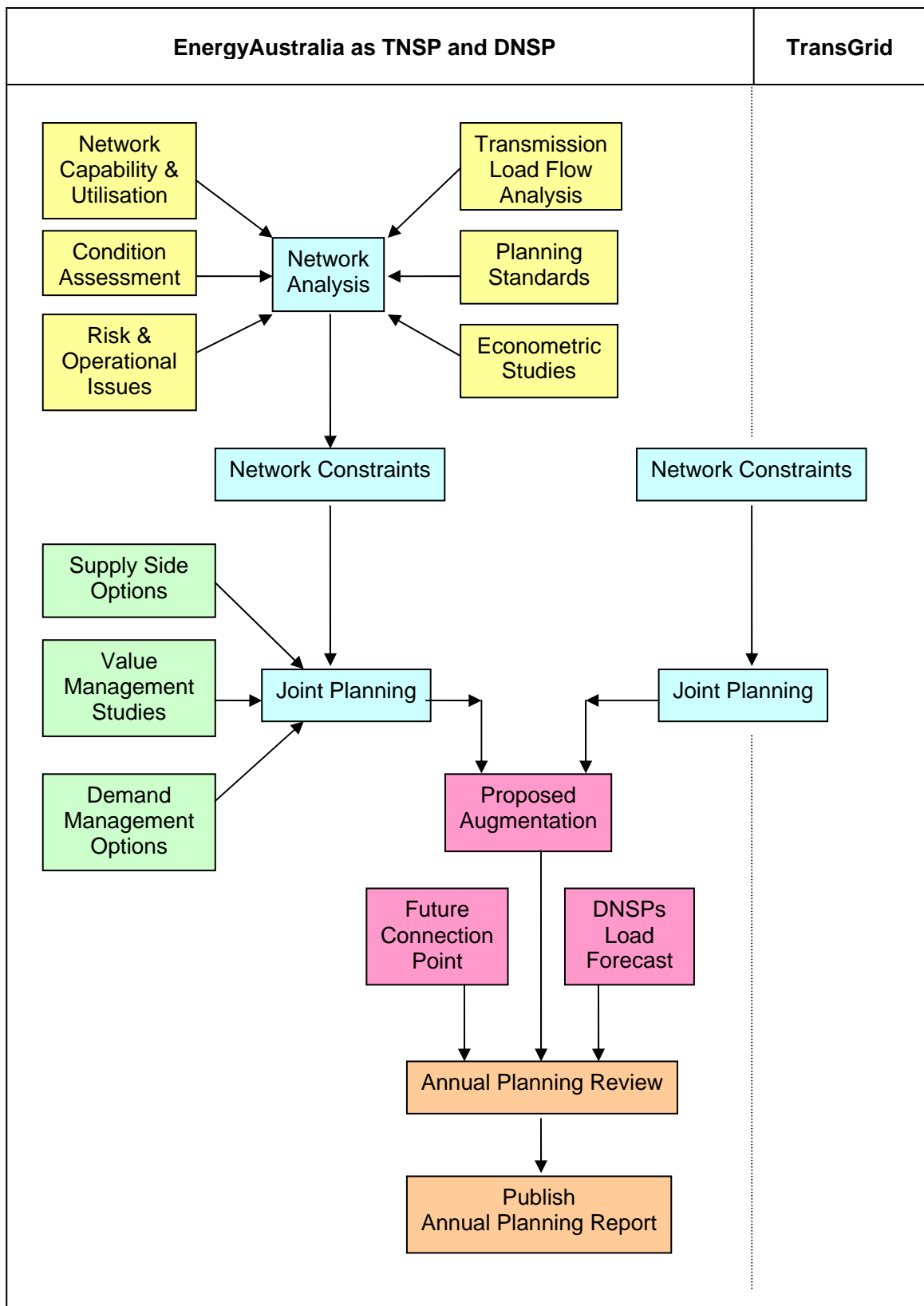
Clause 5.6 of the NER sets out the planning process and consultation requirements and includes requirements on forecasting, annual reviews, regulatory tests and consultations.

The main inputs to the planning process are:

- DNSP supply point load forecasts;
- Review of network capacity and utilisation;
- Planning criteria and indicators;
- Condition, operational and risk assessments;
- Transmission network loadflow analysis; and
- TransGrid planning reviews.

The relationship between the various elements in the planning process is shown in Figure 2.1.

Figure 2.1: Planning Process



3 TRANSMISSION FLOW PATH DEVELOPMENTS

3.1 ANNUAL NATIONAL TRANSMISSION STATEMENT

The Annual National Transmission Statement (ANTS) is the outcome of the National Electricity Market Management Company Limited (NEMMCO) annual national transmission review. It provides an integrated overview of the current state and potential future development of National Transmission Flow Paths (NTFPs).

The ANTS includes a review of the:

- National transmission flow paths;
- Historical and forecast utilisation and constraints in respect of the national transmission flow paths; and
- Options that are technically capable of relieving forecast constraints in respect of national transmission flow paths.

A copy of the Annual National Transmission Statement is available on NEMMCO's website at www.nemmco.com.au.

3.2 NSW RESPONSIBILITY

In the ANTS, network augmentation proposals by TNSPs that affect NTFPs are taken into account by NEMMCO in the development of conceptual augmentation options and market development scenarios.

TransGrid is the Jurisdictional Planning Body (JPB) for NSW in the NEM. In this role it:

- Represents the NSW jurisdiction on the Inter-Regional Planning Committee (IRPC); and
- Provides jurisdictional information to the IRPC to enable it to assist NEMMCO in producing its annual Statement of Opportunities (SOO) and ANTS.

Accordingly, TransGrid is responsible for providing information concerning transmission developments in NSW which may affect the power transfer capacity of NTFPs.

Further details are available on TransGrid's website at www.transgrid.com.au.

4 ENERGY AND DEMAND FORECASTS

4.1 INTRODUCTION

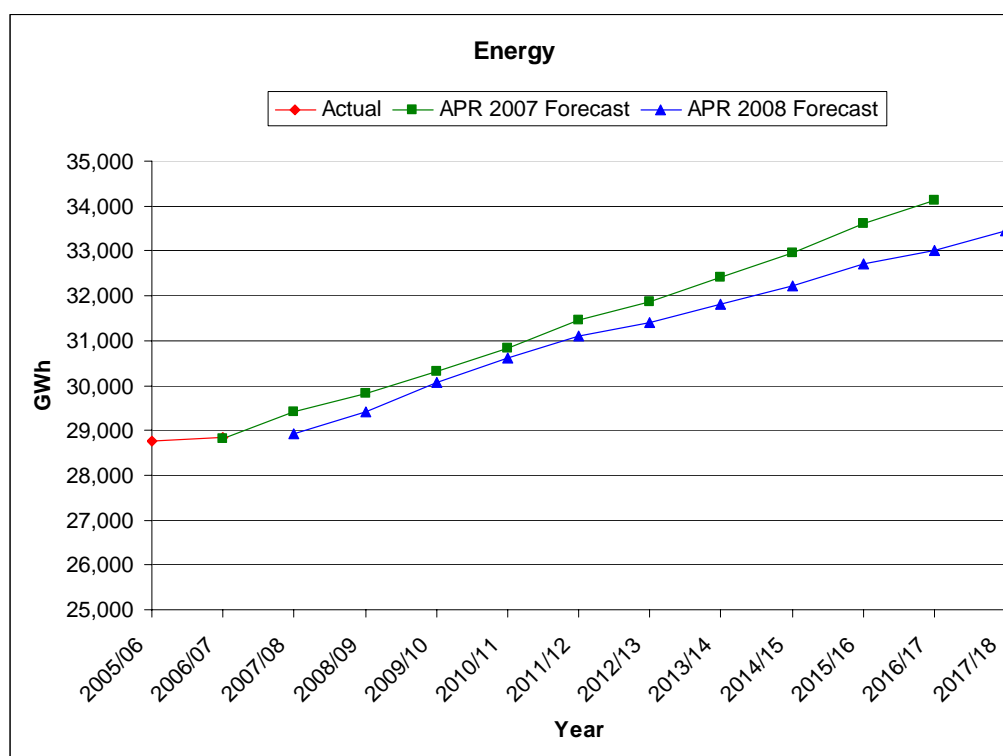
This section presents forecasts of energy and demand for EnergyAustralia, covering:

- Network energy in Giga Watt Hours (GWh);
- Network summer peak demand 50% Probability of Exceedence (PoE) in Mega Watts (MW); and
- Network winter peak demand 50% PoE in MW.

The forecasts of demand are used by EnergyAustralia as an independent logic check of the spatial peak demand forecasts to identify future transmission constraints and to quantify any associated transmission development proposals.

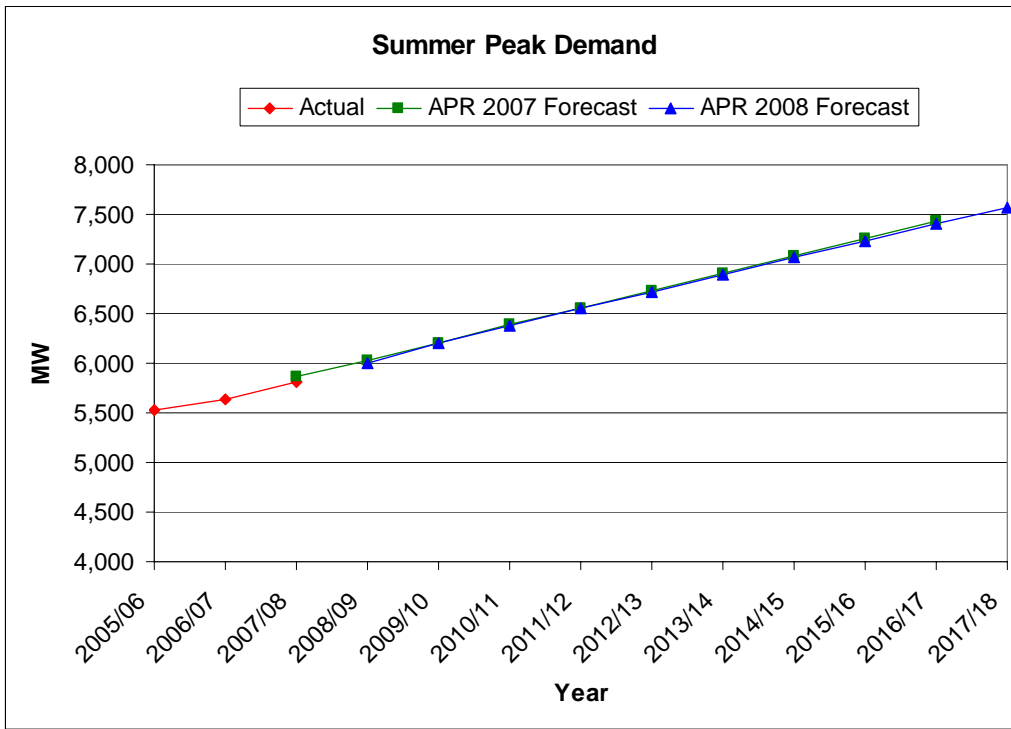
4.2 NETWORK ENERGY FORECAST

Actual values and forecast values are illustrated below.



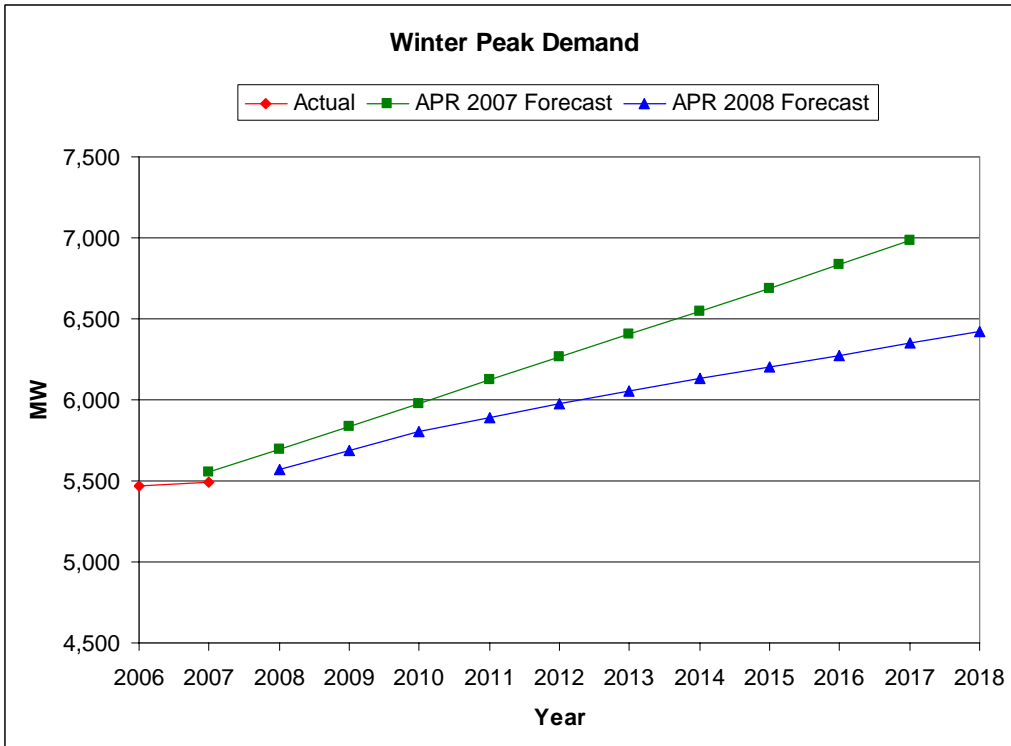
4.3 NETWORK SUMMER PEAK DEMAND FORECAST

Actual values and forecast values are illustrated below.



4.4 NETWORK WINTER PEAK DEMAND FORECAST

Actual values and forecast values are illustrated below.



5 COMMITTED NETWORK AUGMENTATIONS

5.1 COMPLETED AUGMENTATIONS

This section describes augmentations that have been completed since publication of APR 2007.

The completed augmentations are as tabulated below.

Region	APR Section	Augmentation	Completed
Sydney	5.1.1	Mason Park & Chullora Aged Asset Replacement	2007/08

Summary information concerning these augmentations follows.

5.1.1 Mason Park & Chullora Aged Asset Replacement

In APR 2007 it was proposed to replace the existing three shunt reactors at Chullora STS and Mason Park STS with two shunt reactors of increased capacity.

This work has now been completed.

5.2 COMMITTED AUGMENTATIONS

This section describes network constraints that are being relieved by augmentations that are considered committed. These projects will normally have appeared in previous APR publications as proposed network augmentations.

For the purposes of the APR, an augmentation is considered to be committed if it satisfies all the criteria that are defined in NEMMCO's Statement of Opportunities (SOO), as follows:

- Board commitment has been achieved (this requires the appropriate planning approvals and licences to be in place);
- Funding has been approved;
- The project has satisfied the Regulatory Test; and
- Construction has either commenced or a firm date has been set for it to commence.

The committed augmentations are as tabulated below.

Region	APR Section	Augmentation	Timing	Estimated Cost
Sydney	5.2.1	Macquarie Park ZS 132/11kV Additional Transformer	2008/09	\$4.8M
Sydney	5.2.2	Rozelle STS 132kV Feeders 90V/3 and 90W/4 Part Replacement	2009/10	\$21.7M
Sydney	5.2.3	Top Ryde 132/11kV Zone Substation	2009/10	\$30.0M
Sydney	5.2.4	Bunnerong STS to Kurnell STS 132kV Feeders	2010/11	\$160.0M
Central Coast	5.2.5	Ourimbah STS 132/66kV Substation Refurbishment	2010/11	\$41.0M

Summary information concerning these augmentations follows.

5.2.1 Macquarie Park ZS 132/11kV Additional Transformer

In APR 2007 it was proposed to install a third 50 MVA 132/11kV transformer at Macquarie Park zone substation to cater for increased load growth and a number of spot loads in the area.

A consultation process was carried out in accordance with clause 5.6.6 of the NER. A Final Report (Upgrade of Macquarie Park Zone Substation) was published in June 2007 with the proposed works being unchanged.

The works are planned to be completed by late 2008.

5.2.2 Rozelle STS 132kV Feeders 90V/3 and 90W/4 Part Replacement

The 132kV feeder 90V/3 (Rozelle STS to City Central ZS) and 90W/4 (Rozelle STS to Pyrmont STS) contain sections of oil-filled cable which has been progressively replaced over the years.

EnergyAustralia intend to replace the remaining oil-filled cable sections.

The works are planned to be completed by late 2009.

5.2.3 Top Ryde 132/11kV Zone Substation

In APR 2007, it was mentioned that the most likely option to cater for increased load growth and substantial new commercial developments in the Top Ryde area was the construction of a new 132/11kV zone substation.

A consultation process was carried out in accordance with clause 5.6.6 of the NER. An Application Notice was published in October 2007. A Final Report (Development of Electricity Supply to Top Ryde Load Area) was published in January 2008 with the proposed works being unchanged.

The works are planned to be completed by early 2010.

5.2.4 Bunnerong STS to Kurnell STS 132kV Feeders

In APR 2007 it was mentioned that the most likely option to address asset condition issues associated with the existing 132kV feeders 908/909 between Canterbury STS and Bunnerong STS was to replace them with new additional capacity 132kV feeders between Kurnell STS and Bunnerong STS.

A consultation process was carried out in accordance with clause 5.6.6 of the NER. An Application Notice was published in October 2006. EnergyAustralia has consulted separately over the community aspects of the proposed development and has received NSW Department of Planning approval (December 2007) to proceed. A Final Report (Replacement of 132kV Feeders 908 & 909 Canterbury to Bunnerong) was published in April 2008 with the proposed works being unchanged.

The works are planned to be completed by late 2010.

5.2.5 Ourimbah STS 132/66kV Substation Refurbishment

In APR 2007, it was mentioned that the most likely option to address asset condition issues associated with the equipment at Ourimbah STS was to rebuild the substation on the existing site.

A consultation process was carried out in accordance with clause 5.6.6 of the NER. An Application Notice was published in October 2007. A Final Report (Refurbishment of Ourimbah Sub Transmission Substation) was published in January 2008 with the proposed works being unchanged.

The works are planned to be completed by late 2010.

5.3 PLANNED AUGMENTATIONS THAT HAVE SATISFIED THE REGULATORY TEST

This section describes network constraints that are being relieved by augmentations that have satisfied the regulatory test but have not progressed to the point where they can be considered committed in accordance with the criteria described in NEMMCO's SOO.

An augmentation option satisfies the regulatory test if:

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

The planned augmentations that have satisfied the regulatory test are as tabulated below.

Region	APR Section	Augmentation	Timing	Estimated Cost
Hunter	5.3.1	Tomago Bulk Supply Point 132kV Connections	2009/10	\$21.0M

Summary information concerning these augmentations follows.

5.3.1 Tomago Bulk Supply Point 132kV Connections

The 132 kV network which supplies Beresfield, Tomago and Country Energy on the lower mid north coast, has reached the stage where reinforcement is required.

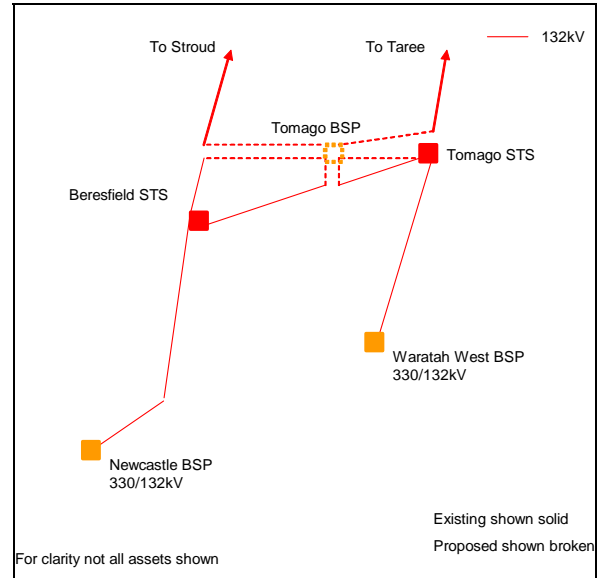
In the APR 2007 it was mentioned that the most likely option to address these issues was for TransGrid to establish a new 330/132kV substation in the Tomago area.

In conjunction with this option, EnergyAustralia would be required to provide connections to the substation and undertake the necessary 132kV augmentation works on their network to transfer load to the new substation.

A joint Application Notice was published in October 2007 outlining the issues and a preliminary application of the regulatory test.

The Application Notice reported that it was not cost effective to postpone any of the elements of the proposed network development by implementing demand management strategies.

A joint Final Report (Development of Electricity Supply to the Newcastle Area) was published in December 2007 with the proposed works being unchanged



EnergyAustralia intend to provide connections to the proposed Tomago 330/132kV substation and undertake the necessary 132kV augmentation works on their network.

The EnergyAustralia works are planned to be completed by late 2009.

The project is a reliability augmentation and will not have a material inter-network impact. Joint planning has addressed likely impacts on the TransGrid network.

6 PROPOSED NETWORK DEVELOPMENTS

6.1 INTRODUCTION

The following sections describe specifically identified current and emerging constraints within EnergyAustralia's network. Where New Small Transmission Network Assets or New Large Transmission Network Assets are proposed to relieve these constraints they are detailed as required by the NER. Where there is no proposed new transmission network augmentation one or more options for relief of the constraint may be described.

Section 6.2 describes constraints expected to emerge over a five year planning horizon that are proposed to be relieved by New Small Transmission Network Assets. These descriptions include an explanation of the ranking of reasonable options to each proposal in accordance with the principles contained in the AER's regulatory test.

Section 6.3 describes constraints expected to emerge over a five year planning horizon that are proposed to be relieved by New Large Transmission Network Assets for which consultation is anticipated prior to publication of APR 2009.

Section 6.4 describes constraints expected to emerge over a five year planning horizon that are proposed to be relieved by New Large Transmission Network Assets where consultation is not anticipated prior to publication of APR 2009.

Section 6.5 describes longer term constraints and indicative developments that are expected to arise over a time frame that is longer than 5 years.

The constraints detailed in APR 2008 are subject to change in respect to the number and nature of the constraints and their timing. In some cases changes will occur at short notice. Changes may be brought about by changes in load growth, new load developments as well as local generation and demand management developments. In all cases options for the relief of constraints will be developed and commitments will be made in time to ensure that standards of supply are maintained.

The NER requires the Annual Planning Report to set out planning proposals for future Connection Points. These can be initiated by generators or customers or arise as the result of joint planning with a distributor. Proposals for augmentations to the capacity of existing Connection Points and proposals for new Connection Points are detailed in Appendix A4.

6.2 CONSTRAINTS EMERGING WITHIN 5 YEARS – PROPOSED NEW SMALL TRANSMISSION NETWORK ASSETS

This section describes constraints that are proposed to be relieved by New Small Transmission Network Assets. In accordance with clause 5.6.6A of the NER, these augmentations have an estimated capital cost of between \$1M and \$10M for which the Annual Planning Report forms the basis of the formal consultation.

The proposed New Small Transmission Network Assets are as tabulated below.

Region	APR Section	Constraint	Augmentation	Timing	Estimated Cost
Sydney	6.2.1	Load Growth	Chullora Bulk Supply Point 132kV Connections	2012/13	\$8.0M
Hunter	6.2.2	Load Growth	Beresfield STS 33kV Capacitor Bank	2008/09	\$4.2M
Hunter	6.2.3	Load Growth	Tomago STS 33kV Capacitor Bank	2009/10	\$2.6M

Information concerning these augmentations follows.

6.2.1 Chullora Bulk Supply Point 132kV Connections

The 132kV supply to the Inner Sydney Metropolitan area is provided by a radial 132kV distribution network supplied from Sydney East BSP and an interconnected 132kV transmission network linking Beaconsfield West BSP, Haymarket BSP, Sydney North BSP and Sydney South BSP.

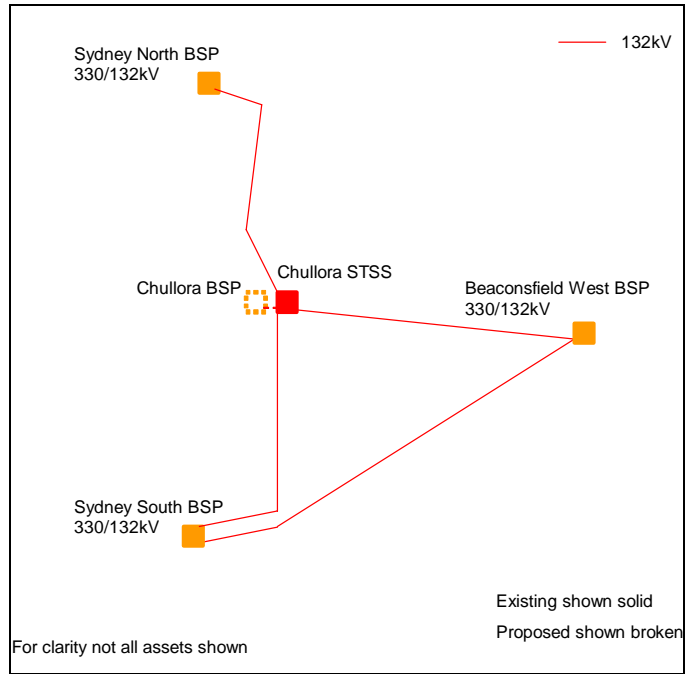
The forecast loads on the Inner Sydney Metropolitan area will exceed the capacity of Sydney North BSP and Sydney South BSP in 2012/13 when applying the target reliability standard.

Joint planning with TransGrid has been initiated to consider a strategy for the Inner Sydney Metropolitan 132kV System. Possible options to address this issue include:

1. Development of a 330kV supply from Sydney West to a new Chullora 330/132kV BSP; and
2. Development of a 330kV supply from Sydney East to a new Inner Sydney Metropolitan 330/132kV BSP.

The most likely option is to establish a new 330/132kV BSP in the Chullora/Potts Hill area.

The investigation of network and non-network options will continue to be pursued.



In conjunction with this option, EnergyAustralia would be responsible for providing connections to the BSP and undertaking the necessary augmentation works on their network.

It is intended that Chullora BSP connections would be included in a joint consultation process with TransGrid covering the establishment of Chullora BSP to be commenced during 2008/09.

6.2.2 Beresfield STS 33kV Capacitor Bank

The Beresfield area is experiencing high load growth which is placing capacity constraints on the overhead feeder network. This growth is expected to continue.

The extent of these constraints varies depending on the load distribution on the system and ambient conditions at the time. In the interim, demand reduction will be required to assist with feeder capacity issues prior to the establishment of the proposed Tomago 330/132kV substation.

Joint planning with EnergyAustralia DNSP is underway to address this issue. Possible options include:

1. 33kV Capacitor Bank

Under this option it is proposed to install a 36MVAR 33kV capacitor bank at Beresfield STS. The cost of this work is estimated to be \$4.2 million.

2. Demand management and/or local generation

Based on a screening test analysis, demand management is considered unlikely to be cost effective in this instance.

The only reasonable option to meet the above limitation is option 1. The following table details the costs associated with this option over a ten year period.

Option	Capex Costs	NPC Capex Costs + O&M Costs 10 year period @ 8.5% WACC	Rank
1	\$4.2M	\$4.13M	1

This proposal is a reliability augmentation and will not have a material inter-network impact.

It is proposed to install a 36MVAR 33kV capacitor bank at Beresfield STS by 2008/09, to meet increased capacity requirements in the area.

6.2.3 Tomago STS 33kV Capacitor Bank

The Tomago area is experiencing high load growth which is placing capacity constraints on the overhead feeder network. This growth is expected to continue.

The extent of these constraints varies depending on the load distribution on the system and ambient conditions at the time. In the interim, demand reduction will be required to assist with feeder capacity issues prior to the establishment of the proposed Tomago 330/132kV substation.

Joint planning with EnergyAustralia DNSP is underway to address this issue. Possible options include:

1. 33kV Capacitor Bank

Under this option it is proposed to install a 36MVAR 33kV capacitor bank at Tomago STS. The cost of this work is estimated to be \$2.6 million.

2. Demand management and/or local generation

Based on a screening test analysis, demand management is considered unlikely to be cost effective in this instance.

The only reasonable option to meet the above limitation is option 1. The following table details the costs associated with this option over a ten year period.

Option	Capex Costs	NPC Capex Costs + O&M Costs 10 year period @ 8.5% WACC	Rank
1	\$2.6M	\$2.56M	1

This proposal is a reliability augmentation and will not have a material inter-network impact.

It is proposed to install a 36MVAR 33kV capacitor bank at Tomago STS by 2009/10, to meet increased capacity requirements in the area.

6.3 CONSTRAINTS EMERGING WITHIN 5 YEARS – PROPOSED NEW LARGE TRANSMISSION NETWORK ASSETS – CONSULTATION ANTICIPATED WITHIN 12 MONTHS

This section describes constraints expected to emerge over a five year planning horizon that are proposed to be relieved by New Large Transmission Network Assets for which there are augmentation proposals or where consultation is anticipated prior to publication of APR 2009.

In accordance with clause 5.6.6 of the NER, these augmentations have an estimated capital cost greater than \$10M and require a separate and more detailed consultation and regulatory test application.

The proposed New Large Transmission Network Assets are as tabulated below.

Region	APR Section	Constraint	Augmentation	Timing	Estimated Cost
Sydney	6.3.1	Load Growth	Gwawley Bay ZS 132kV Conversion	2010/11	\$18.5M
Sydney	6.3.2	Load Growth	Kurnell 132/11kV Zone Substation	2010/11	\$24.2M
Sydney	6.3.3	Customer Connection	Sydney Airport 132kV Busbar	2010/11	\$26.3M
Sydney	6.3.4	Reliability Standards	Belmore Park 132/11kV Zone Substation	2012/13	\$125.3M
Central Coast	6.3.5	Load Growth	Lake Munmorah 132/11kV Zone Substation	2012/13	\$53.2M
Hunter	6.3.6	Load Growth	Kurri 132/11kV Zone Substation	2010/11	\$27.1M

Summary information concerning these augmentations follows.

Separately, a consultation process will be carried out for each proposal comprising publication of an Application Notice, including a review of feasible supply options and a regulatory test analysis, and publication of the Final Report which takes into account responses generated by the Application Notice.

6.3.1 Gwawley Bay ZS 132kV Conversion

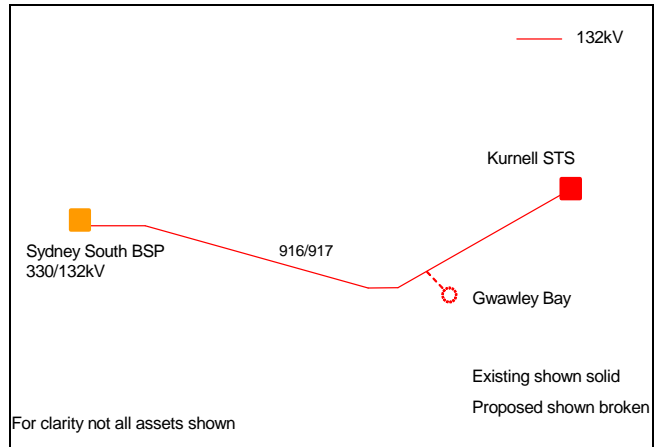
The Caringbah area is experiencing high load growth due to residential development and commercial/retail expansion. This growth is expected to continue. Current forecasts indicate that the distribution system will be constrained by 2010.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address these issues include:

1. Augment Port Hacking STS and the 33kV network;
2. Convert Gwawley Bay (distribution asset) to 132/11kV construction; and
3. Demand management and/or local generation.

The most likely option is the conversion of Gwawley Bay to a 132/11kV substation. The substation can be connected into the 132kV transmission feeders between Sydney South BSP and Kurnell STS.

The option relieves the 33kV network and utilises spare capacity in the 132kV network.



The investigation of non-network options will continue to be pursued.

It is intended that a consultation process and application of the regulatory test be commenced during 2008/09.

6.3.2 Kurnell 132/11kV Zone Substation

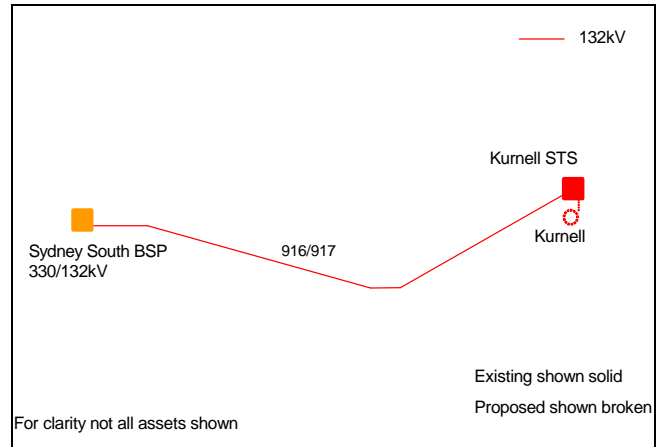
The existing Kurnell 33/11kV zone substation equipment and feeders (distribution assets) are approaching the end of their economic life and the area is experiencing significant load growth. This growth is expected to continue. Current forecasts indicate that the distribution system will be constrained by 2010.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address these issues include:

1. Rebuild and augment the existing Kurnell zone substation and Kurnell STS facilities;
2. Establish a new 132/11kV zone substation in the Kurnell area; and
3. Demand management and/or local generation.

The most likely option is the installation of a new 132/11kV zone substation within the Kurnell STS site in order to retire the existing 33/11kV infrastructure.

The substation can be connected into the 132kV transmission system at Kurnell STS.



The investigation of non-network options will continue to be pursued.

It is intended that a consultation process and application of the regulatory test be commenced during 2008/09.

6.3.3 Sydney Airport 132kV Busbar

Sydney Airport Corporation Limited has requested additional supply capacity to meet the needs of further development of the Sydney Kingsford Smith Airport site.

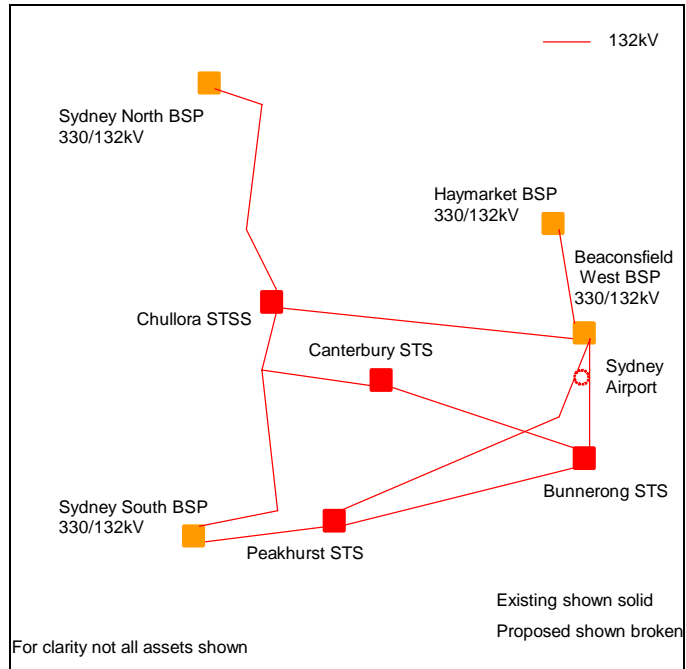
Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Installation of additional 33kV cables from Bunnerong STS to Sydney Airport; and
2. Installation of a new 132kV busbar connection point on the site with Sydney Airport constructing a new 132/11kV customer substation.

The most likely option is the installation of a new 132kV busbar within the Airport site in order to retire the existing 33/11kV infrastructure.

The option relieves the 33kV network and utilises spare capacity in the 132kV network.

The busbar can be connected into the 132kV transmission system linking Beaconsfield West BSP, Peakhurst STS and Bunnerong STS.



It is intended that a consultation process and application of the regulatory test be commenced during 2008/09.

6.3.4 Belmore Park 132/11kV Zone Substation

On 1 August 2005, the then Minister for Energy imposed additional conditions relating to reliability performance on licences held by distribution network service providers under the Electricity Supply Act 1995. Following a review of the licence conditions conducted by the Minister, those conditions were replaced with updated and revised conditions relating to reliability performance, with effect from 1 December 2007.

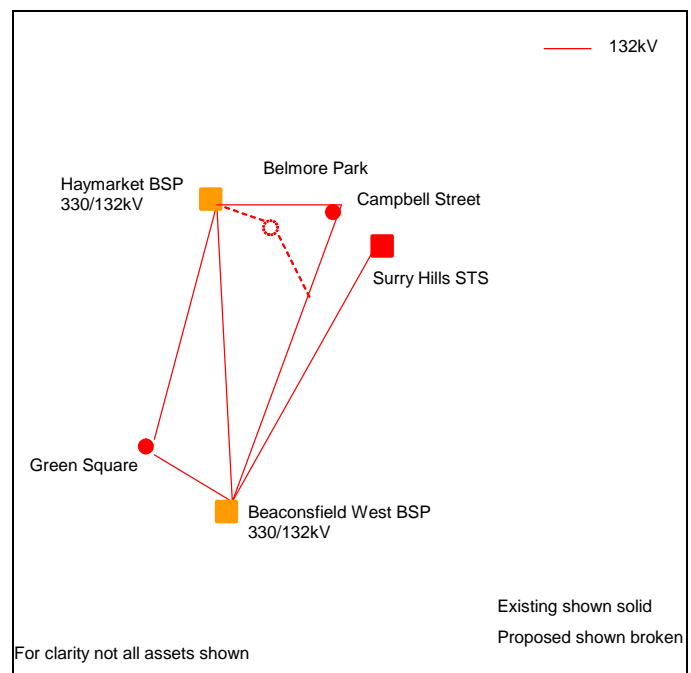
Specifically, an N-2 security standard is required for the Sydney CBD area. The licence holder must plan the Sydney CBD network to cater for two credible contingencies involving the loss of multiple lines or items of electrical apparatus within a substation. For the first failure there is to be no interruption, however for the second failure supply must be able to be restored within one hour.

As EnergyAustralia's existing Sydney CBD 132/11kV zone substations only provide N-1 security, it is necessary to carry out work to achieve the required level of security at existing CBD substations.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Establish a new 132/11kV zone substation on the eastern side of the Sydney CBD;
2. Establish a new 132/11kV zone substation at the southern end of the Sydney CBD; and
3. Demand management and/or local generation.

The most likely option is to establish a new 132/11kV zone substation at the southern end of the Sydney CBD on a site opposite Belmore Park.



To provide connection for the 132kV feeders and future developments in the eastern suburbs area, Belmore Park will include a substantial 132kV busbar arrangement.

It is proposed to initially provide 132kV supply via a new 132kV feeder from Haymarket BSP and by extending the existing 132kV feeder 9SB from Surry Hills.

The investigation of non-network options will continue to be pursued.

It is intended that a consultation process and application of the regulatory test be commenced during 2008/09.

6.3.5 Lake Munmorah 132/11kV Zone Substation

The existing Lake Munmorah 33/11kV zone substation equipment and feeders (distribution assets) are approaching the end of their economic life. Whilst upgrading Lake Munmorah at 33kV provides a short term solution, the long term capacity of the 33kV system is limited by 33kV feeder capacity and available 33kV capacity at Munmorah Power Station.

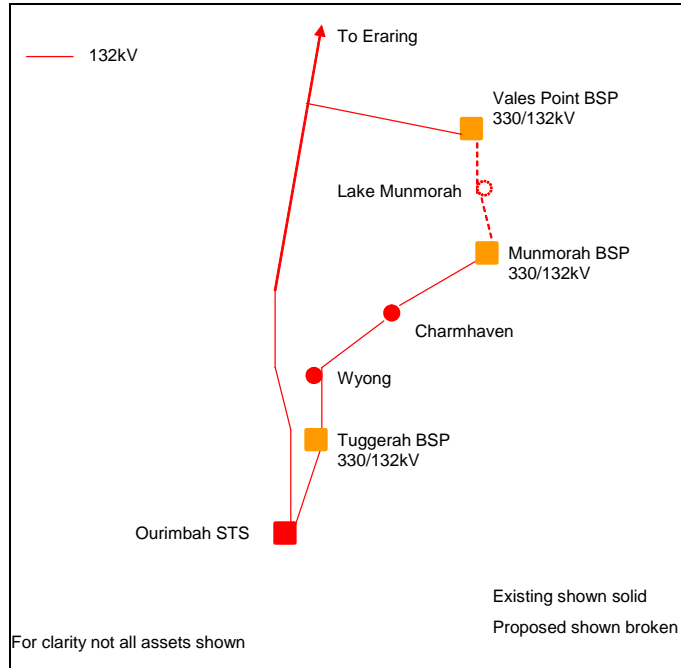
Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Replace Lake Munmorah zone substation and the 33kV feeders with new 33kV infrastructure and construct a new 132/33kV supply point;
2. Establish a new 132/11kV zone substation at Lake Munmorah; and
3. Demand management and/or local generation.

As this project is driven by replacement, demand management is not expected to be effective.

Therefore this option is not considered reasonable.

The most likely option is the installation of a new 132/11kV zone substation at Lake Munmorah.



Concurrently, in joint planning with TransGrid, the most likely option to provide 132kV supply to Lake Munmorah is for TransGrid to establish a 132kV busbar at both Munmorah BSP and Vales Point BSP. It is proposed that EnergyAustralia would then construct new 132kV transmission feeders between Lake Munmorah and the TransGrid Vales Point and Munmorah BSP's.

Should this option prevail, Lake Munmorah would then change classification from distribution asset to transmission asset.

It is intended that a consultation process and application of the regulatory test be commenced during 2008/09.

6.3.6 Kurri 132/11kV Zone Substation

The existing Kurri 33/11kV zone substation (distribution asset) is approaching the end of its economic life and the area is experiencing significant load growth. This growth is expected to continue. Current forecasts indicate that the distribution system will be constrained by 2010.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address these issues include:

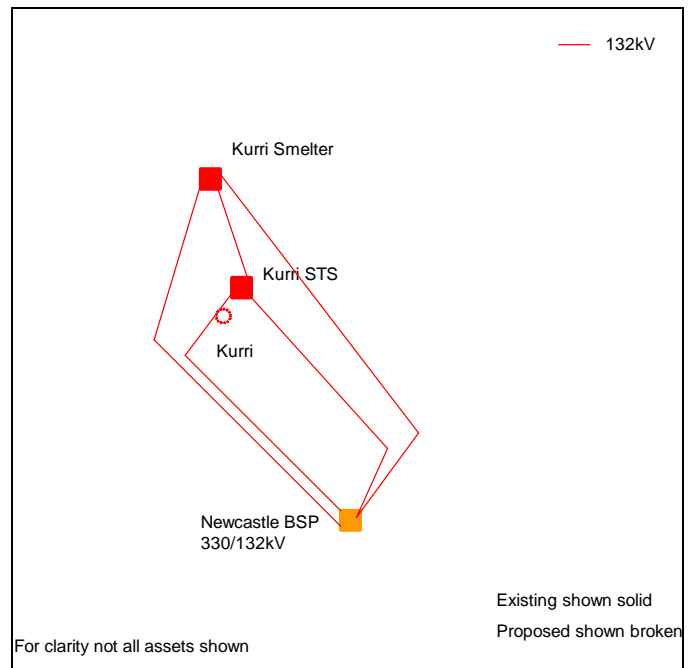
1. Replace Kurri zone substation with a new 33/11kV zone substation;
2. Replace Kurri zone substation with a new 132/11kV zone substation; and
3. Demand management and/or local generation.

As this project is driven by replacement and load growth, demand management is not expected to be effective.

Therefore this option is not considered reasonable.

The most likely option is the construction of a new 132/11kV zone substation at Kurri.

The option relieves the 33kV network and utilises spare capacity in the 132kV network.



The substation can be connected into the existing 132kV feeder 96U between Newcastle BSP and Kurri STS.

The consultation process has commenced with the publication of an Application Notice (Development of Kurri 132/11kV Substation) in June 2008.

6.4 CONSTRAINTS EMERGING WITHIN 5 YEARS – PROPOSED NEW LARGE TRANSMISSION NETWORK ASSETS – CONSULTATION ANTICIPATED BEYOND 12 MONTHS

This section describes constraints expected to emerge over a five year planning horizon that are proposed to be relieved by New Large Transmission Network Assets where consultation is not anticipated prior to publication of APR 2009.

In accordance with clause 5.6.6 of the NER, these augmentations have an estimated capital cost greater than \$10M and require a separate and more detailed consultation and regulatory test application.

The proposed New Large Transmission Network Assets are as tabulated below.

Region	APR Section	Constraint	Augmentation	Timing	Estimated Cost
Sydney	6.4.1	Load Growth	Haymarket BSP to Beaconsfield West BSP 132kV Feeder	2011/12	\$15.4M
Sydney	6.4.2	Asset Condition	Peakhurst STS 132kV Feeders 91L/91M Replacement	2012/13	\$157.3M
Sydney	6.4.3	Asset Condition	Leichhardt ZS 132kV Conversion	2012/13	\$72.3M
Sydney	6.4.4	Asset Condition	Mason Park STS 132kV Feeder 900 Replacement	2012/13	\$60.5M
Central Coast	6.4.5	Load Growth	Warnervale 132/11kV Zone Substation	2012/13	\$27.7M
Hunter	6.4.6	Load Growth	Brandy Hill 132/11kV Zone Substation	2011/12	\$19.2M

Summary information concerning these augmentations follows.

Separately, a consultation process will be carried out for each proposal comprising publication of an Application Notice, including a review of feasible supply options and a regulatory test analysis, and publication of the Final Report which takes into account responses generated by the Application Notice.

6.4.1 Haymarket BSP to Beaconsfield West BSP 132kV Feeder

EnergyAustralia plans the Inner Sydney Metropolitan transmission system jointly with TransGrid.

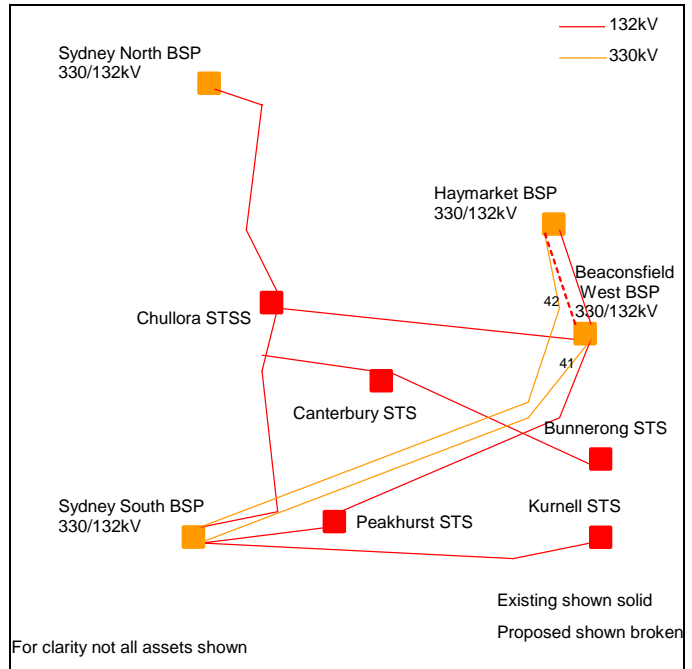
The joint reliability standard for the Inner Sydney Metropolitan transmission system, as agreed in a Memorandum of Understanding between TransGrid and EnergyAustralia, is that the system will be capable of supplying peak load under the following contingencies:

- A coincident outage of TransGrid's 330kV cable 41 or 330kV cable 42 and any 132kV feeder or 330/132kV transformer; and
- An outage of any section of 132kV busbar.

Load flow modelling predicts that the Haymarket BSP to Beaconsfield West BSP 132kV cables (9S2, 9SE, 90T & 9SA) will be overloaded during an outage of TransGrid 330kV cable 42 (Sydney South BSP to Haymarket BSP) and any one of the above cables.

Possible options to address this issue include:

1. EnergyAustralia to form a new 132kV interconnection between Beaconsfield West BSP and Haymarket BSP.
2. Demand management and/or local generation.



The most likely option is the installation of a new 132kV feeder between Haymarket BSP and Beaconsfield West BSP by 2011/12.

The investigation of non-network options will continue to be pursued.

It is intended that a consultation process and application of the regulatory test be commenced during 2009/10.

The project is a reliability augmentation and will not have a material inter-network impact. Joint planning has addressed likely impacts on the TransGrid network.

6.4.2 Peakhurst STS 132kV Feeders 91L/91M Replacement

The existing 132kV feeders 91L and 91M/1 connect Peakhurst STS to Bunnerong STS and Beaconsfield West BSP respectively. The feeders are underground 132kV oil filled cables of approximately 20kms in length and were installed in the 1970's.

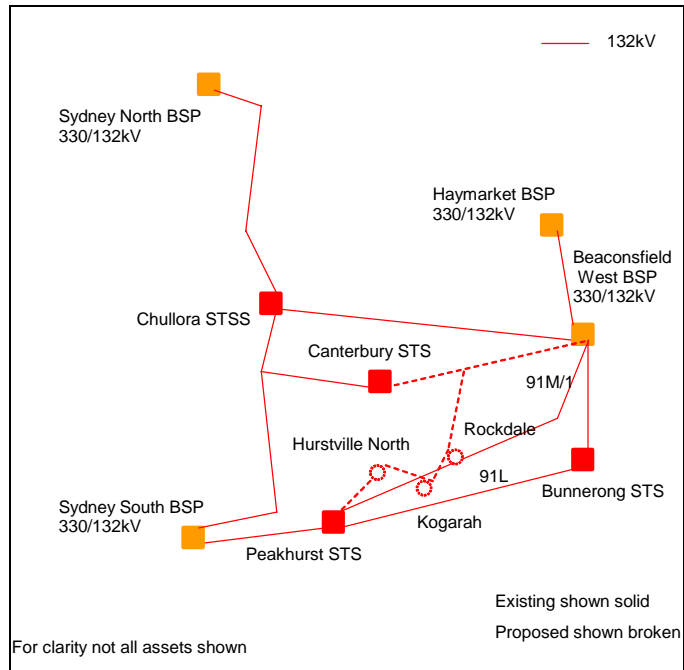
These cables have high maintenance costs, high failure rates, extended repair times, and require specialist jointing. Failure of the cables can lead to oil leaks which have the potential to cause environmental damage. The cables are reaching the end of their service lifetimes and have been prioritised for replacement based on condition.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Replacement of 91L and 91M/1 in a like for like manner;
2. Replacement of 91L and 91M/1 with two feeders from Canterbury STS to Beaconsfield West BSP including the upgrading of feeders 910/911 Canterbury STS to Sydney South BSP/Chullora STS;
3. Replacement of 91L and 91M/1 with one feeder from Canterbury STS to Beaconsfield West BSP and one feeder from Peakhurst STS to Beaconsfield West BSP; and
4. Demand management and/or local generation.

As this project is driven by replacement, demand management is not expected to be effective.

Therefore this option is not considered reasonable.



The most likely option is the replacement of 91L and 91M/1 with one feeder from Canterbury STS to Beaconsfield West BSP and one feeder from Peakhurst STS to Beaconsfield West BSP by 2012/13.

Further, the scope of work associated with the most likely option includes the installation of 132kV reactors at Canterbury STS and the decommissioning of the 91L and 91M/1 cable.

It is intended that a consultation process and application of the regulatory test be commenced during 2009/10.

The project is a reliability augmentation and will not have a material inter-network impact. Joint planning has addressed likely impacts on the TransGrid network.

6.4.3 Leichhardt ZS 132kV Conversion

The Leichhardt 33/11kV zone substation equipment and feeders (distribution assets) are approaching the end of their economic life.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Upgrading of Rozelle STS and the installation of a new 33kV cable between Rozelle STS and Leichhardt;
2. Convert Leichhardt to 132kV construction; and
3. Demand management and/or local generation.

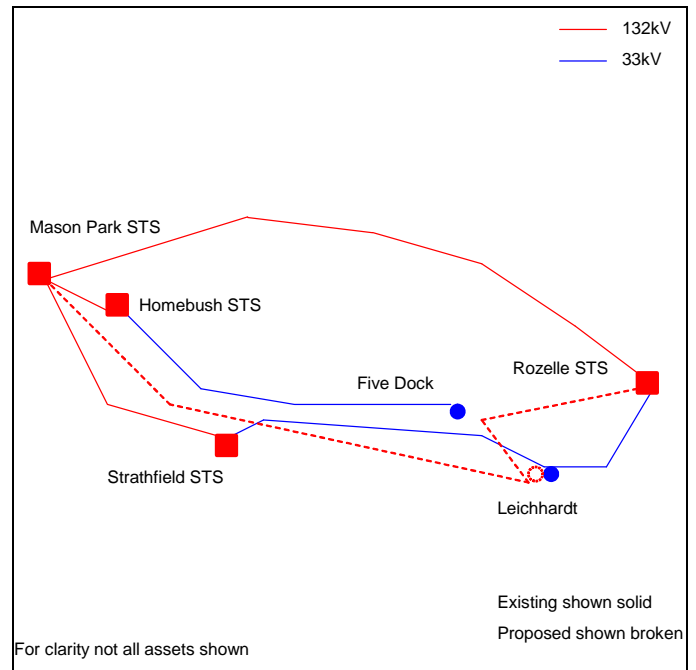
As this project is driven by replacement, demand management is not expected to be effective.

Therefore this option is not considered reasonable.

The most likely option is the conversion of Leichhardt to a 132/11kV substation.

The substation can be connected into the proposed replacement 132kV feeder 900 between Mason Park STS and Rozelle STS.

The option relieves the 33kV network and utilises spare capacity in the 132kV network.



It is intended that a consultation process and application of the regulatory test be commenced during 2009/10.

6.4.4 Mason Park STS 132kV Feeder 900 Replacement

The existing 132kV feeder 900 connects Mason Park STS to Rozelle STS. The feeder is lead sheathed oil filled underground cable of approximately 11kms in length and was installed in 1962.

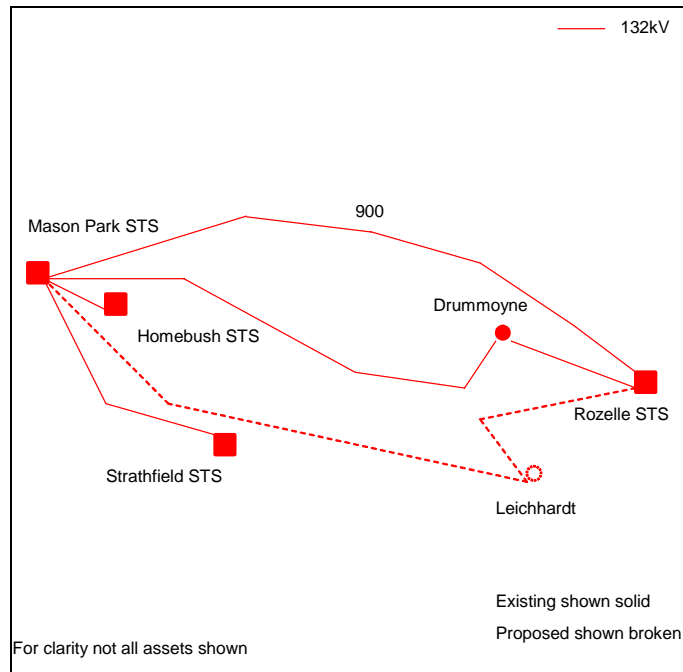
The performance of the feeder is typical of its type and age and is close to the end of its economic life. In addition part of the oil filled sections of the feeder are submarine cables, and the conductor area is inadequate for present system fault levels.

Joint planning with EnergyAustralia DNSP is underway. Possible options to address the issues include:

1. Replace the existing 132kV feeder between Mason Park STS and Rozelle STS along the existing route;
2. Replace the existing 132kV feeder between Mason Park STS and Rozelle STS along a revised route; and
3. Install a new 132kV feeder between Drummoyne and Rozelle STS.

The most likely option is to replace the existing 132kV feeder between Mason Park STS and Rozelle STS along a revised route.

This option avoids the current submarine crossings and facilitates the replacement of aged distribution cables presently supplying Leichhardt zone substation and Five Dock zone substation.



It is intended that a consultation process and application of the regulatory test be commenced during 2009/10.

6.4.5 Warnervale 132/11kV Zone Substation

The Warnervale area is experiencing high load growth due to land release, related population growth and light industrial development. The proposed Warnervale Town Centre and Warnervale Employment Zone will have a significant impact on system loads in the area. Current forecasts indicate that the distribution system will be constrained by 2012.

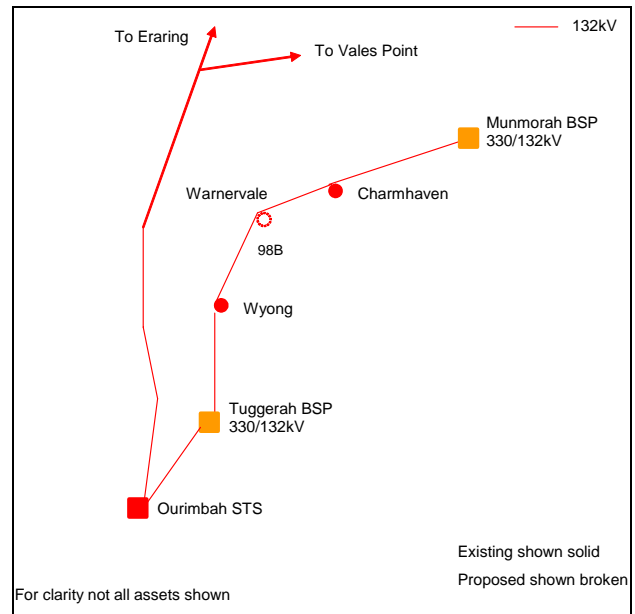
Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Upgrade Charmhaven zone substation and supply the Warnervale spot loads at 11kV;
2. Establish a new 132/11kV zone substation in the Warnervale area; and
3. Demand management and/or local generation.

The most likely option is the installation of a new 132/11kV zone substation in the Warnervale area.

The substation can be supplied by looping into the existing 132kV transmission feeder 98B between Charmhaven and Wyong.

The investigation of non-network options will continue to be pursued.



It is intended that a consultation process and application of the regulatory test be commenced during 2009/10.

6.4.6 Brandy Hill 132/11kV Zone Substation

The originally rural areas around Wallalong, Brandy Hill and Seaham are now experiencing significant residential development. Current forecasts indicate that the distribution system will be constrained by 2011.

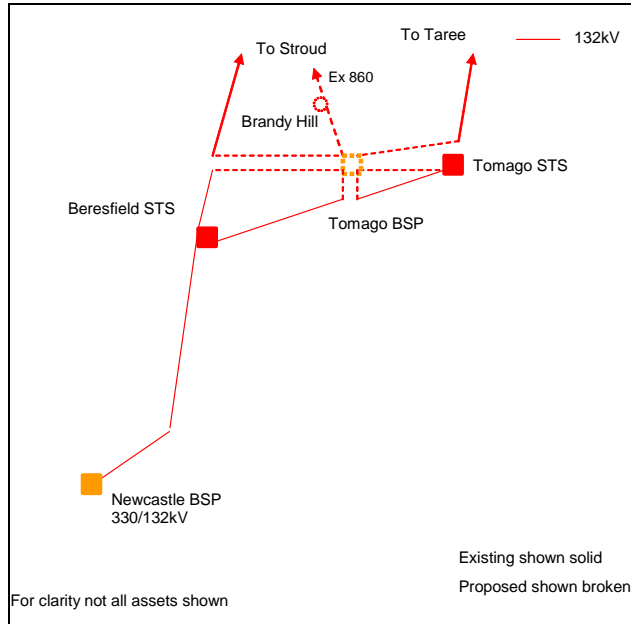
Joint planning with EnergyAustralia DNSP is underway. Possible options to address this issue include:

1. Establish a new 33/11kV zone substation in the Brandy Hill area;
2. Establish a new 132/11kV zone substation in the Brandy Hill area; and
3. Demand management and/or local generation.

The most likely option is the installation of a new 132/11kV zone substation in the Brandy Hill area.

132kV supply to Brandy Hill can be provided from a proposed 132kV line to be constructed by TransGrid between Tomago BSP and Stroud (ex feeder 860).

The option relieves the 33kV network and utilises spare capacity in the 132kV network.



The investigation of non-network options will continue to be pursued.

It is intended that a consultation process and application of the regulatory test be commenced during 2009/10.

6.5 LONGER TERM CONSTRAINTS AND INDICATIVE DEVELOPMENTS

The following table briefly summarises constraints that are expected to arise over a time frame that is longer than 5 years.

Region	Constraint	Indicative Development	Timing	Estimated Cost
Sydney	Load Growth	Bunnerong STS 132kV Capacitor Bank	2013/14	\$3.8M
Sydney	Load Growth	Drummoyne ZS 132kV Additional Transformer	2013/14	\$7.8M
Sydney	Asset Condition	Five Dock 132/11kV Zone Substation	2013/14	\$28.8M
Sydney	Licence Compliance	Marrickville ZS 132kV Ring Main Circuit Breaker	2013/14	\$14.4M
Sydney	Load Growth	Meadowbank ZS 11kV Capacitor Banks	2013/14	\$1.3M
Sydney	Load Growth	Peakhurst STS 132kV Capacitor Bank	2013/14	\$3.8M
Sydney	Licence Compliance	St Peters ZS 132kV Ring Main Circuit Breaker	2013/14	\$14.4M
Sydney	Licence Compliance	Belmore Park ZS 132kV Additional Feeder	2014/15	\$3.9M
Sydney	Load Growth	Green Square ZS to Beaconsfield West BSP 132kV Feeder	2014/15	\$8.3M
Sydney	Load Growth	Homebush Bay ZS 132kV Additional Transformer	2014/15	\$6.7M
Sydney	Asset Condition	Hurstville 132/11kV Zone Substation	2014/15	\$39.6M
Sydney	Load Growth	Rhodes 132/11kV Zone Substation	2014/15	\$35.7M
Sydney	Load Growth	Surry Hills BSP 132kV Busbar	2014/15	\$70.6M
Sydney	Load Growth	Pennant Hills to Feeder 926 132kV Interconnection	2015/16	\$9.3M
Sydney	Asset Condition	Rockdale 132/11kV Zone Substation	2015/16	\$31.6M
Sydney	Load Growth	Campbell St ZS 132kV Additional Transformer	2016/17	\$6.2M

Region	Constraint	Indicative Development	Timing	Estimated Cost
Sydney	Load Growth	Surry Hills Bulk Supply Point 132kV Connections	2016/17	\$5.0M
Central Coast	Load Growth	Lisarow 132/11kV Zone Substation	2013/14	\$29.7M
Central Coast	Load Growth	Charmhaven ZS 132kV Additional Transformer	2014/15	\$7.4M
Central Coast	Load Growth	Warnervale ZS 132kV Feeder Upgrade	2016/17	\$18.4M
Central Coast	Load Growth	Tuggerah BSP 132kV Feeder 957/3 Augmentation	2017/18	\$21.2M
Central Coast	Load Growth	Wamberal ZS 132kV Conversion	2017/18	\$34.7M
Hunter	Load Growth	Cameron Park 132kV Zone Substation	2013/14	\$20.9M
Hunter	Load Growth	Beresfield STS 132kV Additional Transformer	2014/15	\$5.2M

7 OTHER PLANNING ISSUES

7.1 DEMAND SIDE OPTIONS

The Annual Planning Report provides advance information to the market on the nature and location of emerging network constraints. This is intended to encourage Registered Participants and interested parties to formulate and propose feasible options, including local generation and demand management options, to relieve the emerging network constraints.

The advantages that local generation and demand management options offer in relieving transmission constraints are that they may reduce, defer or eliminate the need for new transmission or distribution investment.

TNSPs consider local generation, demand management and bundled options on an equal footing with network options when applying the AER's regulatory test.

For any option to be considered during the evaluation and analysis process, it must be feasible and capable of being implemented in time to relieve the emerging constraint.

For an option to be recommended for implementation after the evaluation and analysis, it must satisfy the regulatory test. It must also have a proponent who is committed to implement the option and to accept the associated risks, responsibilities and accountabilities.

It is expected that local generation and demand management options would emerge either from joint planning with DNSPs, or from Registered Participants and other interested parties.

7.2 LOCAL GENERATION

Local generation options may include generation or cogeneration facilities located on the load side of a transmission constraint. Energy sources may include, but are not limited to:

- Hydro;
- Solar;
- Wind;
- Gas;
- Bagasse; and
- Biomass.

7.3 DEMAND MANAGEMENT

Demand management options may include, but are not limited to, combinations of the following:

- Reduction in electrical energy consumption through:
 - Improved energy efficiency devices and systems;
 - Thermal insulation;
 - Renewable energy sources; and
 - Alternative reticulated energy sources.
- Reduction in peak electricity consumption through:
 - Tariff incentives;
 - Load interruption/reduction incentives;
 - Arrangements to transfer load from peak to off-peak times;
 - Energy storage systems;
 - Standby generators; and
 - Power factor correction equipment.

7.4 COMMUNITY CONSULTATION

EnergyAustralia regularly consults with the community about future network enhancements. Whenever EnergyAustralia identifies a potential opportunity to use local generation or demand management, public consultation is an important part of identifying options for investigation.

EnergyAustralia actively promotes local generation and demand management options by:

- Identifying opportunities for local generation and demand management options through joint planning with distributors;
- Informing the market of constraints via the Annual Planning Report and consultations for alleviating individual constraints and proposed network augmentations;
- Informing the market of constraints via the Annual Electricity System Development Review (AESDR);
- Informing the market of demand management investigations and programs via the Electricity Network Performance Report;
- Participation in initiatives with TransGrid and EnergyAustralia DNSP; and
- Participation in initiatives and reviews by the Department of Water and Energy (DWE) and other government bodies.

8 APPENDICES

A1 ENERGYAUSTRALIA IN PERSPECTIVE

A1.1 OVERVIEW

EnergyAustralia is one of the nation's largest electricity distributors and energy service companies. It is a major New South Wales Government State Owned Corporation. EnergyAustralia serves a community of more than three million people with customers ranging from rural to urban and residential to commercial, as well as serving industries such as mining, manufacturing and agriculture.

EnergyAustralia's supply area encompasses the Sydney, Central Coast and Hunter geographical regions as depicted below:



The supply area covers over 22,000 square kilometres – from the Royal National Park south of Sydney to Port Stephens in the north, west to the municipality of Auburn and north-west to the Upper Hunter Valley.

A1.2 NETWORK ASSETS

EnergyAustralia is registered as both a Transmission Network Service Provider (TNSP) and a Distribution Network Service Provider (DNSP) in the National Electricity Market.

As a TNSP, the transmission network assets include:

- Transmission 132kV and 66kV assets that are operated in parallel and in support of the TransGrid transmission network.

As a DNSP, the distribution network assets include:

- Sub-transmission 132kV, 66kV and 33kV assets;
- Distribution high voltage 22kV, 11kV and 5kV assets; and
- Distribution low voltage 415V and 240V assets.

EnergyAustralia's transmission assets are defined as transmission assets under the National Electricity Rules due to the fact that they operate in parallel with TransGrid's network and they provide support to that network. Currently, in several areas of EnergyAustralia's network, 330kV supply is non-firm and EnergyAustralia 132kV assets are used to provide firm capacity.

The National Electricity Rules define a "transmission network" to include any part of a network operating at nominal voltages between 66kV and 220kV that operates in parallel to and provides support to the higher voltage transmission network.

EnergyAustralia's NER defined transmission assets account for approximately 12% of the total network asset base.

A1.3 SYDNEY REGION

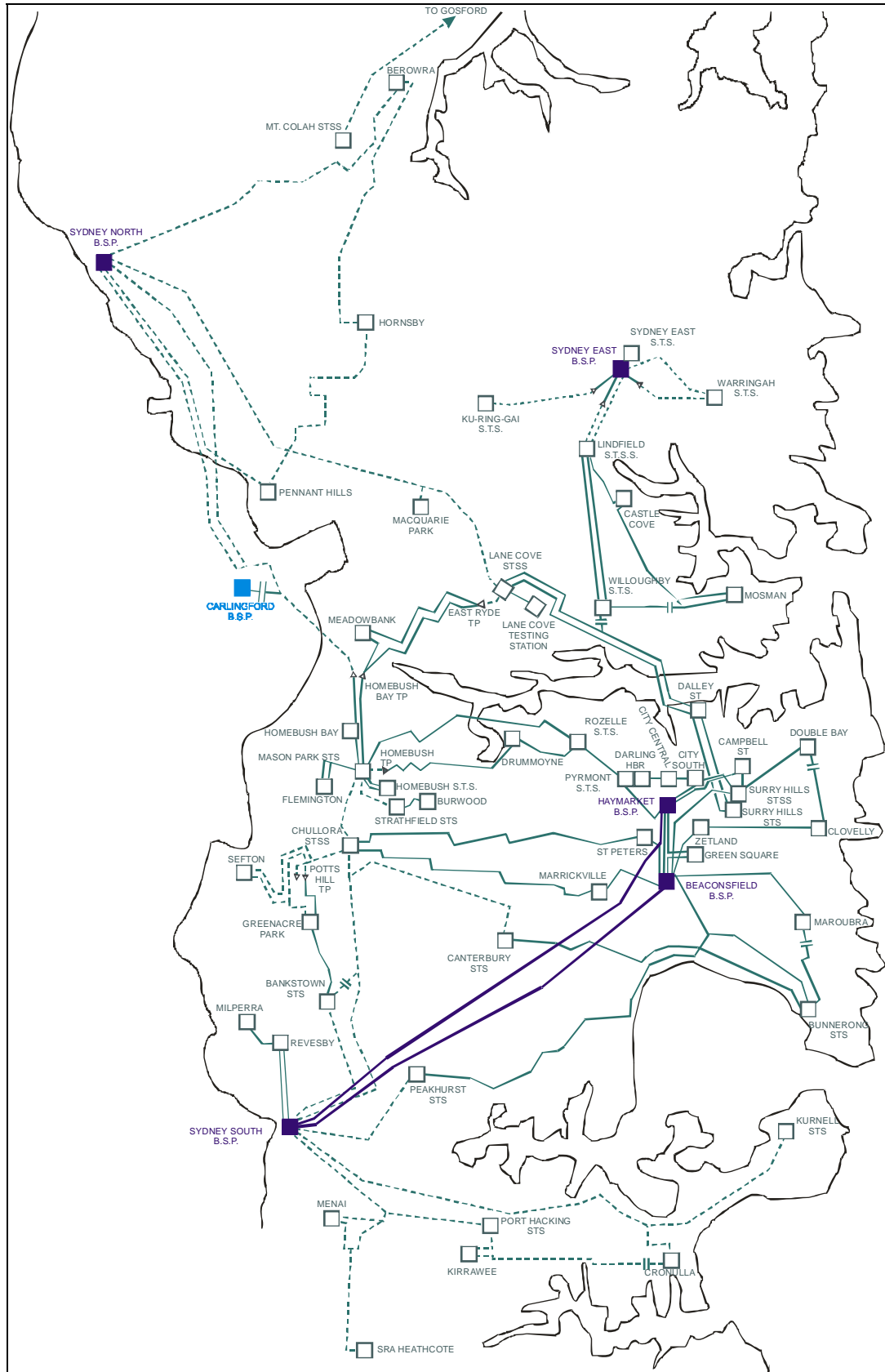
The 132kV supply to the Sydney Region is provided by a radial 132kV distribution network supplied from Sydney East BSP and an interconnected 132kV transmission network linking Beaconsfield West BSP, Haymarket BSP, Sydney North BSP and Sydney South BSP.

The 330kV supply to Beaconsfield West BSP and Haymarket BSP is provided by a single 330kV underground feeder to each BSP.

Joint planning is underway by TransGrid and EnergyAustralia to construct a new BSP in the Potts Hill/Chullora area by 2012/13.

The following diagram indicates the coverage of EnergyAustralia's 132kV assets.

It should be noted that only part of the 132kV network indicated is classified as transmission for the purposes of this report, the remainder is classified as distribution.



For completeness the diagram depicts EnergyAustralia's 132kV transmission and distribution assets along with selected TransGrid assets. (For clarity not all of the inner Sydney CBD 132kV cables are shown).

A1.4 CENTRAL COAST REGION

The 132kV supply to the Central Coast Region is normally supplied from Sydney North BSP, Munmorah BSP, Vales Point BSP and Tuggerah BSP. Tuggerah BSP and Munmorah BSP are of single transformer configuration.

Works are underway by TransGrid to provide a second transformer at Tuggerah BSP by 2008/09.

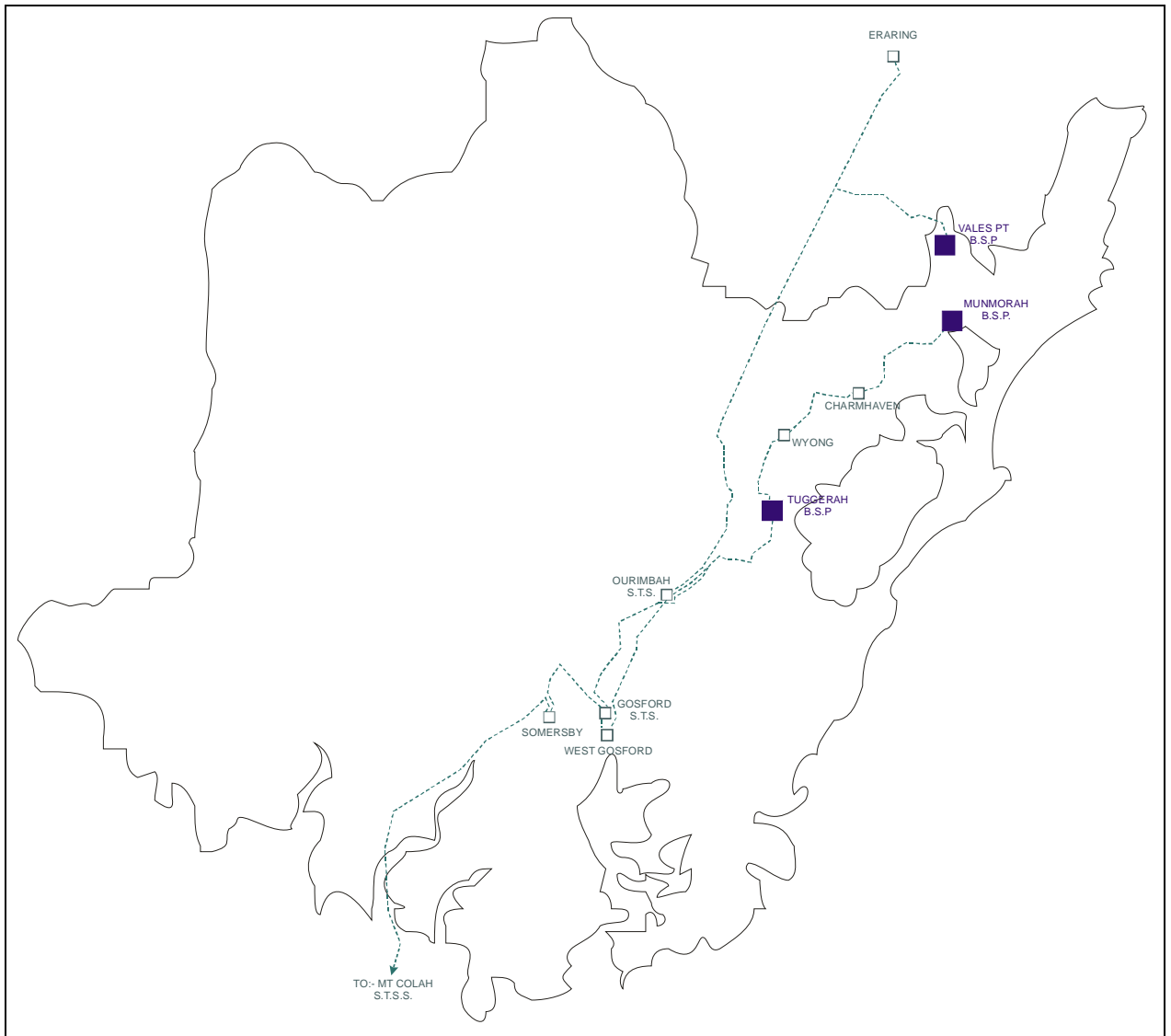


Diagram 2: The Central Coast Region 132kV Network.

For completeness the diagram depicts EnergyAustralia's 132kV transmission and distribution assets along with selected TransGrid assets.

A1.5 HUNTER REGION

The 132kV supply to the Lower Hunter Region is normally supplied from Newcastle BSP and Waratah West BSP. The 132kV supply to the Upper Hunter Region is normally supplied from Muswellbrook BSP.

Works are underway by TransGrid and EnergyAustralia to construct a new BSP in the Tomago area of the Lower Hunter Region by 2011/12.

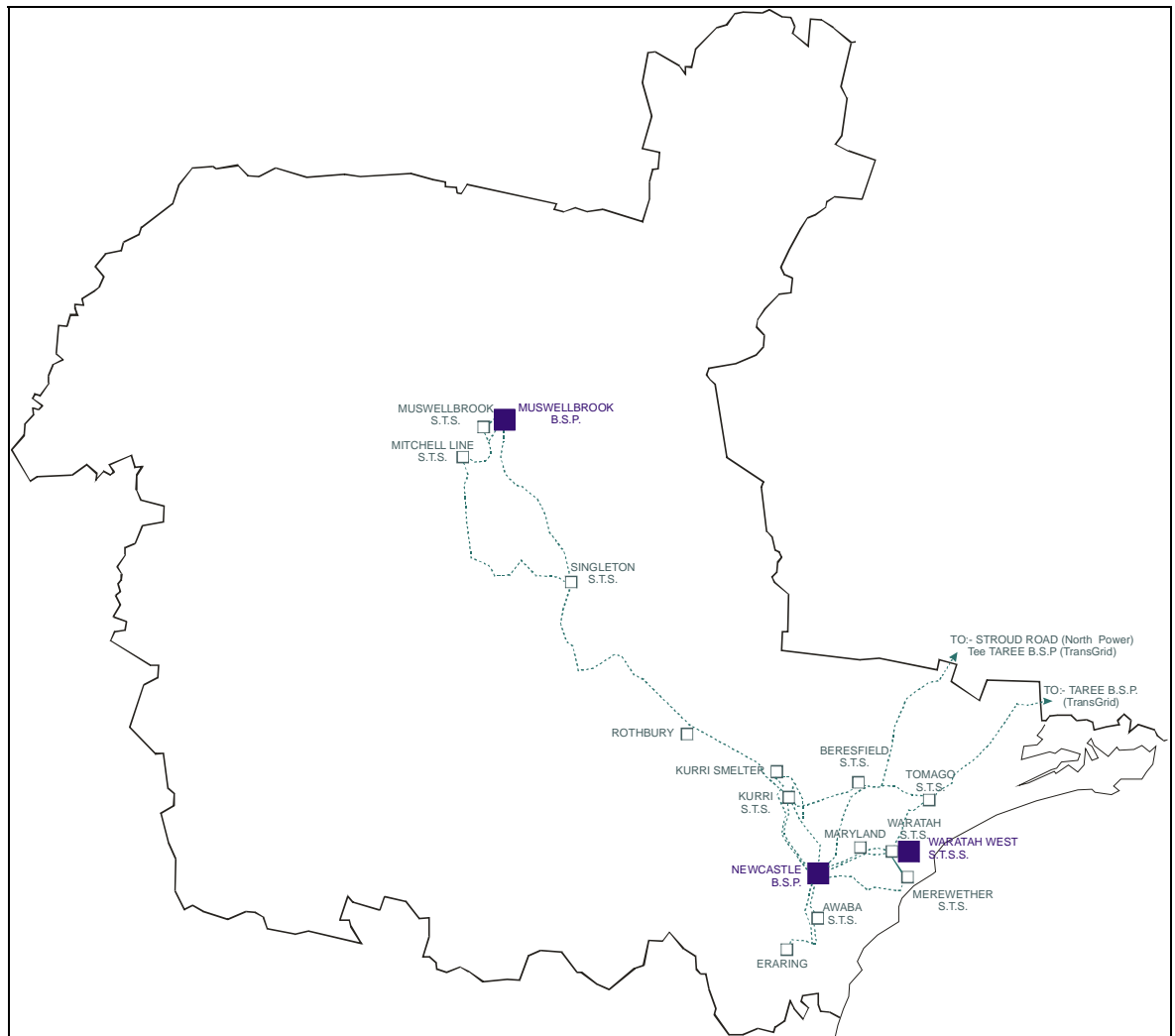


Diagram 3: The Hunter Region 132kV Network.

For completeness the diagram depicts EnergyAustralia's 132kV transmission and distribution assets along with selected TransGrid assets.

A2 GLOBAL DEMAND FORECASTS

A2.1 INTRODUCTION

This section sets out EnergyAustralia's forecast of annual energy consumption and winter peak demand and summer peak demand for the period 2008-2017.

EnergyAustralia produces two distinct sets of forecasts, namely "spatial" forecasts of peak demand at the sub-transmission substation and zone substation level, and "global" forecasts of energy consumption and peak demand at the network level.

The distinction between energy consumption trends and peak demand trends is important for planning purposes. The energy consumption forecasts form the volume basis for projecting network revenue and for assisting in the setting of appropriate tariffs. Peak demand forecasts form an important input to the demand driven capital expenditure program.

A2.2 GLOBAL ENERGY FORECASTS

The global forecasts of energy consumption form the volume basis for projecting network revenue and for assisting in the setting of appropriate tariffs. They are based on modelling and analysis of historical and expected trends in the energy market, economic and demographic conditions in the EnergyAustralia supply area and consideration of the following drivers:

- Economic activity;
- Residential customer numbers and customer characteristics;
- Fuel substitution and energy market share trends;
- Energy efficiency improvements and environmental impacts;
- Short-term abnormal weather and day-type impacts; and
- Political, economic and market uncertainties associated with future trends.

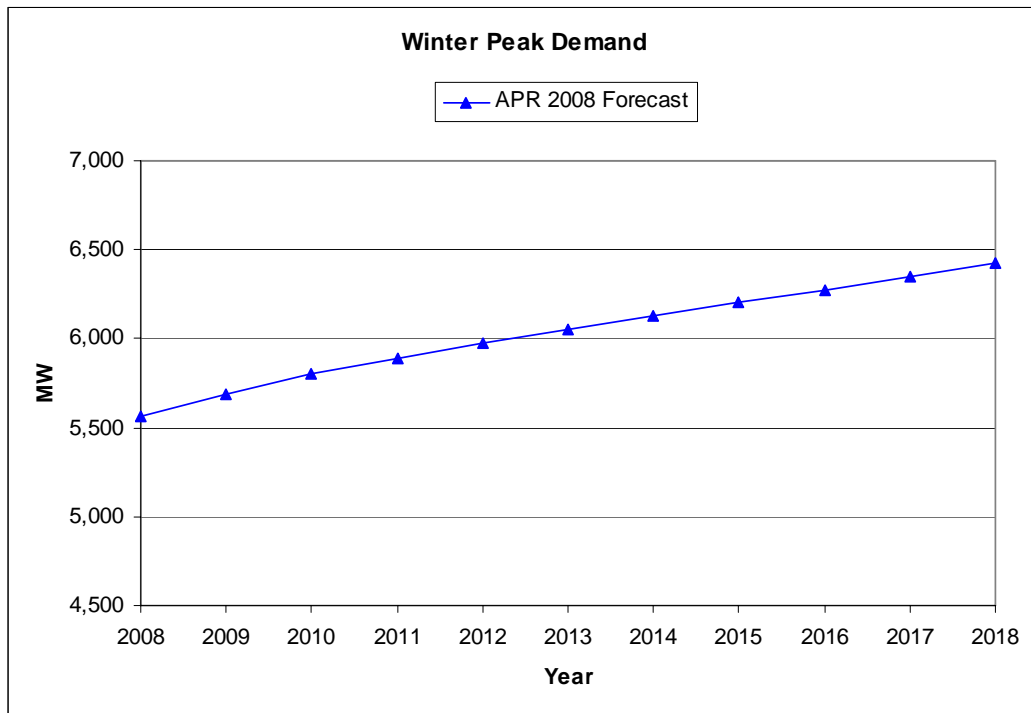
A2.3 GLOBAL DEMAND FORECASTS

Global forecasts of both summer peak demand and winter peak demand are produced annually. The global peak demand forecasts, which are based on the same assumed trends in the drivers of the energy forecasts, are indicative of overall demand, and are used as an independent logic check of the spatial peak demand forecasts. Linking the global and spatial peak demand forecasts in this way ensures consistency in the assumptions used in both revenue and capital expenditure planning.

The winter peak demand forecast and summer peak demand forecasts are shown graphically below.

A2.4.1 Winter Peak Demand

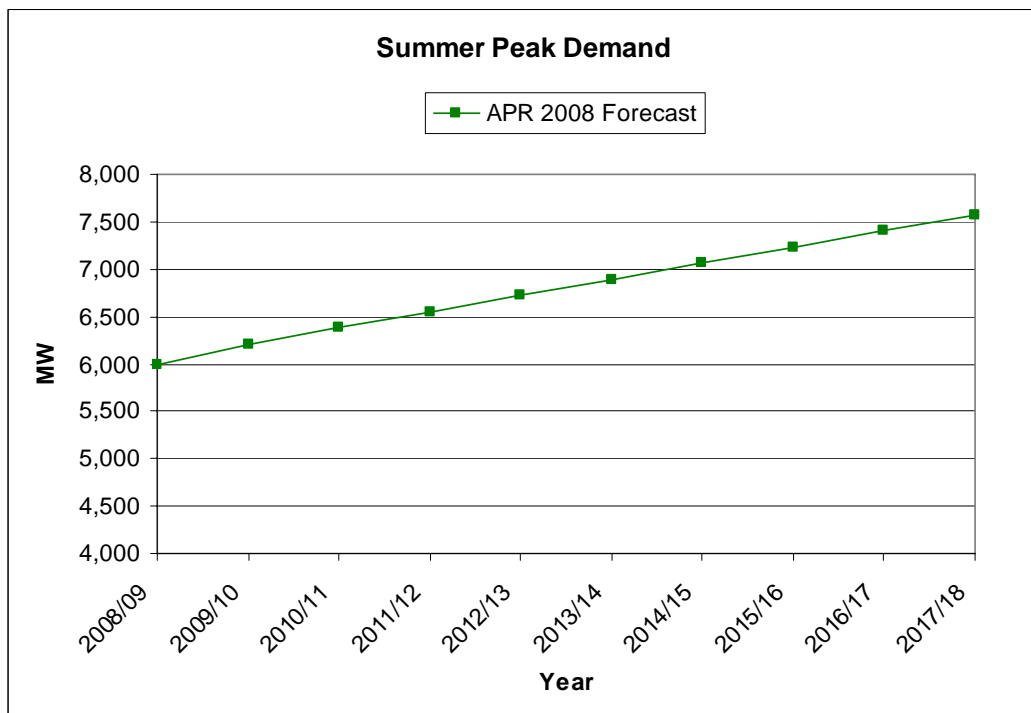
The global forecast growth in winter peak demand (50% PoE) for the period 2008-2018 is as follows:



The average growth rate over the period is 1.4%.

A2.4.2 Summer Peak Demand

The global forecast growth in summer peak demand (50% PoE) for the period 2008/09-2017/18 is as follows:



The average growth rate over the period is 2.7%.

A3 SPATIAL DEMAND FORECASTS

A3.1 OVERVIEW

EnergyAustralia's transmission forecasts are developed in conjunction with the distribution forecasts. Sources for the forecast include actual loads from historical data and zone substation forecasts provided from DNSPs. Once received, the forecasts are aggregated and diversified on the basis of historical diversification factors.

The spatial forecasts of peak demand are prepared at the Sub Transmission Substation level and at the Zone Substation level. These spatial forecasts form a key input to the planning of the demand driven capital expenditure program. They take into account local trends and the utilisation of specific assets to service particular regions during peak times.

The forecasts rely on intensive analysis of actual loads and historical trends while incorporating the following factors:

- Expected or committed future spot loads;
- Planned network projects which will affect prospective spatial loads;
- Relevant local and regional projections from bodies such as the NSW Department of Planning; and
- Network adjustment and historical diversification.

The forecasts indicate that demand growth is expected to continue throughout the network.

The spatial 50% PoE forecast loads on EnergyAustralia's transmission network are tabulated below.

For ease of understanding, they have been presented on the basis of the three geographical regions which comprise EnergyAustralia's supply area, namely the Sydney Region, the Central Coast Region and the Hunter Region.

A3.2 SYDNEY REGION

A3.2.1 Winter Peak Demand

A3.2.1.1 Transmission Substations

The following EnergyAustralia 132kV substations are classified as transmission network assets. Their forecast winter peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bunnerong STS	270.5	256.2	273.7	248.7	230.2	233.4	236.6	238.7	240.9	243.0	245.2
Campbell St ZS	22.3	30.7	41.8	42.4	42.9	43.5	44.0	44.6	45.2	45.8	46.4
Canterbury STS	178.4	180.0	188.0	192.7	197.4	199.9	202.4	204.9	207.5	210.1	212.8
Drummoyne ZS	66.8	65.0	66.0	67.1	68.2	69.3	70.4	71.5	72.6	73.8	75.0
Green Square ZS	13.7	37.0	37.8	38.5	39.3	40.1	40.9	41.7	42.6	43.4	44.3
Gwawley Bay ZS	32.1	32.8	33.4	34.1	34.8	35.5	36.2	36.9	37.7	38.4	39.2
Homebush Bay ZS	34.8	37.2	38.7	40.2	41.9	43.5	45.2	47.1	48.9	50.9	52.9
Kurnell STS	48.0	55.8	55.8	54.9	54.9	54.9	54.9	54.9	54.9	54.9	54.9
Macquarie Park ZS	37.5	44.9	64.2	76.9	86.6	88.3	90.1	91.9	93.7	95.6	97.5
Marrickville ZS	60.4	60.4	60.6	60.8	61.0	61.2	61.3	61.5	61.7	61.9	62.1
Meadowbank ZS	70.8	73.0	75.9	80.2	80.8	80.8	80.8	80.8	80.8	80.8	80.8
Peakhurst STS	265.0	269.4	274.1	262.4	270.8	276.0	281.2	286.6	292.0	297.6	303.2
Pymont STS	86.4	86.6	92.0	96.2	68.5	69.3	70.1	71.0	71.8	72.7	73.6
Rozelle STS	16.0	20.9	22.0	23.0	24.1	24.5	24.9	25.3	25.7	26.1	26.5
St. Peters ZS	55.0	54.3	62.6	63.9	65.2	66.5	67.8	69.2	70.5	72.0	73.4

A3.2.1.2 Distribution Substations

The following EnergyAustralia 132kV substations are distribution network assets supplied from the transmission network. Their forecast winter peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Burwood ZS	65.8	66.8	67.4	68.7	70.1	71.6	73.0	74.5	76.0	77.6	79.2
City Central ZS	111.6	125.5	139.0	144.8	138.9	138.9	106.0	106.1	109.1	113.4	115.1
City North ZS	0.0	0.0	0.0	0.0	53.5	77.9	128.3	137.7	144.4	144.4	136.6
City South ZS	124.9	134.8	115.9	115.9	115.9	115.9	118.6	120.0	117.3	121.4	138.4
Clovelly ZS	97.0	92.7	93.5	94.4	95.2	96.1	97.0	97.8	98.7	99.6	100.5
Dalley Street ZS	118.0	125.4	136.4	139.6	137.7	129.6	121.0	121.4	125.9	128.9	129.6
Darling Harbour ZS	40.3	49.7	50.8	52.9	55.0	57.2	59.5	61.9	64.3	66.9	69.6
Double Bay ZS	70.7	66.7	72.3	76.3	80.5	84.9	89.6	94.5	99.7	105.2	111.0
Flemington ZS	57.8	55.3	59.7	60.3	60.4	60.4	60.4	60.4	60.4	60.4	60.4
Homebush STS	107.6	114.3	117.8	119.5	122.1	124.0	125.8	127.7	129.6	131.6	133.6
Strathfield STS	44.0	57.4	62.9	68.6	74.3	76.5	78.1	79.6	81.2	82.8	84.5
Surry Hills STS	232.1	238.6	244.8	248.4	248.4	246.5	247.5	248.4	249.4	250.4	251.4
Zetland ZS	66.8	71.4	73.1	74.8	76.6	78.4	80.3	82.2	84.2	86.2	88.2

A3.2.2 Summer Peak Demand

A3.2.2.1 Transmission Substations

The following EnergyAustralia 132kV substations are classified as transmission network assets. Their forecast summer peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bunnerong STS	267.1	288.8	299.8	305.18	268.0	272.1	276.3	279.3	282.4	285.5	288.6
Campbell St ZS	22.8	34.5	46.4	46.7	47.0	47.3	47.7	48.0	48.3	48.7	49.0
Canterbury STS	135.0	153.4	161.2	165.1	169.1	170.7	172.5	174.2	175.9	177.7	179.5
Drummoyne ZS	42.6	44.2	45.0	45.9	46.9	47.8	48.8	49.7	50.7	51.7	52.8
Green Square ZS	6.8	39.3	47.7	49.2	50.8	52.4	54.1	55.8	57.6	59.4	61.3
Gwawley Bay ZS	27.7	30.2	30.7	31.1	31.6	32.1	32.7	33.2	33.7	34.3	34.8
Homebush Bay ZS	47.0	49.8	52.8	55.9	59.2	62.7	66.4	70.3	74.4	78.8	83.5
Kurnell STS	51.0	58.8	60.2	60.7	62.3	63.8	65.4	67.1	68.7	70.4	72.2
Macquarie Park ZS	44.5	57.3	61.0	66.6	74.7	77.6	80.7	84.0	87.3	90.8	94.5
Marrickville ZS	48.6	55.2	55.6	56.0	56.4	56.8	57.2	57.6	58.0	58.4	58.8
Meadowbank ZS	64.6	80.3	81.5	88.6	92.7	94.1	95.5	96.9	98.4	99.9	101.4
Peakhurst STS	210.0	226.7	229.6	237.9	223.6	228.1	232.6	237.3	242.0	246.9	251.8
Pymont STS	89.5	102.7	108.1	111.8	68.7	68.9	69.0	69.2	69.3	69.4	69.6
Rozelle STS	9.7	15.4	16.1	16.8	17.5	17.5	17.5	17.5	17.5	17.5	17.5
St. Peters ZS	67.5	63.1	70.1	72.4	74.7	77.1	79.5	82.1	84.7	87.4	90.2

A3.2.2.2 Distribution Substations

The following EnergyAustralia 132kV substations are distribution network assets supplied from the transmission network. Their forecast summer peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Burwood ZS	64.2	74.2	78.7	81.1	83.5	86.0	88.6	91.3	94.0	96.8	99.8
City Central ZS	141.0	158.5	175.6	182.9	175.4	175.4	133.8	134.1	137.7	143.2	145.3
City North ZS	0.0	0.0	0.0	0.0	66.1	96.4	158.7	170.3	178.6	178.6	169.0
City South ZS	153.0	165.1	142.0	142.0	142.0	142.0	145.3	147.0	143.7	148.7	169.6
Clovelly ZS	56.3	57.4	58.0	58.6	59.1	59.7	60.3	60.9	61.6	62.2	62.8
Dalley Street ZS	146.0	155.1	168.8	172.7	170.5	160.3	149.7	150.2	155.8	159.5	160.3
Darling Harbour ZS	49.4	62.9	65.2	68.5	71.9	75.5	79.3	83.3	87.4	91.8	96.4
Double Bay ZS	63.7	66.2	71.8	75.7	79.9	84.3	88.9	93.8	99.0	104.4	110.2
Flemington ZS	66.5	72.9	72.9	73.7	74.1	74.1	74.1	74.1	74.1	74.1	74.1
Homebush STS	100.2	125.8	134.3	139.4	143.6	147.9	152.3	156.9	161.6	166.4	171.4
Strathfield STS	44.0	60.1	66.3	72.7	79.2	81.5	83.9	86.3	88.8	91.4	94.1
Surry Hills STS	209.1	241.8	271.1	266.2	269.2	269.9	274.5	279.1	283.9	288.7	293.6
Zetland ZS	76.3	87.6	86.6	88.5	90.6	92.7	94.8	97.0	99.2	101.5	103.8

A3.3 CENTRAL COAST REGION

A3.3.1 Winter Peak Demand

A3.3.1.1 Transmission Substations

The following EnergyAustralia 132kV substations are classified as transmission network assets. Their forecast winter peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Charmhaven ZS	36.2	41.8	46.1	50.6	52.5	54.6	56.6	58.8	61.1	63.4	65.9
Gosford STS ¹	177.7	177.6	177.9	166.8	170.5	174.4	178.4	182.4	186.6	190.8	195.2
Ourimbah STS	106.6	101.8	63.0	60.7	62.1	62.5	63.0	63.4	63.9	64.3	64.8
Somersby ZS	14.4	18.3	18.6	18.8	19.1	19.4	19.7	20.0	20.2	20.5	20.8
West Gosford ZS	44.5	48.4	52.5	53.8	55.1	56.4	57.7	59.1	60.5	62.0	63.5
Wyong ZS	30.1	30.2	34.1	34.6	35.1	35.6	36.2	36.7	37.3	37.8	38.4

A3.3.2 Summer Peak Demand

A3.3.2.1 Transmission Substations

The following EnergyAustralia 132kV substations are classified as transmission network assets. Their forecast summer peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Charmhaven ZS	35.5	45.0	50.9	57.2	61.5	66.2	71.1	76.4	82.2	88.3	95.0
Gosford STS ¹	148.4	167.9	169.4	159.6	164.9	170.4	176.1	182.0	188.0	194.3	200.8
Ourimbah STS	93.8	99.3	45.5	43.2	44.6	45.1	45.5	46.0	46.4	46.9	47.4
Somersby ZS	13.3	17.9	19.4	19.8	20.3	20.8	21.3	21.8	22.3	22.8	23.4
West Gosford ZS	47.8	56.5	58.0	59.6	61.2	62.8	64.5	66.3	68.1	69.9	71.8
Wyong ZS	27.6	32.7	36.8	37.8	38.8	39.8	40.9	42.0	43.2	44.3	45.5

¹ Includes Lisarow ZS

A3.4 HUNTER REGION

A3.4.1 Winter Peak Demand

A3.4.1.1 Transmission Substations

The following EnergyAustralia 132kV substations are classified as transmission network assets. Their forecast winter peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beresfield STS	52.7	68.6	72.6	81.2	83.4	85.8	88.2	90.7	93.2	96.6	99.3
Kurri STS	120.8	113.7	118.3	124.6	105.4	107.2	109.1	111.0	112.9	114.9	117.0
Tomago STS	124.8	96.6	103.6	109.2	104.7	107.4	110.2	113.2	116.2	119.3	122.5
Non-EA Load ²	326.3	325.9	325.9	325.9	325.9	325.9	325.9	325.9	325.9	325.9	325.9

A3.4.2 Summer Peak Demand

A3.4.2.1 Transmission Substations

The following EnergyAustralia 132kV substations are classified as transmission network assets. Their forecast summer peak demand (MW) is:

Substation	2007 Actual	2008 Forecast	2009	2010	2011	2012	2013	2014	2015	2016	2017
Beresfield STS	81.5	98.0	103.4	108.1	113.0	118.2	123.7	129.4	135.4	141.8	148.4
Kurri STS	134.7	147.4	154.6	162.1	169.0	175.7	182.7	190.1	197.8	205.9	214.3
Tomago STS	113.9	132.2	138.0	144.2	150.6	157.4	164.5	171.9	179.7	187.9	196.5
Non-EA Load ²	322.1	322.1	322.1	322.1	322.1	322.1	322.1	322.1	322.1	322.1	322.1

² This includes HV customer Kurri Smelter.

A4 CONNECTION POINTS

A4.1 INTRODUCTION

The NER requires the Annual Planning Report to set out planning proposals for Connection Points.

EnergyAustralia transmission is currently undergoing planning with customers and joint planning with DNSPs, which may involve the establishment of new Connection Points. These augmentations are driven by constraints on the DNSPs network, however, when the augmentation options are considered in the future, the preferred solution may comprise a mix of transmission and distribution augmentations.

Planning of new or augmented connections involves consultation between EnergyAustralia TNSP and the connecting party, the determination of technical requirements and completion of connection agreements. New connections can result from joint planning with EnergyAustralia DNSP or be initiated by generators or customers.

In the following sections, proposals for augmentations to the capacity of existing Connection Points and proposed new Connection Points that may be provided over the next five years are identified.

A4.2 AUGMENTATION OF EXISTING CONNECTION POINTS

EnergyAustralia has identified augmentations to the capacity of existing Connection Points as tabulated below.

Region	APR Section	Proposal	Purpose	Timing
Sydney	5.2.1	Macquarie Park ZS 132kV Additional Transformer	Increase transformer capacity	2008/09

Summary information concerning these augmentations is provided in the referenced sections.

A4.3 PROPOSED NEW CONNECTION POINTS

EnergyAustralia has identified proposed new Connection Points as tabulated below.

Region	APR Section	Proposal	Purpose	Timing
Sydney	6.3.1	Gwawley Bay ZS 132kV Conversion	Replace existing 33kV (distribution) infrastructure	2010/11
Sydney	6.3.2	Kurnell 132/11kV Zone Substation	Replace existing 33kV (distribution) infrastructure	2010/11
Sydney	6.3.3	Sydney Airport 132kV Busbar	New customer connection	2010/11
Sydney	5.2.3	Top Ryde 132/11kV Zone Substation	New connection point	2010/11
Sydney	6.3.4	Belmore Park 132/11kV Zone Substation	New connection point	2012/13
Sydney	6.4.3	Leichhardt ZS 132kV Conversion	Replace existing 33kV (distribution) infrastructure	2012/13
Central Coast	6.3.5	Lake Munmorah 132/11kV Zone Substation	Replace existing 33kV (distribution) infrastructure	2012/13
Central Coast	6.4.5	Warnervale 132/11kV Zone Substation	New connection point	2012/13
Hunter	6.3.6	Kurri 132/11kV Zone Substation	Replace existing 33kV (distribution) infrastructure	2010/11
Hunter	6.4.6	Brandy Hill 132/11kV Zone Substation	New connection point	2011/12

Summary information concerning these augmentations is provided in the referenced sections.

A5 REPLACEMENT PROJECTS

A5.1 INTRODUCTION

In addition to developing its network to meet forecast electricity demand, EnergyAustralia is required to maintain the capability of its existing network. EnergyAustralia has developed a long term program of asset replacement in which condition based monitoring and failure data form the basis of an asset management strategy. The program considers the risk and consequence of failure, asset sustainability, population size and the availability of technology and spares.

This section outlines the Replacement Projects which EnergyAustralia is progressing or proposes to progress in the next ten years.

The identification of potential replacement projects does not indicate a supply reliability risk. Replacement programs are planned a number of years into the future to allow EnergyAustralia to schedule works in order for it to continue to provide a reliable electricity supply to customers.

A5.2 REPLACEMENT PROJECTS

EnergyAustralia has identified Replacement Projects as tabulated below.

Region	APR Section	Refurbishment	Timing	Estimated Cost
Sydney	A5.2.1	Kurnell ZS 132kV Feeders 916 & 917 Refurbishment	2011/12	\$8.5M
Sydney	A5.2.2	Canterbury STS 132kV Busbar Refurbishment	2012/13	\$10.6M
Sydney	A5.2.3	Canterbury STS 33kV Switchgear Replacement	2012/13	\$21.8M
Sydney	A5.2.4	St Peters ZS 11kV Switchgear Refurbishment	2012/13	\$1.5M
Sydney	A5.2.5	Bunnerong STS 132kV Feeder 91M/3 Part Replacement	2013/14	\$29.7M
Sydney	A5.2.6	Marrickville ZS 11kV Switchgear Refurbishment	2014/15	\$1.5M
Sydney	A5.2.7	Beaconsfield West BSP 132kV Feeders 91A & 91B Replacement	2017/18	\$83.0M
Sydney	A5.2.8	Bunnerong STS 33kV Reactor Replacement	2017/18	\$2.5M
Sydney	A5.2.9	Drummoyne ZS 132kV Switchgear Replacement	2017/18	\$14.5M
Sydney	A5.2.10	Drummoyne ZS 132kV Feeder 202 Replacement	2017/18	\$20.2M
Sydney	A5.2.11	Drummoyne ZS 132kV Feeders 203 & 204 Replacement	2017/18	\$49.8M
Sydney	A5.2.12	Lane Cove STSS 132kV Feeders 92F & 92J Replacement	2017/18	\$58.4M
Hunter	A5.2.13	Tomago STS 33kV Switchgear Replacement	2010/11	\$15.6M
Hunter	A5.2.14	Kurri STS 33kV Switchgear Replacement	2011/12	\$16.9M

Summary information concerning these replacements follows.

A5.2.1 Kurnell ZS 132kV Feeders 916 & 917 Refurbishment

The 132kV feeders 916/917 from Sydney South BSP to Kurnell STS comprise overhead tower-line construction of approximately 22.3km in length which were commissioned in the early 1960's.

The tower-line has been identified as exhibiting tower corrosion and line deterioration due to adverse affects from the marine environment.

The most likely option is to replace the corroded structural tower members and conductor.

A5.2.2 Canterbury STS 132kV Busbar Refurbishment

Canterbury STS was established in 1961 and is currently a four transformer 132/33kV sub-transmission substation.

The 132kV busbar has been identified as being inadequate to meet increased fault levels on the sub-transmission system following the completion of proposed new connections to Beaconsfield West BSP and Peakhurst STS.

The most likely option is to replace the 132kV busbar.

A5.2.3 Canterbury STS 33kV Switchgear Replacement

Canterbury STS was established in 1961 and is currently a four transformer 132/33kV sub-transmission substation.

The 33kV switchgear has been identified as approaching the end of its economic life, while the 33kV busbar height does not meet current standards.

The most likely option is to replace the 33kV switchgear in conjunction with addressing the busbar height.

A5.2.4 St Peters ZS 11kV Switchgear Refurbishment

St Peters was established in 1971 and is currently a four transformer 132/11kV zone substation.

The 11kV oil circuit breakers have been identified as approaching the end of their economic life.

The most likely option is to replace the 11kV oil circuit breaker trucks with vacuum circuit breaker trucks.

A5.2.5 Bunnerong STS 132kV Feeder 91M/3 Part Replacement

The 132kV feeder 91M/3 from Beaconsfield West BSP to Bunnerong STS comprises an oil-filled cable section of approximately 5.9km in length which was commissioned in the early 1970's.

The oil-filled cable section has been identified as approaching the end of its economic life, while its construction presents an environmental risk in the event of an oil leak.

The most likely option is to replace the oil-filled cable section with XLPE cable.

A5.2.6 Marrickville ZS 11kV Switchgear Refurbishment

Marrickville was established in 1972 and is currently a three transformer 132/11kV zone substation.

The 11kV oil circuit breakers have been identified as approaching the end of their economic life.

The most likely option is to replace the 11kV oil circuit breaker trucks with vacuum circuit breaker trucks.

A5.2.7 Beaconsfield West BSP 132kV Feeders 91A & 91B Replacement

The 132kV feeders 91A and 91B from Beaconsfield West BSP to Chullora STS comprise oil-filled cables of approximately 16.2km in length which were commissioned in the late 1960's.

The oil-filled cables have been identified as approaching the end of their economic life, while their construction presents an environmental risk in the event of an oil leak.

The most likely option is to replace the oil-filled cables with XLPE cable.

A5.2.8 Bunnerong STS 33kV Reactor Replacement

Bunnerong STS was established in 1956 and is currently a three transformer 132/33kV sub-transmission substation.

The 33kV reactors, now more than 70 years old due to their prior usage at the Bunnerong Power Station, have been identified as approaching the end of their economic life and are in poor condition.

The most likely option is to replace the 33kV reactors.

A5.2.9 Drummoyne ZS 132kV Switchgear Replacement

Drummoyne was established in 1979 and is currently a two transformer 132/11kV zone substation.

The 132kV switchgear has been identified as approaching the end of its economic life.

The most likely option is to replace the 132kV switchgear.

A5.2.10 Drummoyne ZS 132kV Feeder 202 Replacement

The 132kV feeder 202 from Rozelle STSS to Drummoyne comprises an oil-filled cable of approximately 3.8km in length, including a submarine section, which was commissioned in the late 1970's.

The oil-filled cable has been identified as approaching the end of its economic life, while its construction presents an environmental risk in the event of an oil leak.

The most likely option is to replace the oil-filled cable with XLPE cable.

A5.2.11 Drummoyne ZS 132kV Feeders 203 & 204 Replacement

The 132kV feeders 203/204 from Mason Park STSS to Drummoyne comprise oil-filled cables of approximately 7.3km in length which were commissioned in the late 1970's.

The oil-filled cables have been identified as approaching the end of their economic life, while their construction presents an environmental risk in the event of an oil leak.

The most likely option is to replace the oil-filled cables with XLPE cable.

A5.2.12 Lane Cove STSS 132kV Feeders 92F & 92J Replacement

The 132kV feeder 92F from Lane Cove STSS to Mason Park STSS comprises an oil-filled section made up of two parallel cables, 92FA and 92FB, of approximately 8.5km in length which were commissioned in the late 1970's.

The 132kV feeder 92J from Lane Cove STSS to Meadowbank comprises an oil-filled section made up of two parallel cables, 92JA and 92JB, of approximately 6.2km in length which were commissioned in the early 1970's.

The oil filled cables 92FA, 92FB, 92JA and 92JB have been identified as approaching the end of their economic life.

The most likely option is to replace the oil-filled cable sections with XLPE cable.

A5.2.13 Tomago STS 33kV Switchgear Replacement

Tomago STS was established in 1963 and is currently a three transformer 132/33kV sub-transmission substation.

The 33kV switchgear has been identified as approaching the end of its economic life, while the 33kV busbar height does not meet current standards.

The most likely option is to replace the 33kV switchgear in conjunction with addressing the busbar height.

A5.2.14 Kurri STS 33kV Switchgear Replacement

Kurri STS was established in 1964 and is currently a three transformer 132/33kV sub-transmission substation.

The 33kV switchgear has been identified as approaching the end of its economic life, while the 33kV busbar height does not meet current standards.

The most likely option is to replace the 33kV switchgear in conjunction with addressing the busbar height.

A6 ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AESDR	Annual Electricity System Development Review
ANTS	Annual National Transmission Statement
APR	Annual Planning Report
BSP	Bulk Supply Point
CBD	Central Business District
DEUS	Department of Energy, Utilities and Sustainability (NSW)
DM	Demand Management
DNSP	Distribution Network Service Provider
DWE	Department of Water and Energy (NSW)
EA	EnergyAustralia
GWh	Giga Watt Hour
HV	High Voltage
IPART	Independent Pricing and Regulatory Tribunal (NSW)
kV	Kilovolt
km	Kilometre
MVA	Mega Volt Amperes
MVAr	Mega Var
MW	Mega Watt
NEMMCO	National Electricity Market Management Company Limited
NER	National Electricity Rules
PoE	Probability of Exceedence
SOO	Statement of Opportunities
STS	Sub-Transmission Substation
STSS	Sub-Transmission Switching Substation
TG	TransGrid
TNSP	Transmission Network Service Provider
TS	Transmission Substation
ZS	Zone Substation

A7 CONTACT DETAILS

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