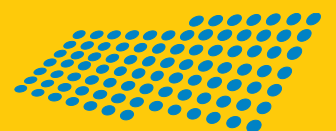


Demand Management Options Consultation

SYDNEY INNER METROPOLITAN AREA

JUNE 2007



EnergyAustralia[®]

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Demand Management Options Consultation

Sydney Inner Metropolitan Area

EnergyAustralia and TransGrid plan and develop the Sydney Inner Metropolitan electricity system to meet the supply requirements of customers. Analysis of this system under forecast peak loads predicts an emerging limitation in summer 2012/13.

The current default supply option would be to construct a new 330/132kV Bulk Supply Point (BSP) to EnergyAustralia. Preliminary estimates indicate that this project is likely to cost in excess of \$200m.

EnergyAustralia is seeking input from interested parties on non-network demand management options to reduce peak electrical loads or increase supply from alternative sources.

This document is intended to:

- provide information on forecast limitations identified in the network supplying parts of the metropolitan area of Sydney;
- explain how EnergyAustralia and TransGrid will develop and evaluate options for overcoming these limitations;
- identify the opportunities for members of the public to participate in this process;
- seek comments on the proposed approach, especially with respect to investigation of potential non-network options;
- seek input from interested parties on non-network options such as demand management and embedded generation that should be investigated.

SECTION 1 - Background

Introduction

TransGrid owns and operates the electricity transmission system within NSW. EnergyAustralia owns and operates the distribution system that delivers electricity to customers in the Eastern Sydney, Central Coast and Hunter regions of NSW. Together EnergyAustralia and TransGrid plan and develop this electricity system to meet the requirements of customers.

EnergyAustralia and TransGrid are currently investigating possible options to deal with the emerging limitations we have identified.

The area of Sydney jointly serviced by EnergyAustralia and TransGrid is bounded by the Hawkesbury River in the North, the Royal National Park in the South and the western boundaries of Bankstown, Auburn, Ryde and Hornsby local government areas (see Map 1 – EnergyAustralia / TransGrid Sydney Supply Area). The area includes the CBD of Sydney, a residential population of over 4 million, many key industrial areas and the satellite CBDs of North Sydney, Chatswood and Hurstville.

This area is connected to the state and national electricity grid via a series of bulk supply points (BSPs) located in a ring around the city – at Galston in the northwest, Belrose in the northeast, Beaconsfield in the inner west, Haymarket in Sydney City and Picnic Point in the southwest. From these points, 132kV cables connect to over 100 zone and subtransmission substations spread throughout the area, which in turn supply the system that brings electricity to over one million customers.

At peak times, the electrical demand in this area is currently reaching 4,000MVA and has historically grown by about 140MVA each year.

Assuming this growth continues as forecast, by 2012 it will be necessary to take action to either augment the supply system or reduce the growth in demand, or both.

Current Supply Arrangements

Sydney is supplied by a complex interconnected 330kV and 132kV transmission system.

An area generally corresponding to the Northern Beaches and North Shore is supplied from a radial 132kV distribution network supplied from TransGrid's Sydney East BSP. An area including Ryde and Hunters Hill is supplied from Integral Energy's Carlingford substation

The remainder of the area is supplied by a highly interconnected 132kV transmission network linking TransGrid's Beaconsfield West BSP, Haymarket BSP, Sydney North BSP and Sydney South BSP. Beaconsfield West BSP and Haymarket BSP are each supplied by a single 330kV underground cable.

MAP 1: EnergyAustralia/TransGrid Sydney Supply Area



Region of Interest

The emerging limitations that have been identified relate to the region of the inner metropolitan area supplied from the TransGrid Supply Points at Beaconsfield West, Haymarket, Sydney North and Sydney South.

The Local Government Areas of Pittwater, Ku-ring-gai, Warringah, Willoughby, Manly, Mosman and North Sydney are supplied from the Sydney East BSP and are therefore not within the Region of Interest for this demand management consultation.

Some parts of the Ryde, Hunters Hill and Lane Cove Local Government Area's are also not within the Region of Interest.

The Region of Interest for this demand management consultation is shown as the shaded area within Map 1 (EnergyAustralia/TransGrid Sydney Supply Area).

Applicable Network Design Parameters

EnergyAustralia and TransGrid apply a 'modified n-2' criterion to the inner metropolitan transmission network. This is consistent with general international practice for CBD areas and dense urban loads and reflects the reality that although risks of failure are relatively low the consequences can be very high. This jointly adopted reliability standard means that the system is designed to remain capable of meeting the full forecast peak demand even under the following contingencies:

- (a) The simultaneous outage of a single 330kV cable and any 132kV feeder or 330/132kV transformer; or
- (b) An outage of any section of 132kV busbar.

In addition, the design should ensure that:

- Under normal system operating conditions, all elements would not be loaded beyond their recurrent cyclic ratings¹ at forecast peak load;
- Under single outage conditions (including outage of a 132kV busbar section), loads remain within equipment recurrent cyclic ratings without corrective switching other than automatic switching;
- In the event of a simultaneous outage of a single 330kV cable and any 132kV transmission feeder or 330/132kV transformer in the inner metropolitan area, supply can be restored to all load after corrective switching on the 330kV or 132kV systems. This may require a short period of cyclic load shedding (in areas other than the CBD) in the short term until the corrective switching is completed

Committed or Planned System Changes

A range of projects are expected to be completed prior to the time when the need described in this document arises. The following major projects have been considered as being completed for the purpose of the analysis in this document.

- Upgrading four transformers at Sydney South from 250MVA to 375MVA;
- Replacing existing feeders between Canterbury and Bunnerong with two 200MVA feeders between Kurnell STS and Bunnerong STS;
- Installing a fifth transformer at Sydney North substation; and
- New 132kV connections between Surry Hills STS and Haymarket.

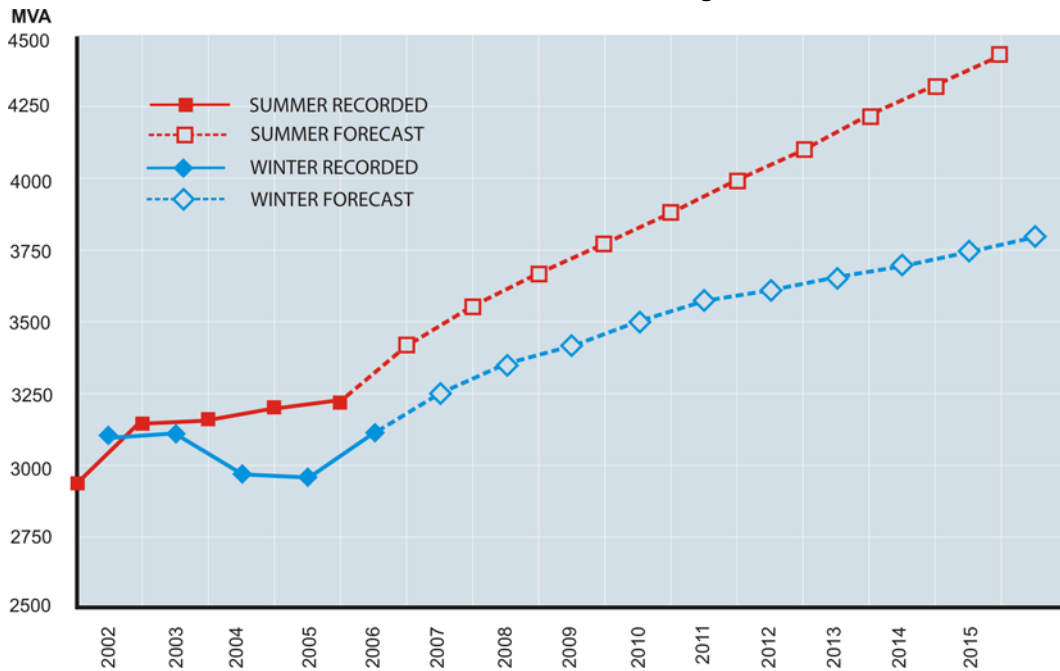
¹ Recurrent cyclic rating refers to the maximum load that can be carried by a piece of equipment when subjected to its normal daily load profile.

SECTION 2 – Emerging Limitations

Demand Forecast

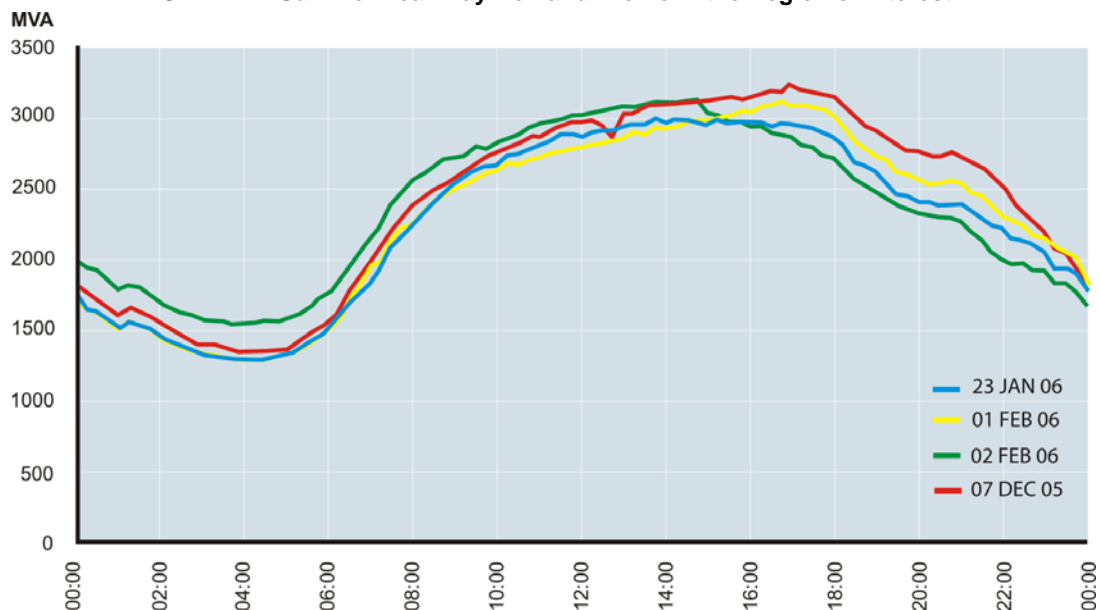
In summer 2005/06, the peak load recorded on the system in the *Region of Interest* was 3226MVA. The peak load in the following winter was 3110MVA. Summer peaks are forecast to continue to grow at an average rate of about 3% (about 100MVA per year) for the next ten years. Summer peaks are expected to continue to grow more quickly than winter.

CHART 1: Seasonal Peak Demand in the Region of Interest



Summer peak demands typically occur on the hottest weekdays from mid November to mid March between midday and 6:00pm. The profiles for the top four days of summer 2005/06 are shown in the following chart. In summer 2005/06, the load exceeded 95% of the seasonal peak on only three days for a total of 9 hours.

CHART 2: Summer Peak Day Demand Profile in the Region of Interest



Emerging Limitations

Based on these load forecasts, we have analysed the performance of the interconnected supply system in the *Region of Interest* for all significant outage scenarios, in accordance with the applicable network design parameters. This has shown that if there were a simultaneous outage of one of the 330kV cables and one of the key 132kV supplies in summer from 2012/13 onwards, we would have a problem. Some load would need to be shed to avoid overloading of key system components.

This could be alleviated by either augmenting the supply system or reducing the load through demand management. Demand management options would need to reduce demand effectively and reliably between 12 noon and 6:00pm on hot weekdays during summer 2012/13. These reductions could come from any location in the *Region of Interest*, but reductions south of the Parramatta River would be more effective. A total of about 75MVA would be sufficient to deal with summer 2012/13 if ideally located. Contributions to this overall reduction from north of the river will assist, but a larger amount will be needed to have the same impact. The reductions would be needed on less than five occasions for a total of less than 50 hours during summer 2012/13.

The amount required would increase by about 100MVA in each year after that, and the likely frequency and duration would also increase.

In the event that insufficient demand reductions were identified, a recommendation to proceed with a supply augmentation would need to be finalised in January 2008 to provide enough time for construction. In order to develop a combined demand management and augmentation strategy, demand management options must be developed to a high level of certainty before that time.

Default Supply Option

A preliminary analysis of the options available suggests that the current default supply option would be to construct a new substation near the western edge of the *Inner Metropolitan Area* and connect it to TransGrid's Sydney West BSP via a new 330kV cable from Holroyd. Preliminary estimates indicate that this project is likely to cost in excess of \$200m and would need to be completed by summer 2012/13 to deal effectively with the emerging limitations.

SECTION 3 – Investigation Process

Investigation and Decision Process

EnergyAustralia is seeking submissions from interested parties for non-network demand management options. The options will need to focus on demand management achievable in the Region of Interest (see Map 1) within the Sydney Supply Area.

In addition, EnergyAustralia is also seeking submissions/comments from interested parties on the overall Demand Management investigation process.

Timetable

12 Jun 07	Publication of Demand Management Options Consultation document (this document)
May-Jul 07	Internal generation and investigation of potential DM options
Jun-Jul 07	Independent review of DM&P outcomes to identify DM options for further development
31 July 07	Close of submissions on process and registration of interest
15 Aug 07	Close of submissions on non-network options for investigation
Aug-Sep 07	Analysis to determine potentially feasible options (shortlist)
Oct-Dec 07	Development of feasible non-network options, including negotiation and market engagement where appropriate
Jan 08	Publication of Application notice to NEMMCo, indicating likely feasible options.

This document is the first element of the consultation and non-network option investigation process.

EnergyAustralia and TransGrid will examine a range of options including those identified in submissions and those resulting from our own research and investigations.

Each identified option will be evaluated in terms of the amount of demand reduction it could deliver and the net cost to EnergyAustralia, and ranked by cost-effectiveness. EnergyAustralia will compare this list to the economic value of deferring the most favourable supply expansion option and determine whether enough cost effective options exist to make demand management a feasible option. The results of this analysis will be published in the Investigation Report in late 2007.

If demand management is determined to be feasible, EnergyAustralia will proceed to develop the most favourable options, in company with the relevant proponents or customers where applicable, so that a final decision to proceed can be made.

Respondents to this consultation paper will be kept informed about the progress of the project at key stages and may be contacted for further information if their ideas/suggestions are going to be taken to the next step of project development.

EnergyAustralia and TransGrid will apply the AER's Regulatory Test to determine the most economic strategy, which may be a combination of demand management and conventional network options. In accordance with regulatory requirements, EnergyAustralia and TransGrid will recommend implementation of the option that satisfies the AER's Regulatory Test

SECTION 4 – Related Demand Management Projects

Demand Management and Planning Project

In early 2002, the Department of Planning approved the installation of the 330kV connection from TransGrid's Sydney South BSP to Haymarket. As a condition of this consent, the Department required EnergyAustralia and TransGrid to fund a \$10m project to provide robust, practical and accurate information about the electricity demand reduction opportunities in the inner Sydney region.

This "Demand Management and Planning Project" (DMPP), is partially complete and has undertaken over 750 demand management reviews, covering most of the major energy-using sites in the Sydney area. In addition, it is implementing a series of demonstration projects that will provide robustness to the cost and demand impact estimates in these reviews. Further information on the project is available at the project web site www.planning.nsw.gov.au/dmpp/

The project is expected to be substantially complete in about 12 months time, and will result in a clearer understanding of the likely cost effective potential for demand management options that would defer or avoid the need for future augmentations of the electricity supply infrastructure.

As part of the investigation of options for this area, EnergyAustralia and TransGrid propose to engage an independent consultant to review all the information developed by the DMPP and prepare a report on the likely size and cost of demand management options relevant to this investigation. This will form an important input into the development of alternatives.

TransGrid's DM program for the Newcastle–Sydney–Wollongong Load Area

In September 2005, TransGrid commenced a process for the development of demand management options relating to the overall supply system for Sydney, Newcastle and Wollongong. That process is not yet completed. However, demand management options identified by that process that are relevant to the *Region of Interest* will be re-examined for applicability irrespective of whether they were found suitable for the previous requirement

EnergyAustralia's Demand Management Projects

EnergyAustralia investigates demand management alternatives for every proposed augmentation project with a value of over \$1m. This process will continue to operate in parallel with this investigation, and identified DM projects will continue to be implemented where they are cost effective.

Opportunities identified by demand management investigations examining specific distribution system opportunities will be examined for relevance to the Inner Metropolitan Area needs, and the benefits combined where appropriate.

Demand management projects selected for implementation in response to needs in the distribution system may contribute to the requirement for demand reductions in this *Region of Interest*.

SECTION 5 – Submissions on Demand Management Options

EnergyAustralia and TransGrid are seeking written submissions in order to identify the broadest possible range of “demand management” opportunities to reduce peak electrical loads or increase supply from alternative sources. It will investigate whether proposed demand management options are practical, deliverable and cost effective.

Submissions should be in writing, and fall into one of the following broad categories:

- **Details of specific demand management opportunities that EnergyAustralia can investigate.** For example, a customer may have a large electrical load that could be interrupted or that could be reduced through energy efficiency or fuel substitution.
- **Proposals for demand management from parties able to implement demand reduction measures themselves.** The proposal should include details of the magnitude of the demand reduction that can be achieved, how these demand reductions will be achieved, and the estimated cost to EnergyAustralia. These proposals are non-binding and will be considered along with demand management opportunities identified and investigated by EnergyAustralia.
- **General views and opinions,** including probable costs, as to what are the best options for EnergyAustralia to cost effectively meet the future electricity requirements of the area.

Submissions relating to specific proposals should include as much of the following information as is available:

- The name, address and contact details of the company or person making the submission.
- The name, address and contact details of the company or person responsible for the load or alternate supply (if different to above).
- The size, type and location of load(s) that can be reduced, shifted, substituted or interrupted.
- The size, type and location of generators that can be utilised if required.
- The type of action or technology proposed to reduce peak demand / provide alternate supplies.
- The time required to implement these measures and any period of notice required before loads can be interrupted or generators started.
- The approximate total cost to implement these measures and any cost savings that would accrue to the owners/operators of the equipment.
- The approximate cost of any contribution/assistance that EnergyAustralia may be required to make in order to make use of this measure for demand management.
- Other additional information to assist EnergyAustralia in investigating and evaluating demand management options.

As EnergyAustralia may be required to publish information about submissions, any commercially sensitive material and other material that the respondent making the submission does not want to be made public should be clearly identified.

Submissions should be addressed to:

The Project Manager
Sydney Supply Area Demand Management Options
EnergyAustralia
570 George Street
SYDNEY NSW 2000

or email to demandmanagement @energy.com.au

CLOSING DATES

Comments of process and registration of interest:

31 July 2007

Submission of non network / demand management options:

15 August 2007