TransGrid

TransGrid's Submission to the Australian Competition & Consumer Commission

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Revised Transmission Capital Investment Program 2004-2009

Attachment 3A

Customer Demand Forecasts Underpinning Future NSW Transmission Needs

November 2004

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TransGrid uses load forecasts to identify future transmission constraints within or adjoining its network and to quantify any associated transmission development proposals. To this end, forecasts of winter and summer peak demand (measured in both MW and MVar) for points of supply from TransGrid's network are developed in conjunction with Distributors. In addition, forecasts of the NSW Region load in aggregate are developed independently by TransGrid, using empirical modelling and economic scenarios provided on a consistent NEM-wide basis by NEMMCO.
A brief description of the NSW load forecast and the distribution of energy and peak demand growth is given below. The development of the NSW load forecast is outlined in Appendix 2 of TransGrid's Annual Planning Review and detailed tables of the NSW load forecast and Distributor supply point forecasts can be found in Appendix 3 of TransGrid's Annual Planning Review.

(i) NSW Energy Forecasts

"Energy sent out" is shown in *Figure 3A.1* and is defined as supply to the NSW region of the NEM including transmission losses. Energy sent out has grown by 1 587 GWh per annum for the last ten years. For the next ten years further growth is expected to supply growing end-use due to increases in population, real income and the cost of substitute fuels. However, this growth will be offset to some extent by rising real electricity prices and substitute generation from embedded (mostly renewable) sources, as well as demand management initiatives.

Energy sent out is projected to grow over the 10 years commencing 2004/05 by an average of 1 587 GWh (or 2.2 per cent) each year under the Medium scenario, ranging from 1 160 GWh to 2 340 GWh (1.5 to 2.9 per cent) provided by the Low and High scenarios, respectively.

Figure 3A.1: NSW Energy Sent Out

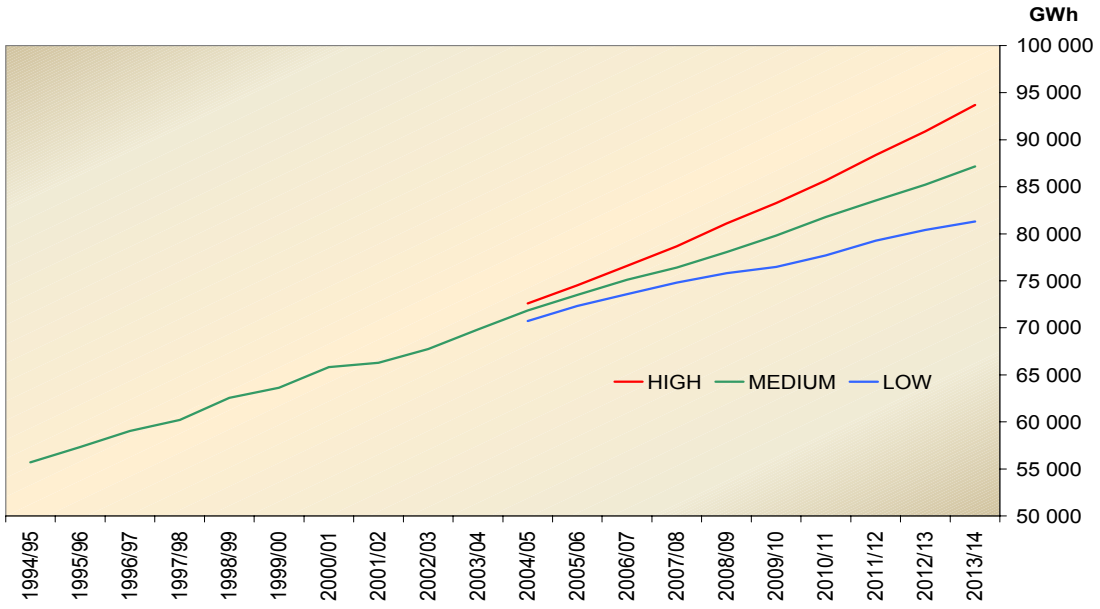
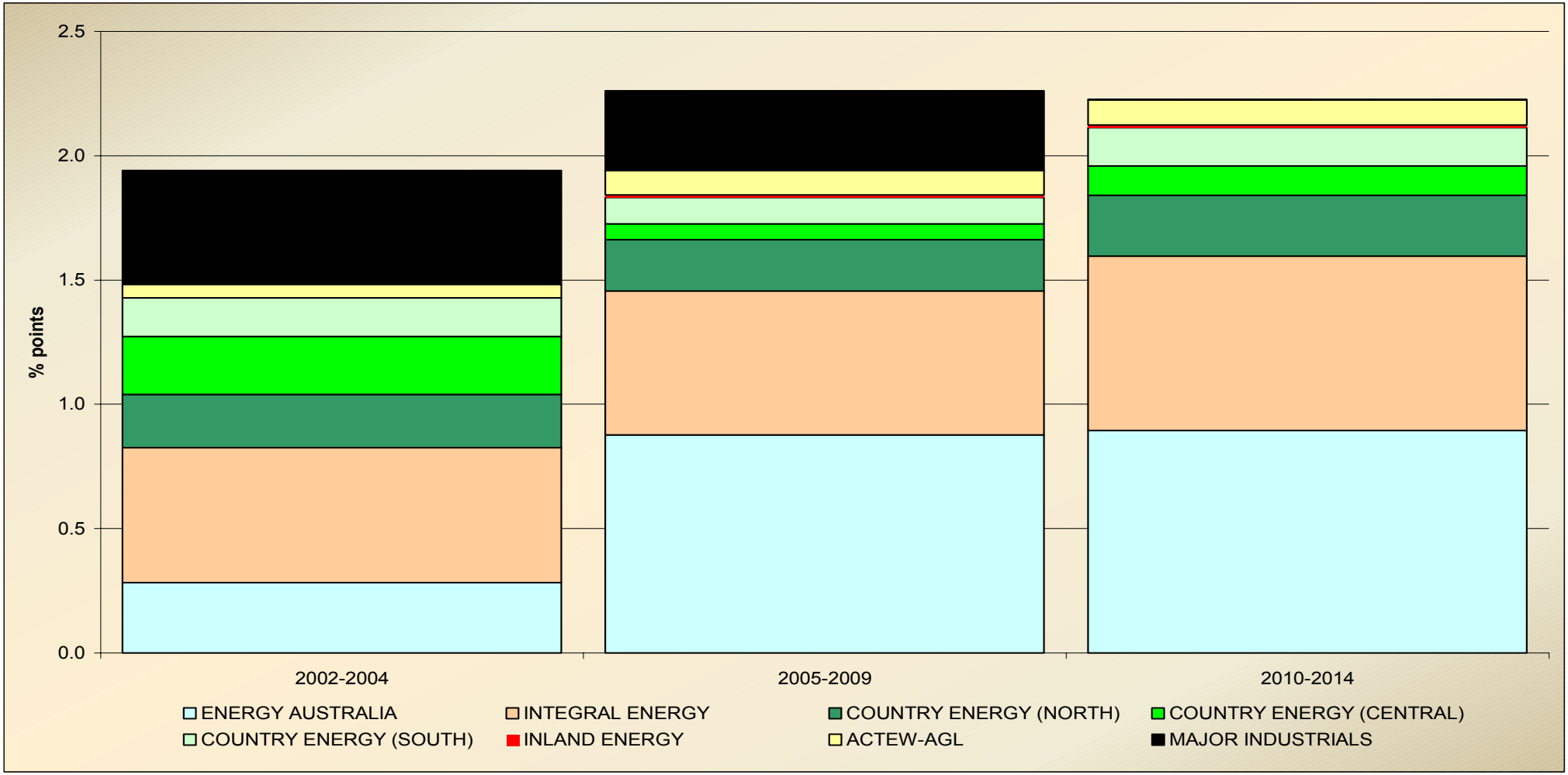


Figure 3A.2 shows contributions to NSW energy growth expected to be made by each of TransGrid's Customers. The areas broadly covered by the respective distribution networks are as follows: EnergyAustralia – from coastal Sydney to Newcastle and lower Hunter Valley; Integral Energy – western Sydney, south coast and Blue Mountains; Country Energy – north, central and southern country NSW; ActewAGL – the Australian Capital Territory; Inland Energy – western NSW.

During the three financial years 2002-2004, NSW growth was less than 2 per cent per annum, mainly due to negative growth in non-industrial load in the Energy Australia distribution area during 2002/03 although this was partly offset by strong industrial load growth. An increase in forecast NSW growth in the next five years reflects normal load growth in the Energy Australia distribution area along with continued major industrial expansion. In the period 2010-2014, it is likely that Integral Energy and Country Energy will compensate for an abatement in industrial load growth.

Figure 3A.2: Contributions to NSW Energy Growth – Distribution Regions and Major Industrial Loads



Notes: (1) Based on 2003 forecast information prepared by Customers to 2008-09, extrapolated at average historical growth rates to 2013-14, with some adjustments to match the overall TransGrid forecast growth rate

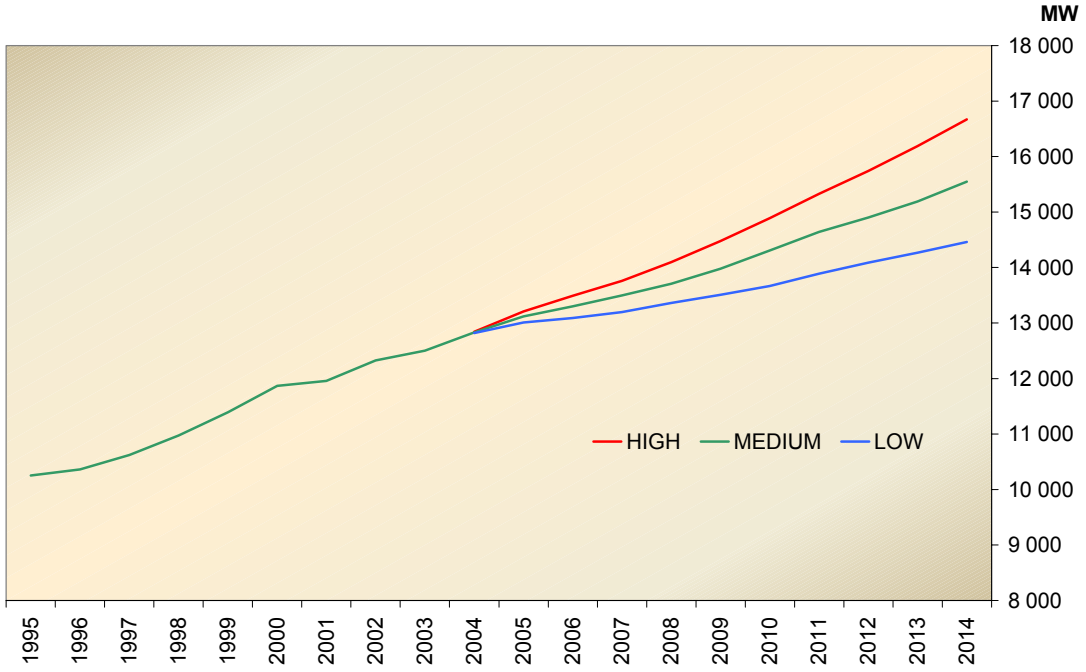
(2) Major industrial loads consist of those loads treated separately by TransGrid in the load forecast process. Some of these loads are supplied directly from the transmission network while others are supplied from the relevant distribution network. .

(ii) NSW Peak Demand Forecasts

Peak demands are defined for each of winter and summer in terms of the maximum output of NSW scheduled generators plus net imports from other Regions, averaged over a half-hourly trading period. Because daily maximum demand during winter and summer is highly correlated with the prevailing weather conditions, current trends are not readily discernable without reference to a standard temperature criterion. Peak demands in each respective season are therefore converted to Standard Weather Peak Demands (SWPD) by making an estimate of the demand that would have occurred at standard temperatures. These temperatures are chosen to represent percentiles of extreme conditions, such that probabilities can be attached to the associated demand levels. A projected "10% Probability of Exceedance" (PoE) winter SWPD for a particular year, for example, describes the level of demand during winter of that year that has a 10 per cent chance of being exceeded.

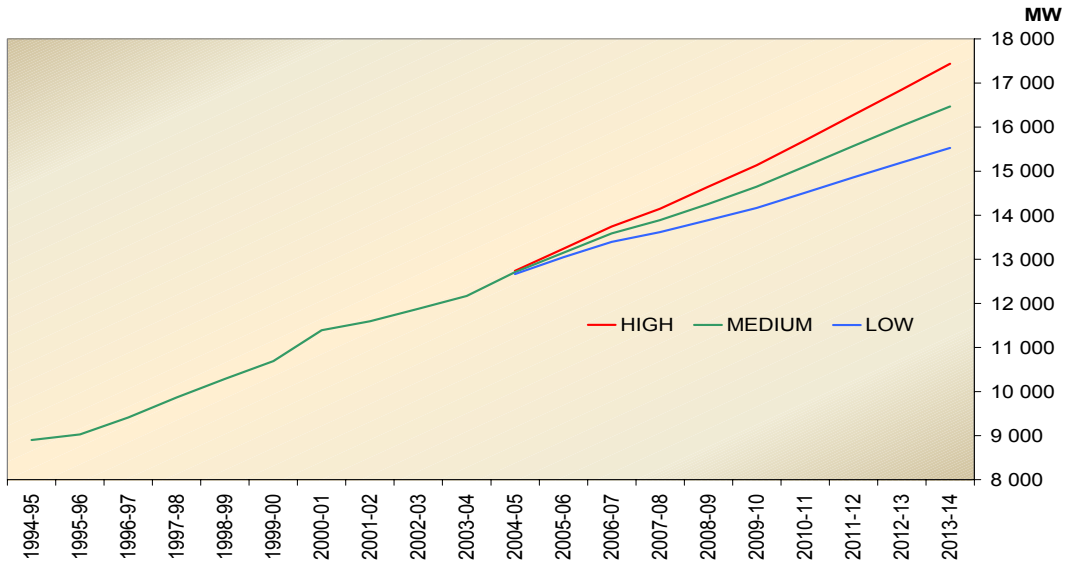
Apart from the temporary influence of weather, peak demand in the longer term reflects the underlying growth in energy usage. In winter the relationship between peak demand and seasonal energy use (represented by the load factor) is relatively stable. However, in recent years the summer load factor has been declining, as the growth in peak demand outstrips energy growth. This is principally due to an increasing temperature-sensitive component of the summer daytime load as air-conditioning becomes more prevalent. Since the trends associated with increased air-conditioning installation (high-rise residential construction in Sydney and retro-fitting of residential air-conditioning units) show no sign of abating, recent high trend growth in summer demand is likely to continue and actual demands will vary to a greater extent than they have in the past in response to extreme temperatures.

Figure 3A.3: NSW Winter SWPD (50% PoE)



Winter SWPD at the 50% PoE is shown in *Figure 3A.3* to have grown on average by 271 MW per annum over the last ten years. The average projected increase for the next ten years is 280 MW under the Medium scenario, within a range of 180 to 380 MW provided by the Low and High scenarios, respectively. Summer SWPD is shown in *Figure 3A.4* to have increased at a faster rate of 355 MW per annum for the last ten years and is projected to grow by 420 MW per annum to 2013-14, with the Low and High scenarios providing bounds of 330 and 510 MW per annum.

Figure 3A.4: NSW Summer SWPD (50% PoE)



Prior to 2003 in NSW, summer peak demand had never exceeded the previous winter peak demand. However, in the summer of 2002-03, fuelled by extreme temperatures, peak demand of 12 456 MW exceeded the preceding winter peak for the first time. An average winter during 2003, however, still produced a new record demand of 12 476 MW which was not surpassed in summer 2003-04. The stronger trend growth of summer peak demand relative to winter, has led to widespread expectation that NSW will soon become summer peaking.

Figure 3A.5 shows that based on the latest forecast, a NSW summer peak is likely to be the predominant pattern by the end of the decade under the medium economic growth scenario. In the interim, the prevailing weather conditions during the winter and summer months will greatly influence when the actual peak occurs.

Figure 3A.5: NSW Summer and Winter SWPD

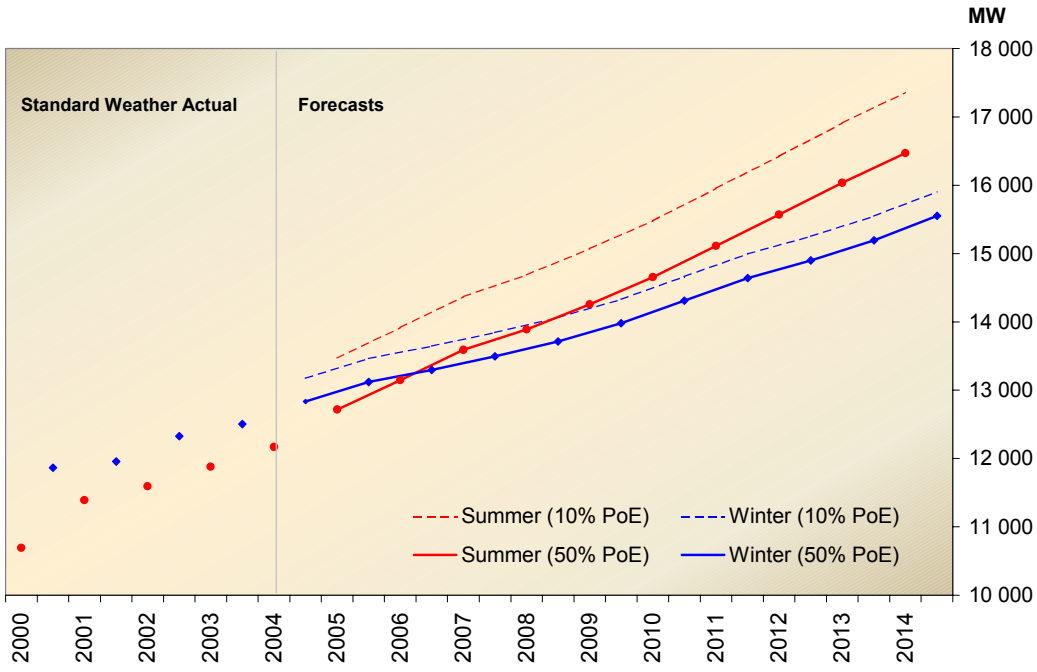
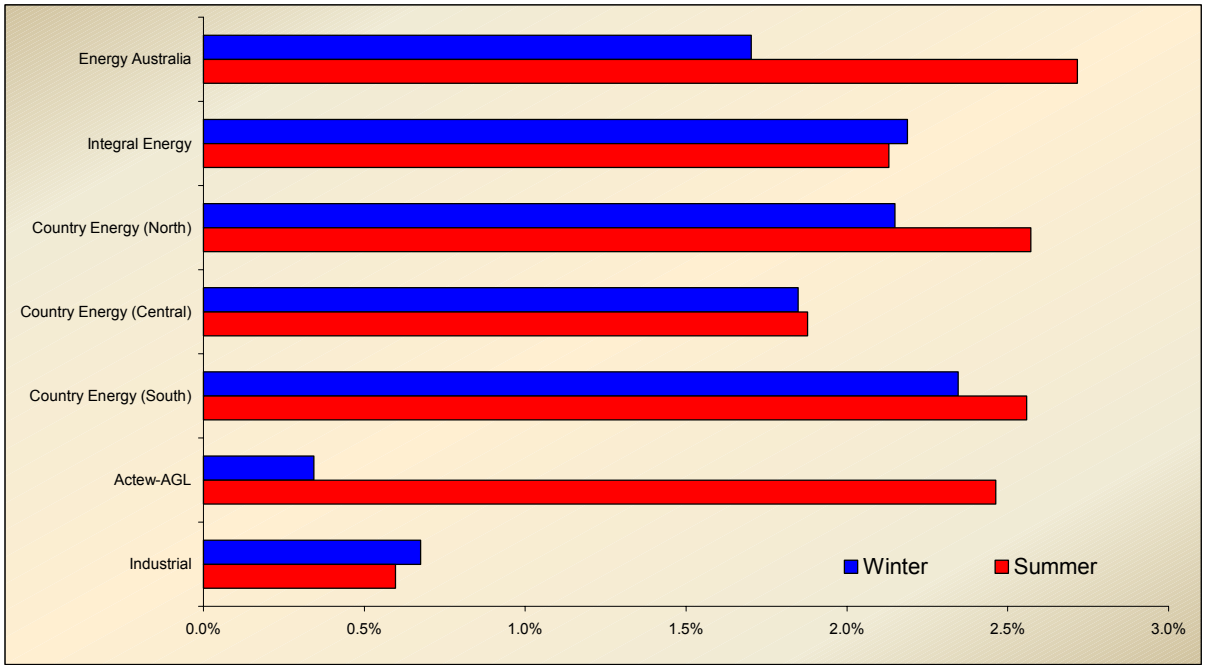


Figure 3A.6 shows summer and winter peak demand growth forecasts for each of TransGrid's customers. These growth rates are based on TransGrid's estimate of the diversified total network demand for each franchise area and do not necessarily equate with forecast information published by the Distributors themselves.

The current forecasts, without significant demand side interventions, indicate that, in most areas of the State, growth in summer peak demand is expected to exceed winter peak demand, particularly in the Energy Australia, Actew-AGL, and Country Energy northern franchise areas.

Figure 3A.6: Compound Annual Peak Demand Growth 2004-2014

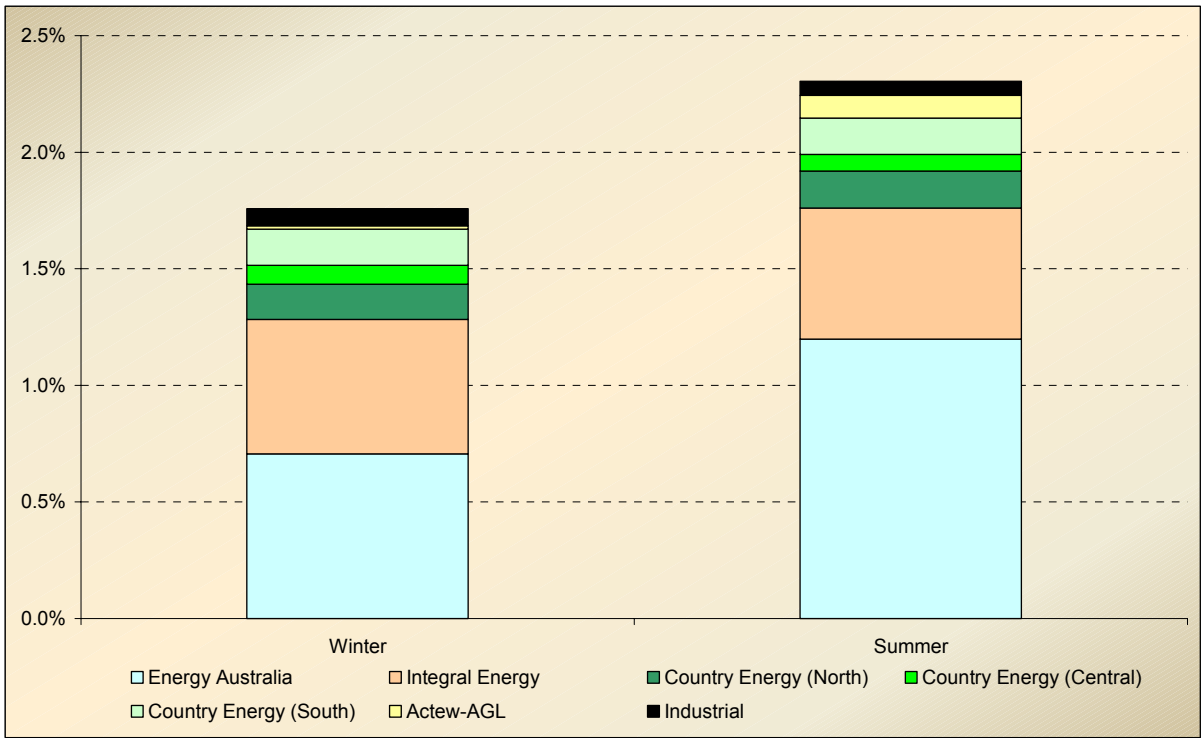


Notes: Based on the latest Distributor connection point forecasts provided to TransGrid. Individual connection point forecasts have been aggregated for each Distribution area, excluding identifiable industrial loads, and then scaled using diversity factors calculated by TransGrid. A large step load has been excluded from the growth rate for the Country Energy southern region.

Figure 3A.7 shows the contribution to peak demand growth in NSW from each customer area. As is to be expected, the largest contributions to growth come from the Energy Australia and Integral Energy networks.

Based on the current forecast information provided to TransGrid, the Integral Energy and Country Energy regions are expected to increase their share of the winter peak load. In Summer, strong summer peak demand growth in the Energy Australia network supplying metropolitan Sydney would see growth in this region contribute more than 50 per cent of the growth in the overall NSW peak load and lift the share of the NSW peak load in this region from around 42 per cent to around 44 per cent. An increased share of the peak load is also expected in the Integral Energy franchise area.

Figure 3A.7: Contribution to NSW Peak Demand Growth 2004-2014



Notes: Values represent the contribution to growth in NSW as represented by the aggregate of all distribution areas. No allowance for diversity between distribution areas has been allowed for. The annual average growth rate for NSW does not equal those calculated from TransGrid's summer and winter peak demand forecasts.