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## New South Wales Annual Planning Report 2011 Outline



## About TransGrid

TransGrid is a State Owned Corporation and the owner, operator and manager of one of the largest electricity transmission networks in Australia, connecting generators, distributors and major end users in NSW and the ACT.

Our network, with 91 substations and over 12,600 kilometres of transmission lines, serves the largest state in Australia's National Electricity Market.

## Message from the Managing Director

TransGrid's network forms the backbone of the National Electricity Market facilitating interstate trade and transfer of electricity. At TransGrid, we work closely with the Australian Energy Market Operator to ensure our central role in the NEM supports the operation of the market and upholds the National Electricity Objective. TransGrid proactively participates in various NEM developments to seek the best outcome for its customers and market participants.

As the National Planner, AEMO developed a number of economic scenarios for its 2011 Electricity Statement of Opportunities and the National Transmission Network Development Plan. The NSW region load forecast prepared by TransGrid and included in the Annual Planning Report for 2011 uses these scenarios and other economic parameters as key inputs. The forecast peak summer electricity demand shows reduced annual growth over the planning horizon compared to last year's forecast. This slowing of demand growth may defer some load driven developments.

The NSW and ACT distributors (Ausgrid, Essential Energy, Endeavour Energy and ActewAGL) have again provided their connection point forecasts for the planning horizon. These forecasts have been used to review the timing and scope of network augmentations as they move through from identification to project completion.

TransGrid has taken a leading role in encouraging and implementing non-network solutions such as demand management and local (embedded) generation. In the summer of 2008/09, TransGrid implemented the largest ever such arrangement in the NEM involving total network support of 350 MW. This allowed deferral of the Western 500 kV Upgrade project by one year, with savings of over \$14 million being returned to our customers. TransGrid continues to encourage the development of non-network alternatives through expressions of interest, consultations under the Australian Energy Regulator's processes and joint planning with distributors. We are also undertaking a number of innovation projects in Demand Management, Demand Side Response and embedded generation with our distribution network partners and universities.



With regards to electricity supply, a move towards lower carbon intensive generation such as gas and renewables including wind and solar is expected. These alternate sources will require connection to the network. Australia's strong financial position and proven ability to deliver commodities to growing world markets has resulted in significant interest in the development of new manufacturing and mining proposals. TransGrid's network development plans are both responsive and flexible in order to meet a range of potential generation and load developments.

TransGrid's Annual Planning Report for 2011 provides advance information to market participants, customers, stakeholders and interested parties on the nature and location of emerging constraints in TransGrid's transmission network. It also includes information on the status of network augmentation projects as they evolve.

This Annual Planning Report Outline highlights key points in the Annual Planning Report for 2011, presenting concise information about TransGrid's plans for meeting your future electricity needs.

Peter McIntyre  
Managing Director  
June 2011

**Our vision is "Excellence in all we do". We are committed to providing a reliable and efficient electricity transmission service to our customers. A reliable electricity supply is essential to economic prosperity and the success of the national electricity market. We are relied upon every day by industries, businesses and families.**

Peter McIntyre  
Managing Director

## Purpose of TransGrid's Annual Planning Report

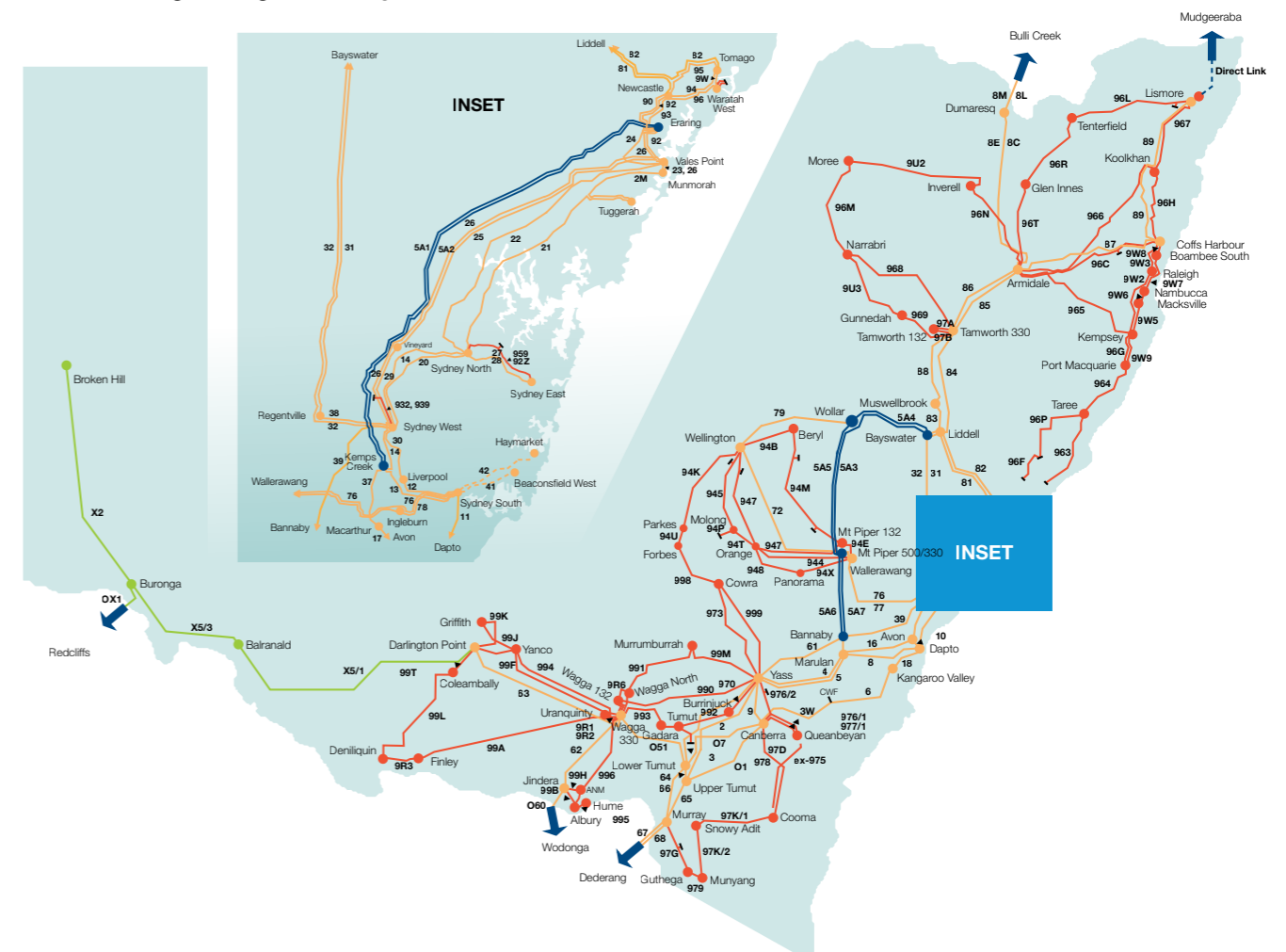
The NSW Annual Planning Report is one of a number of documents that provide information for transmission and distribution planning in the NEM. These documents cover the broad areas of supply demand balance, as well as transmission and distribution network planning. The various documents are a requirement of the National Electricity Rules.

The Annual Planning Report includes:

- Outcomes of planning analysis, identification of network constraints and proposals for network augmentations for the 10 year planning horizon;
- Completed and committed projects;
- Projects having completed the regulatory consultation process;
- Constraints and potential solutions for the one to five year planning horizon;
- Longer term constraints and indicative solutions;
- Indications of whether TransGrid is likely to issue a Request for Proposals seeking commercial offers for non-network solutions; and
- An update of TransGrid's State load forecast.

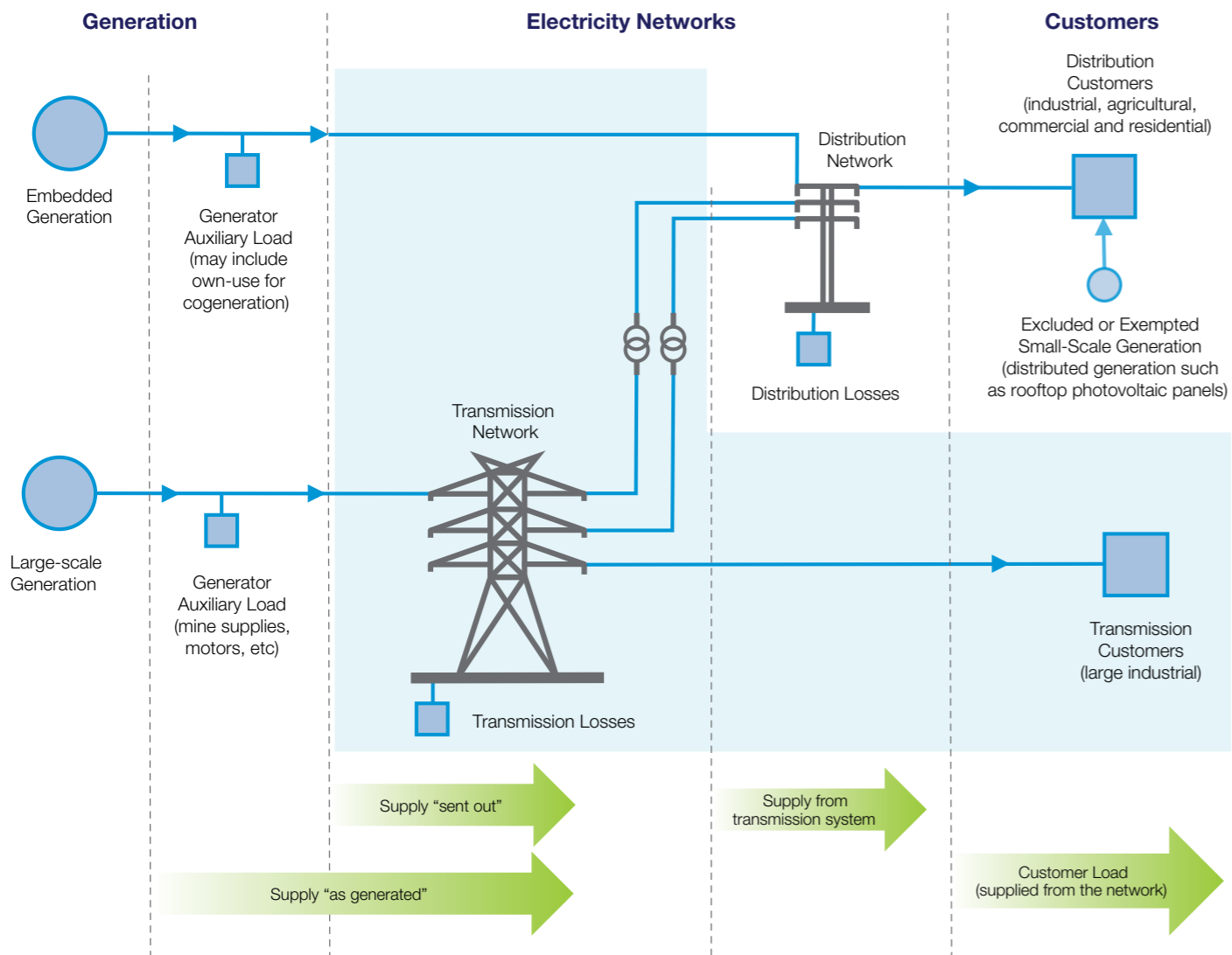
This information feeds into the preparation of the National Transmission Network Development Plan produced by the Australian Energy Market Operator. This plan covers the development of the national transmission system under a range of economic and market development scenarios. TransGrid presents the findings of the Annual Planning Report at a public forum held in Sydney each year.

## TransGrid's High Voltage Electricity Network



# Where TransGrid Fits in the National Electricity Market

The shaded area in the diagram below shows where TransGrid fits in the NEM, as a Transmission Network Service Provider.



Source: Modified version of AEMO diagram in ESOO 2010



## NSW Forecasts

The following table compares 2010 APR and 2011 APR projected growth rates of NSW and ACT energy, summer peak demand and winter peak demand.

	2010 APR	2011 APR
	Projected 2010-11 to 2019-20	Projected 2011-12 to 2020-21
Energy Sent Out	1.8%	1.6%
	Projected 10% POE 2010-11 to 2019-20	Projected 10% POE 2011-12 to 2020-21
Summer Peak Demand	2.3%	2.0%
	Projected 10% POE 2011 to 2020	Projected 10% POE 2012 to 2021
Winter Peak Demand	2.2%	2.0%

## Energy and Demand Forecasts

As the Jurisdictional Planning Body for NSW, TransGrid prepares a global demand and energy forecast for NSW and the ACT. This forecast feeds into the Australian Energy Market Operator planning process including the Electricity Statement of Opportunities and the National Transmission Network Development Plan.

Energy and demand forecasts in the Annual Planning Report are presented as "native" quantities in accordance with AEMO's requirements.

Native energy and native demand projections include load supplied by "Scheduled" generators plus "Semi-Scheduled" and "Non-Scheduled" generators. The figure at right shows the components of native energy and maximum demand.

Scheduled generators are non-intermittent generators above 30 MW capacity.

Semi-Scheduled generators are intermittent generators above 30 MW capacity, meaning that they cannot necessarily be operated at will. Wind generators above 30 MW capacity fall into this category.

Non-Scheduled generators are above 1 MW and below 30 MW capacity.

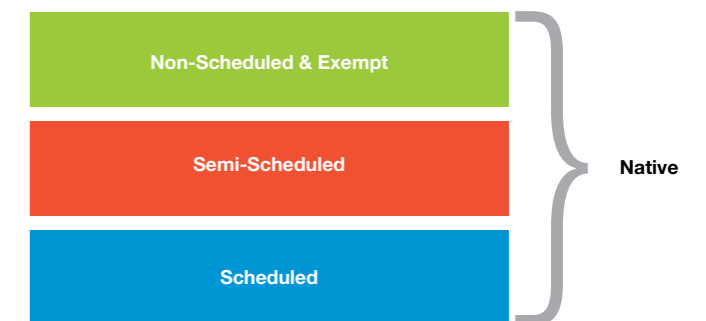
The Australian energy sector is undergoing a period of significant change. To manage the risks associated with planning in such an environment, AEMO, in conjunction with the Department of Resources, Energy and Tourism, has developed five scenarios describing alternative future outcomes for the Australian energy sector.

These scenarios are distinguished in terms of economic growth, population growth, carbon policy, centralised supply-side response, decentralised supply response and demand-side response.

Compared with last year's projections, the 2011 NSW and ACT global forecast for the central scenario shows:

- A reduction in energy growth primarily due to higher electricity price forecasts;
- Lower summer demand projections; and
- Lower winter demand projections.

The Annual Planning Report for 2011 contains forecasts for all of the scenarios including a discussion of the uncertainty affecting the forecasts.



## Non-Network and Demand Management Options

TransGrid takes a holistic approach to planning and considers Demand Management, local/embedded generation and bundled options on an equal footing with network options when planning its network and applying the Australian Energy Regulator's Regulatory Investment Test for Transmission.

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. The option must also have a proponent who is committed to implement the option and accept the associated risks, responsibilities and accountabilities.

It is expected that Demand Management and local generation options would emerge from joint planning with Distributors, from the market or from interested parties through consultation processes.

TransGrid's joint planning with NSW Distributors provides a mechanism to identify opportunities for Demand Management and local/embedded generation options. The NSW Distributors follow a similar process to TransGrid in preparing planning reports for their networks, thereby providing another useful source of information for proponents of Demand Management and local generation options.

## Network Developments

A continual planning process allows TransGrid to identify the areas of the network which will need to be expanded in the future. The energy and demand forecasts indicate these requirements. This process ensures that transmission service delivery to our customers meets the jurisdictional, contractual and National Electricity Rule obligations, including the reliability standards as determined by the NSW Government.

The following projects feature in TransGrid's Annual Planning Report for 2011 and fall into three categories: completed, committed and those which have passed the regulatory process. This list is by no means definitive; more information is contained in the Annual Planning Report for 2011.

### Completed Network Developments

The following works have been completed in the year since publication of TransGrid's Annual Planning Report 2010:

- The Tamworth – Armidale 330 kV No. 86 line has been upgraded. This provides increased power transfer capability between Tamworth, Armidale and Queensland.
- Conversion of the existing Bayswater – Mount Piper and Mount Piper – Bannaby lines, which operated at 330 kV, to operate at their design voltage of 500 kV. This improves supply capability to the Newcastle/Sydney/Wollongong load area. This project entailed the provision of 350 MW of network support capability for the Newcastle – Sydney – Wollongong area for summer 2008/9.
- Establishment (together with Ausgrid) of a 330/132 kV substation at Tomago adjacent to Tomago 330 kV Switching Station with two 375 MVA 330/132 kV transformers, to address limitations in the network supplying the Newcastle and lower mid north coast areas.
- Equipment has been replaced at Dapto 330/132 kV Substation to ensure that the fault rating meets the required level.
- Transformers were replaced or augmented at Sydney North and Sydney South 330/132 kV Substations.
- A shunt reactor has been installed at Sydney South 330/132 kV Substation to assist with voltage control under certain loading conditions.

### Committed Network Developments

The Annual Planning Report describes projects and options which are proposed to meet present and emerging constraints in the network over the coming five years.

TransGrid has committed to the following network developments and the works are proposed for completion by the dates shown:

- New 330/132 kV substations at Holroyd and Potts Hill together with 330 kV connections by transmission line and underground cable to increase supply capacity to the Sydney CBD and Inner Metropolitan Area. The works are expected to be completed by summer 2013/14.
- To meet limitations in the area supplying Inverell a new Glen Innes – Inverell 132 kV line is being constructed with completion expected in 2011.
- To increase the capacity of the network supplying the Orange Area works including a new switching station at Orange North, rearrangements of lines supplying Orange 132/66 kV Substation and other works are being undertaken for completion in 2012.
- To meet reliability of supply to the ACT a new Williamsdale 330/132 kV Substation is being constructed and is due for completion by late 2011.

Additionally, the following works are proposed for completion by the dates indicated:

- New Kempsey – Port Macquarie 132 kV line by late 2011.
- Manildra – Parkes 132 kV line by early 2012.
- Wallerawang 132/66 kV Switchyard relocation by early 2014.
- Beaconsfield West 330/132 kV Substation 132 kV equipment replacement by late 2012.



### Network Developments which have completed the regulatory process

Following are some of the proposals which have completed the regulatory process but are not yet committed projects:

- Supply to the Far North Coast;
- Supply to the Lower Mid North Coast;
- Development of Southern Supply to the ACT;
- Supply to the Tomerong/Nowra Area;
- Reinforcement of Supply within the Sydney CBD;
- Capacity of the Marulan – Avon, Marulan – Dapto and the Kangaroo Valley – Dapto 330 kV lines; and
- Wallerawang – Orange 132 kV line 944 Replacement and Upgrade.

Furthermore, regulatory consultations have commenced or are anticipated to commence soon for limitations in the following areas:

- Southern Sydney;
- Forster/Tuncurry area;
- Gunnedah/Narrabri/Moree areas;
- Kew, Laurieton and Lake Cathie areas; and
- Beryl area.

## Network Constraints

### Constraints expected within five years

The following are some of the constraints described in Chapter 6 of the Annual Planning Report for 2011 which are expected to emerge within the next five years:

- Supply to Southern Sydney;
- Capacity of the Snowy to Yass/Canberra 330 kV System;
- Supply to the Forster/Tuncurry Area;
- Supply to the Kew, Laurieton and Lake Cathie Areas;
- Supply to the Gunnedah, Narrabri and Moree Areas;
- Supply to Beryl; and
- NSW – Queensland Transmission Capacity.

### Constraints expected beyond five years

These are some of the constraints that are anticipated to emerge sometime beyond five years from now:

- Yass – Bannaby and Yass – Marulan 330 kV Lines;
- Hunter Valley – Tamworth – Armidale 330 kV System;
- Further Development of Supply to the Newcastle – Sydney – Wollongong Area;
- NSW – South Australian Interconnection; and
- NSW – Victoria Interconnection.

## Asset Replacement and Refurbishment

TransGrid has a systematic approach to asset management based on a best industry practice model. Within this framework the condition and performance of the transmission and associated network assets is effectively monitored, maintained and developed to meet customer and stakeholder expectations. One of the significant challenges is that works must be undertaken in a manner that ensures services to customers are maintained at acceptable levels. Below are some key projects which have been an outcome of this framework:

- Replacement of a 250 MVA bank of single phase 330/132 kV transformers at Sydney South Substation with a new standard 375 MVA three phase unit.

- Rehabilitation of Upper Tumut Switching Station will progressively continue until completed in 2014.
- Replacement of the Beaconsfield West 132 kV busbar and equipment with a new generation gas insulated installation.
- Replacement of the Secondary system associated with the 330 kV busbar at Dapto with a new modular secondary system installation.
- Reconstruction of Cooma 132/66 kV Substation is expected to be completed by 2014.