PART III:
SERVICE DELIVERY CAPABILITY

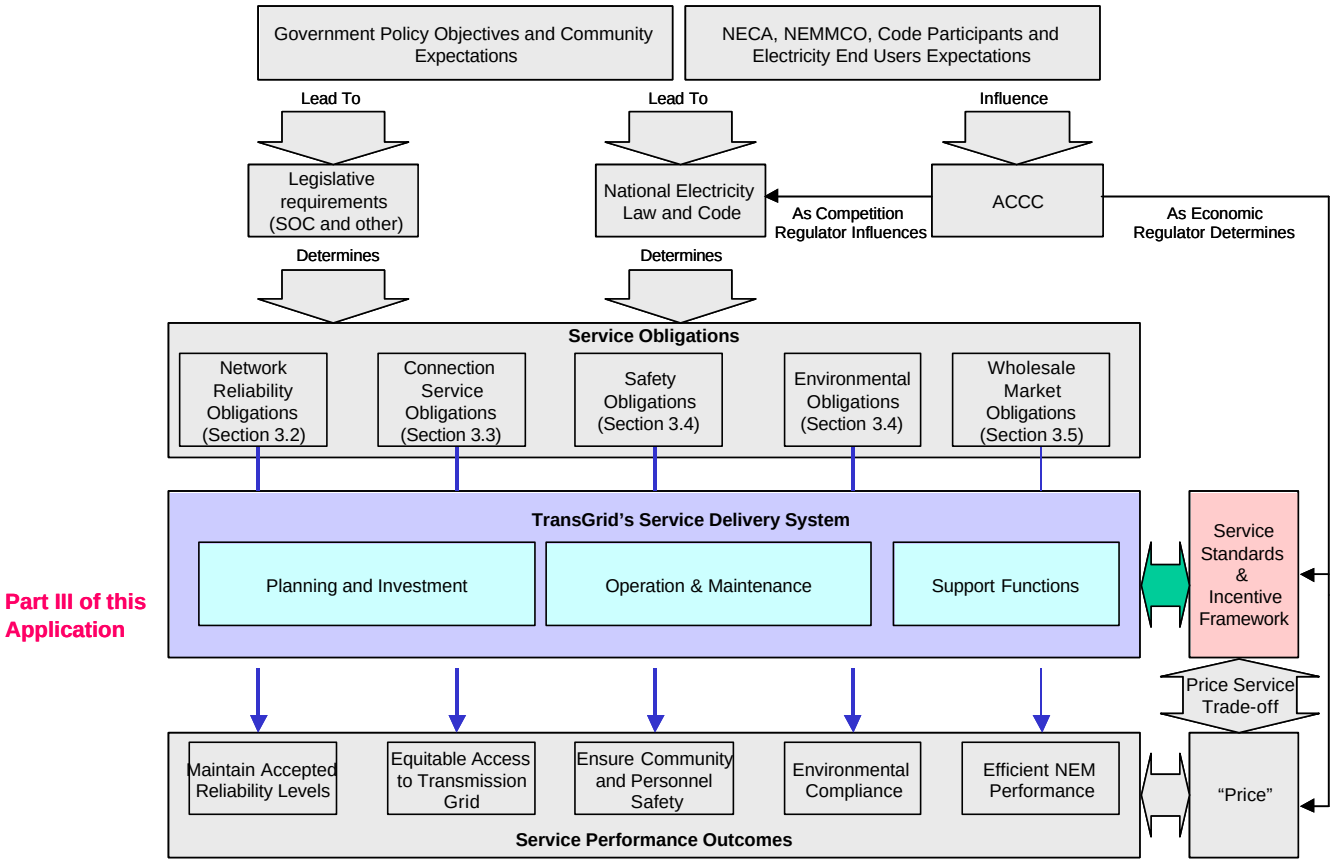
Part III of this Application outlines:

- The processes and capability that TransGrid has to ensure that the network has sufficient capability to meet service obligations, electricity end user needs and expectations, and load growth requirements.
- The process and capability that TransGrid has to operate, maintain, and support the network.

There are three Chapters in this Part as follows:

- Chapter 5 – Service Delivery Systems – Developing Capability.
- Chapter 6 – Operating Expenditure – Getting the Incentives Right.
- Chapter 7 – Service Performance and Operating Standards.

Figure 2-1: Framework for Business Operations and Service Delivery



5 Service Delivery Systems – Developing Capability

This Chapter describes TransGrid's approach to ensuring that the network has sufficient future capacity to meet TransGrid's service obligations in relation to network reliability, connection services, safety, the environment and the market.

In particular, it addresses the way in which future requirements, likely to be imposed on the network, are quantified and the processes by which TransGrid's ability to meet those requirements are maintained.

TransGrid's capital expenditure can be broadly grouped under three categories, namely expenditure associated with:

- growth in demand and/or generation developments;
- maintaining network capability; and
- supporting the business.

These are discussed in the following sections.

5.1 Demand Growth and Generation Developments

The bulk of TransGrid's capital expenditure falls within this category. The magnitude and timing of that expenditure is dependent on:

- the obligation to provide a safe and reliable transmission system for NSW electricity end users, which is reflected in TransGrid's planning process and practices;
- the demands placed on the network, which are a function of:
    - demand growth, particularly within the State but also within the NEM;
    - operation of existing generators; and
    - generation developments within the NEM.

These are addressed in the following sections.

5.1.1 TransGrid's Planning Process

TransGrid's planning process, which is shown in Figure 5-1, is essentially the same as that used by transmission network owners in most other developed countries. It recognises and incorporates the requirements of the Code, particularly those introduced in the Network and Distributed Resources package. It is transparent, incorporating several stages of community consultation from "network limitation identification" through to project implementation. Typically network limitations are publicised in Annual Planning Reports for a number of years. For significant limitations, specific "needs statements" are also published. Those statements seek community input on both TransGrid's approach to identifying the limitations and options to relieve those limitations. Feedback from community consultation is incorporated in subsequent stages of the planning process.

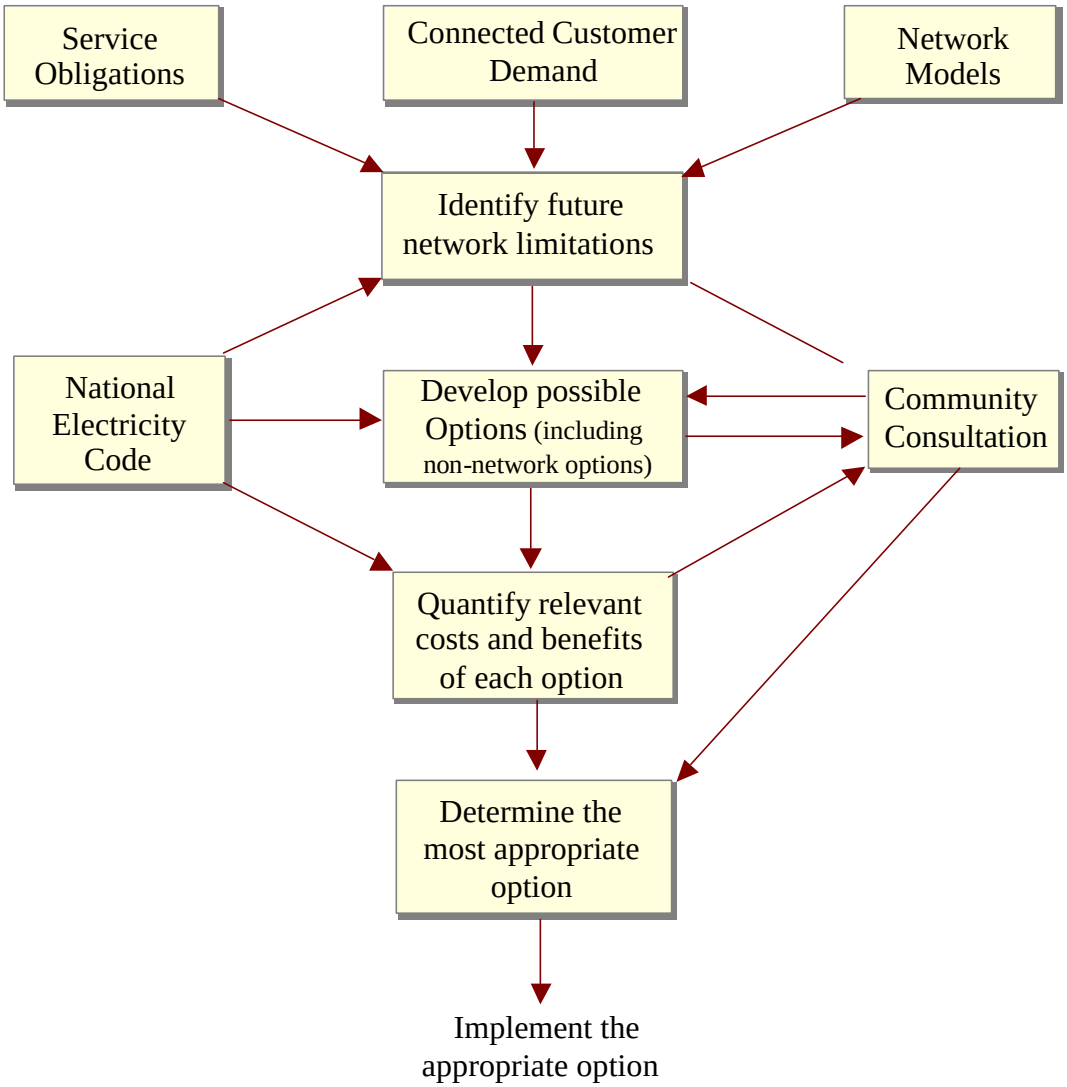
Application of the Regulatory Test is another important facet of the planning process. It is the mechanism by which the most appropriate and efficient option is determined.

Another key input to the process is TransGrid's service obligations including, in particular, what is commonly described as "planning criteria". TransGrid's planning criteria are well established,

having been developed over many years to meet the requirements of electricity end users in the State. They incorporate jurisdictional requirements and have been subject to public scrutiny for many years through publication of Asset Management Plans, Annual Planning Statements and Annual Planning Reports.

A recent independent review of the planning criteria, which compared them to other Australian TNSPs as well as practices in the USA, England and New Zealand, concluded that TransGrid's criteria are "comprehensive; more detailed than most and did not differ greatly on the essential points of planning criteria from other transmission authorities".

Figure 5-1: TransGrid's Planning Process



TransGrid undertakes joint planning with all connected customers as well as interstate TNSPs. This ensures that evolving customer requirements, such as increasing demands, are incorporated in the planning process. It also ensures that limitations within both TransGrid's network and DNSPs' networks are considered and that the overall most effective options to relieve them are adopted.

An integral part of the planning process is consideration of non-network options to relieve network limitations. These options are actively sought from Code Participants and interested parties through various consultation documents such as Annual Planning Reports, needs statements and specific requests for proposals for demand management solutions, as well as in consultation undertaken as part of the regulatory approval process.

In undertaking the consultation process TransGrid is required to consider "other reasonable *network* and non-network options to address the actual or potential *constraint* or inability to meet *network* performance requirements". "Other reasonable *network* and non-network options include, but are not limited to, *interconnectors*, *generation* options, demand side options, *market Network Service* options and options involving other *transmission* and *distribution networks"* (refer to C5.6.2A (b) (4) (vi)).

In addition, in undertaking the regulatory test, TransGrid is required to identify the option that either maximises the net present value of the market benefit, or alternatively minimises the net present value cost of meeting the relevant network performance standards. This requirement implies consideration of feasible non-network options.

Any services that are provided as a result of this process, including non-network options, are eligible for recognition in the setting of the MAR by the Commission and would be treated as prescribed services. The costs of providing these services would be similarly recovered via the current pricing arrangements described in Chapter 6 of the Code. Any assets that are installed to support a non-network solution should be treated as network assets and included in the regulated asset base.

TransGrid has continued to strengthen its planning processes, particularly through:

- development of a more structured process to assess planning options and develop cost estimates (referred to internally as the "pre-planning process");
- improving demand forecasting capability; and
- increasing planning resources.

The "pre-planning" process ensures that the feasibility, scope, timing, cost and risks of each option being considered are adequately assessed. It involves liaising with all relevant TransGrid business units and external agencies to identify the option that best suits the requirements of all stakeholders.

The process utilises the "freedom" available at the planning stage, before any option is selected, to canvass a range of options and to identify the impacts and requirements of each. Formalisation of the process ensures that the evaluations are carried out in a consistent fashion and to an appropriate level of detail, which improves the "quality" of information used in the option selection process.

The initiating step in the pre-planning process is the Project Scoping Report that outlines the need for the project, possible solutions and a time frame for implementation of the finally selected option.

The next step involves liasing with all relevant internal and external stakeholders to identify the important issues and review the engineering feasibility of all potential options. The project Feasibility Report reviews the possible technical options as well as the environmental, construction, and operational risks, Health and Safety issues and the proposed construction programme. The report also provides cost estimates for the identified feasible options.

A Project Delivery Strategy Report is then prepared which focuses on the agreed feasible options and explores the community consultation and perceived risks in greater detail and also reviews the estimated costs and construction programme.

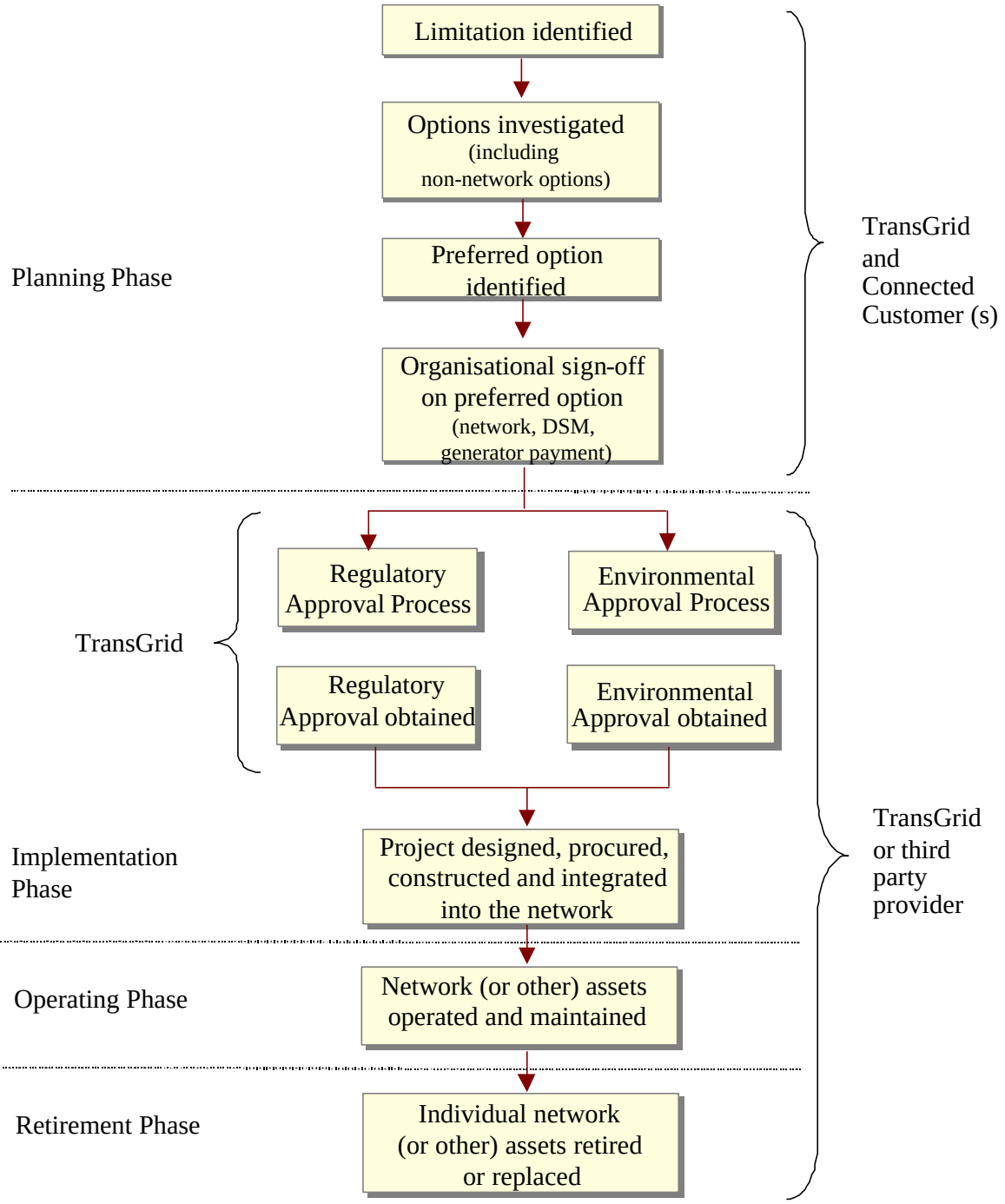
The outcomes of this preparatory work and ongoing planning studies are used to prepare a Project Justification Report and Project Definition Report which form the basis for organisational sign off to commence the regulatory approval process. This approval process is carried out in accordance with the National Electricity Code and formal consultations with Code participants, interested parties and broader community.

This process is described more fully in Attachment 12 "Major Capital Works Project Pre-Panning and Organisational Sign-Off". Before the development of a new network asset with a value in excess of $1 M TransGrid is required to carry out a public consultation process which includes undertaking the regulatory test that has been promulgated by the ACCC (Clause 5.6 of the NEC).

This planning process integrates with the network capability development process shown in Figure 5-2 below. It is coordinated with subsequent phases, particularly the implementation and asset retirement phases. For example:

- Community consultation in the implementation phase complements and builds on that in the planning phase.
- Specific operational considerations, such as maintenance requirements, may need to be considered during the planning phase.
- Retirement of assets affects network capacity and hence the onset of network limitations.

Figure 5-2: Network Capability Development Process

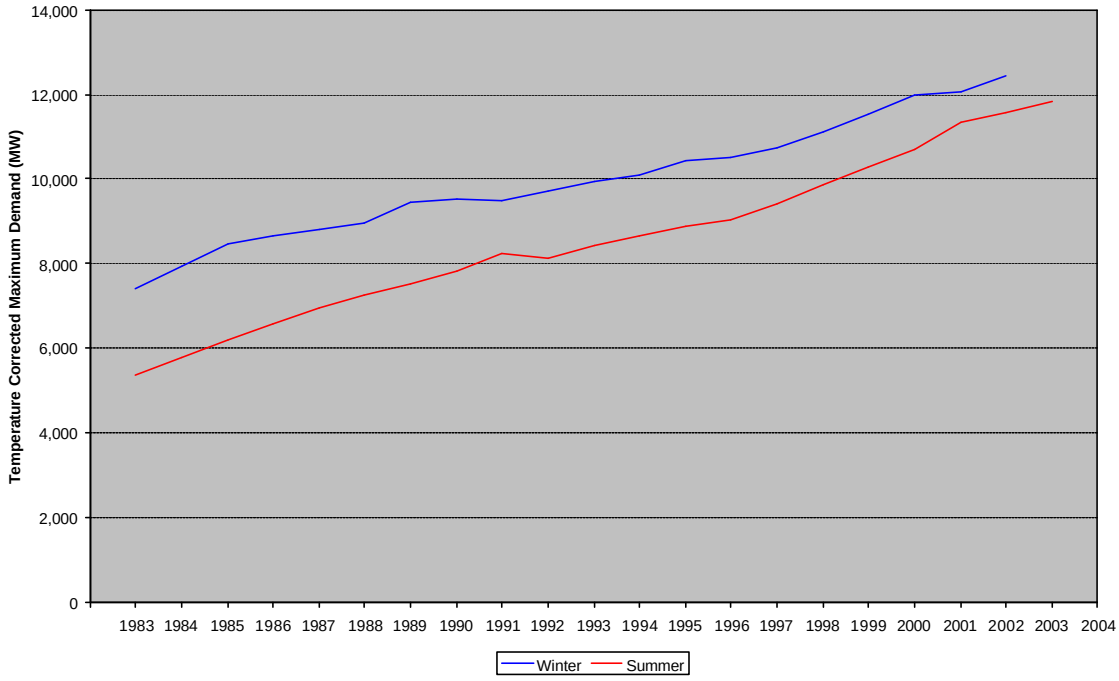


5.1.2 Demand Growth

As indicated in Section 4, summer demand growth within NSW has been at the upper bound of that anticipated prior to the current regulatory period and winter maximum demands have been very close to those anticipated.

Figure 5-3 below shows historical New South Wales temperature corrected maximum demands over the last 20 years. Over this period, the temperature corrected winter maximum demand has grown by 2.4% per annum and summer by 3.5% per annum, such that summer maximum demands are now very similar to the winter maximum demands.

Figure 5-3: Historical NSW Maximum Demands



Strong growth, particularly in summer, is expected to continue. Figures 5-4 and 5-5 show forecast 50% probability of exceedence summer and winter maximum demands for the medium, high and low economic scenarios developed for NEMMCO for the 2003 Statement of Opportunities.

Figure 5-4: Forecast New South Wales Summer 50% PoE Maximum Demands

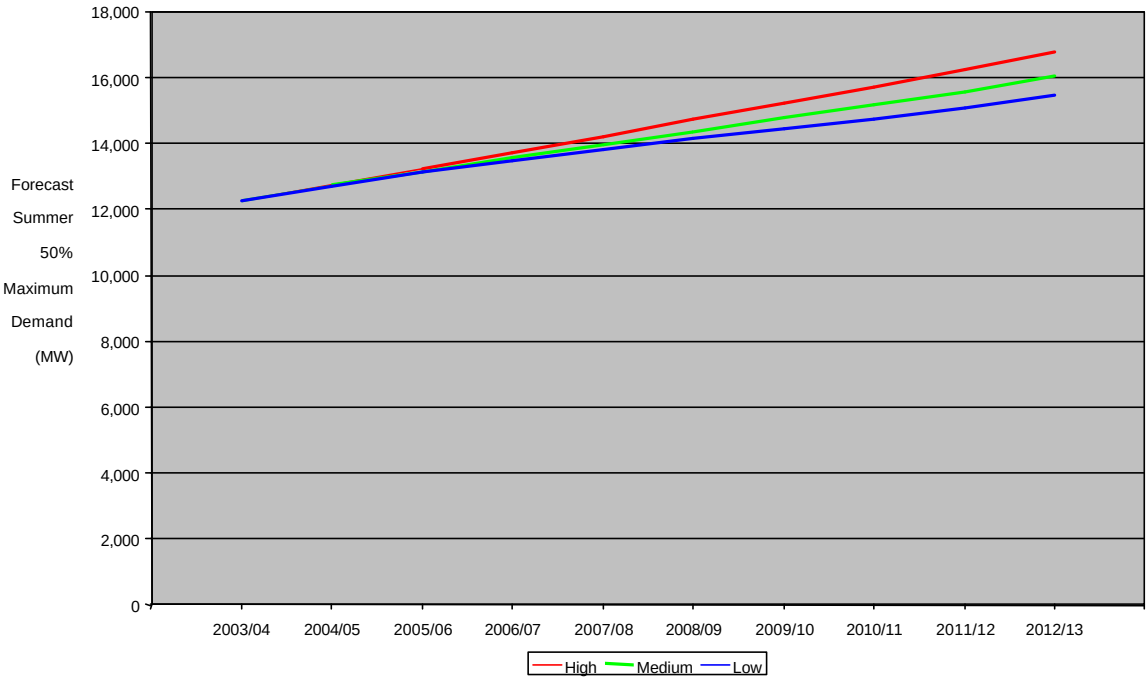
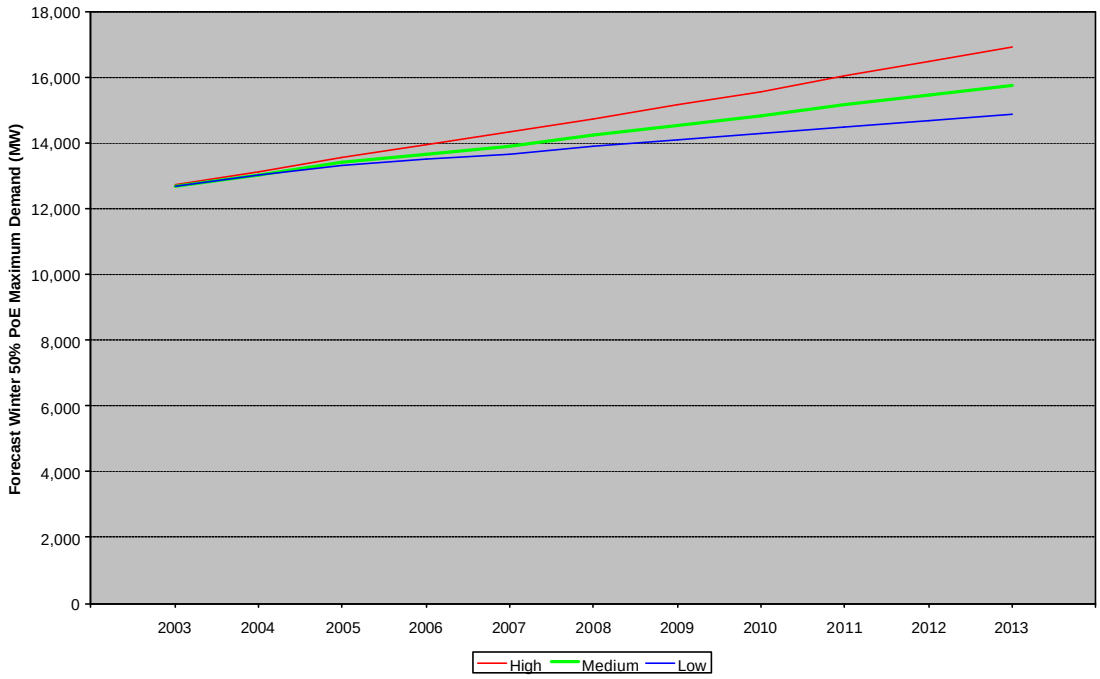


Figure 5-5: Forecast New South Wales Winter 50% PoE Maximum Demands



Under the medium economic scenario, the winter and summer 50% probability of exceedence demands are predicted to grow at 2.2% p.a. and 3.1% p.a. respectively over the forecast period. These growth rates are slightly lower than the actual rates experienced over recent years.

State annual peak demands are expected to occur consistently in summer in the latter half of the decade. However, the lower equipment ratings associated with high summer ambient temperatures and high reactive demands associated with air conditioning have already resulted in the loading on parts of TransGrid's network being more onerous in summer than in winter. This trend is set to continue. The transition to network limitations occurring over summer will necessitate an increased rate of network reinforcement to accommodate the higher summer demand growth.

In addition to the "normal" demand growth, a number of major industrial developments have been proposed. For example, the demand in the greater Newcastle area could potentially double within the upcoming regulatory period. Should one or more of the proposed developments proceed, it is likely that an additional transmission line to the Newcastle area, together with a switching station to marshal the new and existing lines, would be required. The origin of the new line would depend on the location of new or expanded generation developed to supply the additional demand.

5.1.3 Generation Developments

The location and operating regimes of additional generation can have a marked impact on loadings on, and hence the capability of, TransGrid's network. During the next regulatory period, additional generation will be required within New South Wales. The 2003 Statement of Opportunities prepared by NEMMCO indicates that up to approximately 1,600 MW could be required. It also refers to possible additional generation at Wagga, Tallawarra (Illawarra area), Tomago (Newcastle area) and Redbank (upper Hunter Valley).

Developments elsewhere within the NEM can also be critical. NSW plays a central role in the NEM as a result of both its geographical location and its flexible generating plant, which is able to vary its output over a significant range without excessive reductions in efficiency.

In the period covered by this revenue determination, both Queensland and Victoria are expected to rely on imports from NSW at times of high demand and often export to NSW at other times.

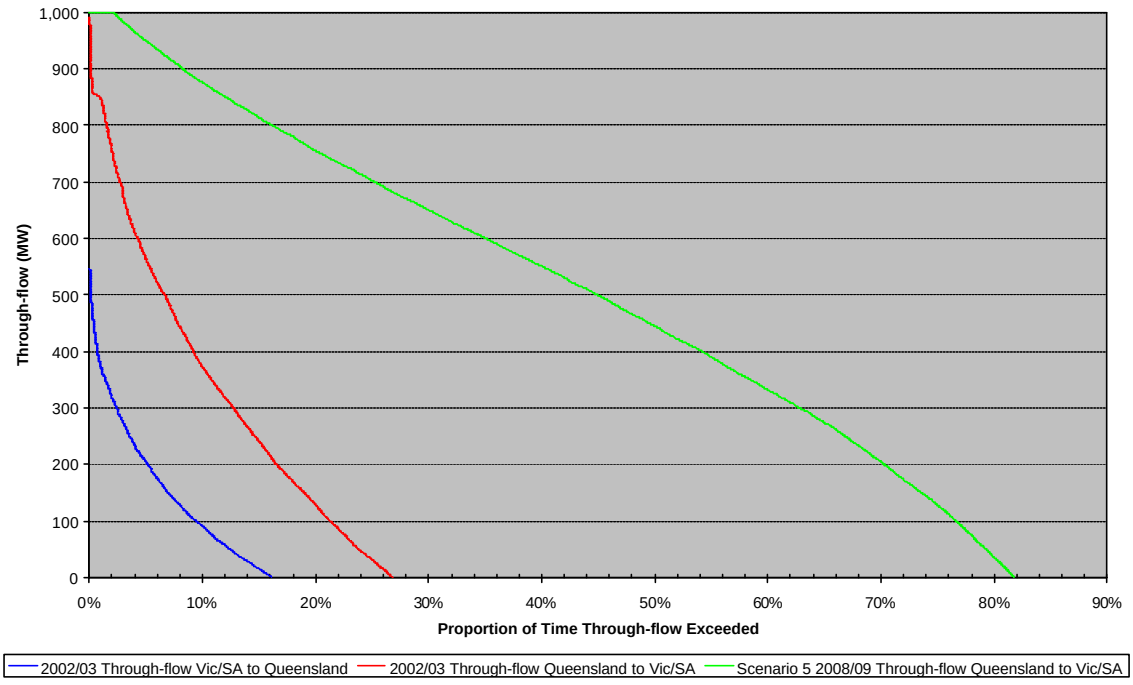
The 2003 Statement of Opportunities refers to two additional power stations in Queensland, both proposed to be connected to QNI, as well as additional and up rated generators in Victoria and South Australia.

The commissioning of QNI has allowed the benefits of reserve sharing and opportunity energy flows between Queensland and the southern states to be realised. It also allows through-flows of energy (in both directions) between Queensland and Victoria/South Australia, via the NSW network.

In 2002/03, through-flow occurred for over 40% of the time (approximately 16% of the time northwards and 26% southwards). By 2008/09 through-flows are expected to prevail for much of the year, primarily in a southward direction. Figure 5-6 shows the magnitude and duration of actual through-flows for 2002/03 and those anticipated for 2008/09 under a likely generation development scenario.

In facilitating operation of the NEM in the next regulatory period, it is expected that the NSW network will be required to accommodate increased through-flows of energy.

Figure 5-6: Historical and Anticipated Interstate Flows via the NSW Network



Scenarios

To address the uncertainty associated with future demand and generation developments, a number of demand/generation scenarios with associated probabilities of occurrence were developed by ROAM Consulting, a consultant skilled in market modelling. For each of the scenarios the necessary network developments and associated capital expenditure requirements were identified. The capital expenditure streams for each scenario have been used to identify an envelope within which future capital expenditure is likely to lie and, together with the associated scenario probabilities, the probability weighted average expenditure.

The 16 scenarios developed by ROAM Consulting encompass four demand growth scenarios, two generation development themes, and two energy policy themes, namely:

- The demand growth scenarios are the high, medium and low economic growth scenarios from NEMMCO's 2002 Statement of Opportunities, together with a fourth based on medium economic growth combined with major industrial developments proceeding.
- The generation themes considered major new generation being primarily either in the north or the south.
- The energy policy themes considered either implementation or non-implementation of the New South Wales Greenhouse Benchmark Scheme.

The probability of each of the scenarios is shown in Figure 5-7 below. The associated capital expenditure streams are shown in Figure 5-8 below. Table 5-1 gives the probability weighted average capital expenditures.

Figure 5-7: Scenario Probabilities

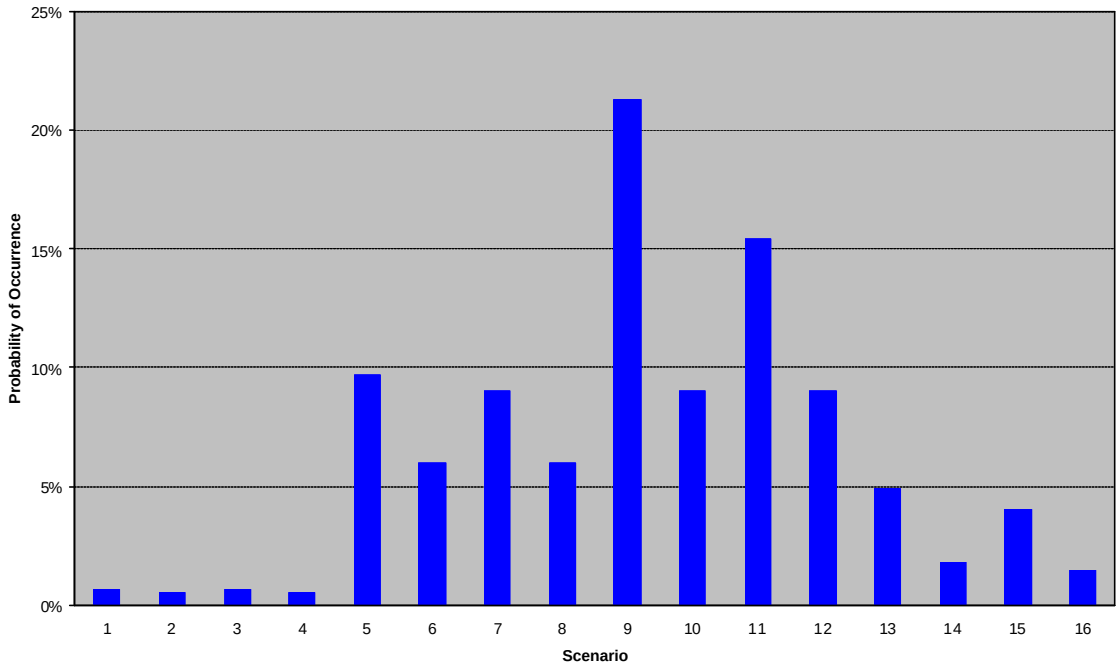


Figure 5- 8: Scenario Capex Streams

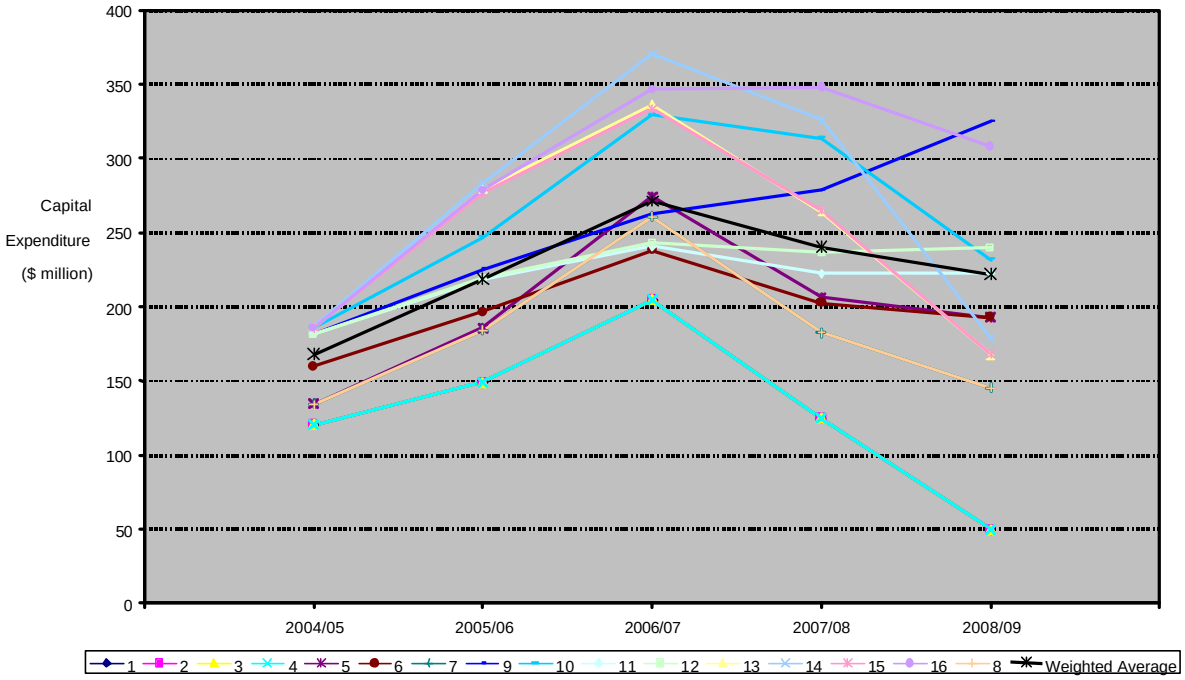


Table 5-1: Probability Weighted Average Expenditures

	2004/05 ($ million)	2005/06 ($ million)	2006/07 ($ million)	2007/08 ($ million)	2008/09 ($ million)	Total ($ million)
Probability Weighted Average Demand and Generation Dependent Expenditure	168	219	271	240	222	1,121

Major Projects

Over the next regulatory period TransGrid proposes to undertake a number of projects throughout the State (subject to regulatory and environmental approvals) to maintain adequate levels of network reliability. Amongst the major projects proposed are:

- Establishing the initial stages of a 330kV network on the NSW mid north coast, an area that is experiencing rapid population growth and associated demand for electricity. This entails, inter alia:
  - construction of a 330/132kV substation at Coffs Harbour;
  - construction of a 330kV line between Kempsey and Port Macquarie;
  - reconstruction of an existing 132kV line from Armidale to Kempsey as a 330kV line; and
  - establishment of a 330/132kV substation near Port Macquarie.
- Establishment of a new 330/132kV substation at Holroyd and up rating of Liverpool and Vineyard substations to accommodate increasing demands resulting from population growth in the western parts of the greater Sydney area.
- Construction of a second 330kV line to Wellington and establishment of a switching station at Wollar to improve security of supply to the central west of NSW.

- Construction of a 330kV line between Yass and Wagga to accommodate increasing demands for electricity in southwestern NSW. This development would be complemented by construction of additional 132kV lines and an additional 132/66kV substation within the area.

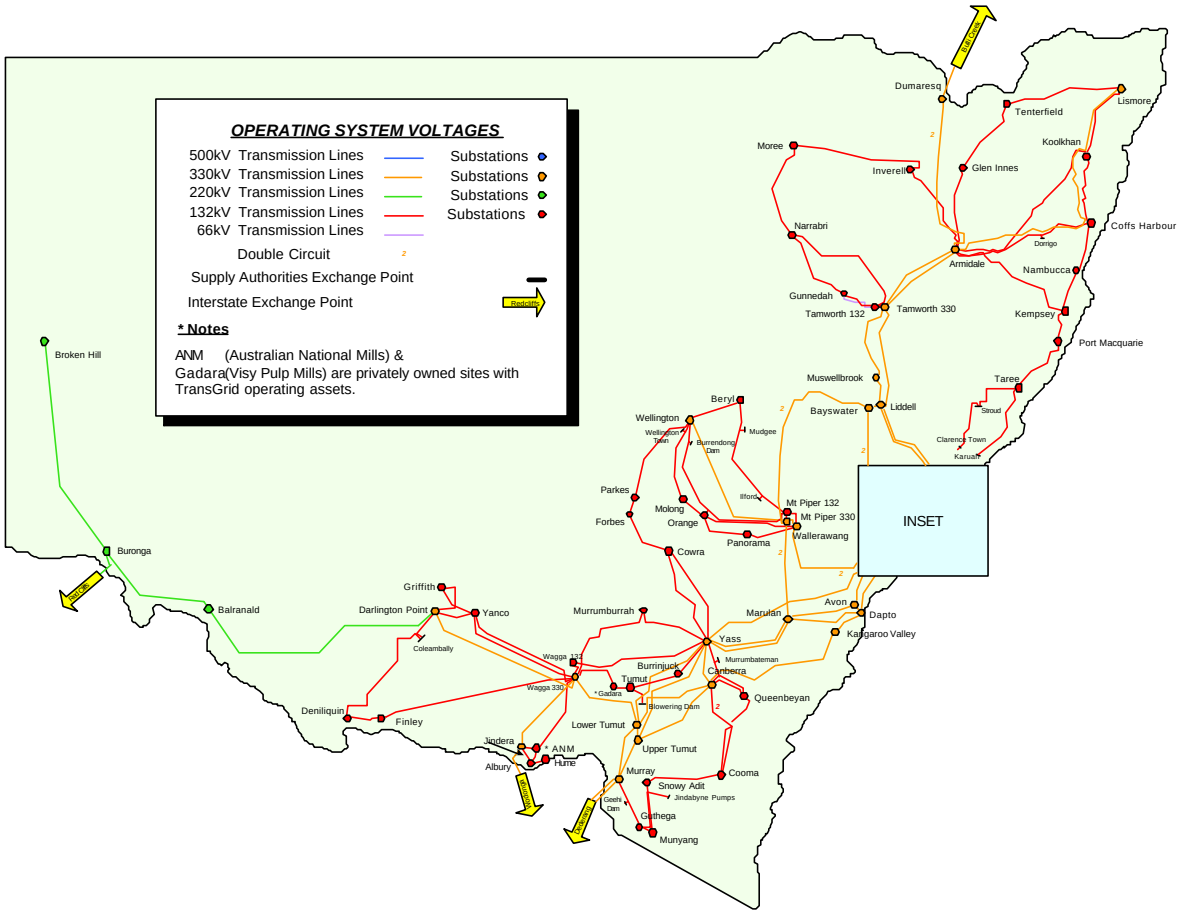
Further details of projects proposed and constraints expected to arise over the next ten years are provided in TransGrid's 2003 Annual Planning Report (Attachment 4).

One major project currently being investigated, but not included in any of the scenarios, is NewVic 3500. This is because of the current level of uncertainty about the cost, timing and market benefits of this development. NewVic 3500 is referred to in NEMMCO's 2003 Statement of Opportunities (page 4-10) and involves possible high voltage direct current developments that would add considerable transmission capability between NSW and Snowy and Victoria.

On completion of present investigations, should this project (or other projects not included in the scenarios) pass the regulatory test and be initiated within the next regulatory period, TransGrid would seek to have the associated costs passed through.

Figure 5-9 shows TransGrid's network as it is expected to be at the beginning of the next regulatory period.

Figure 5-9: TransGrid Network at July 2004



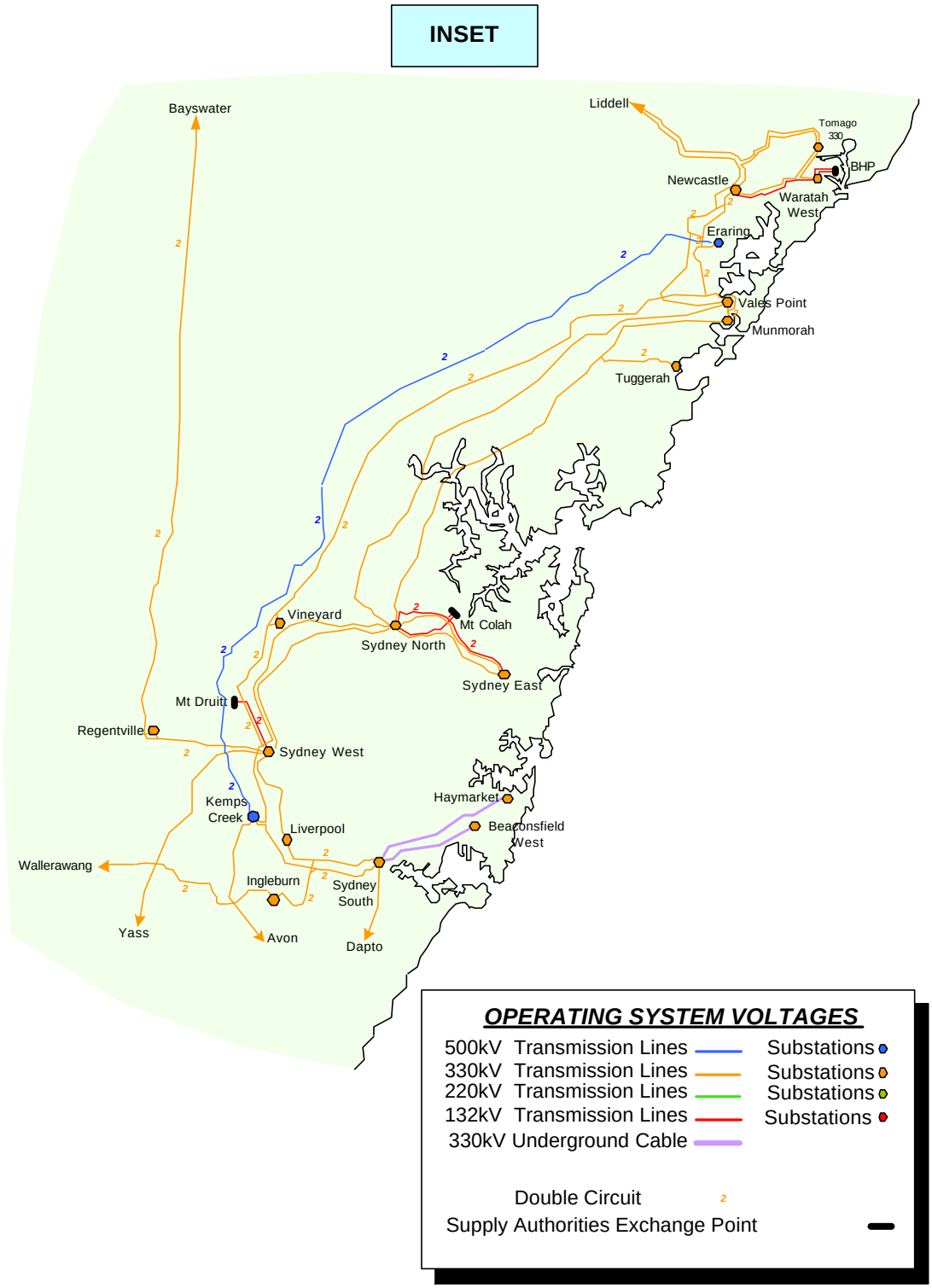
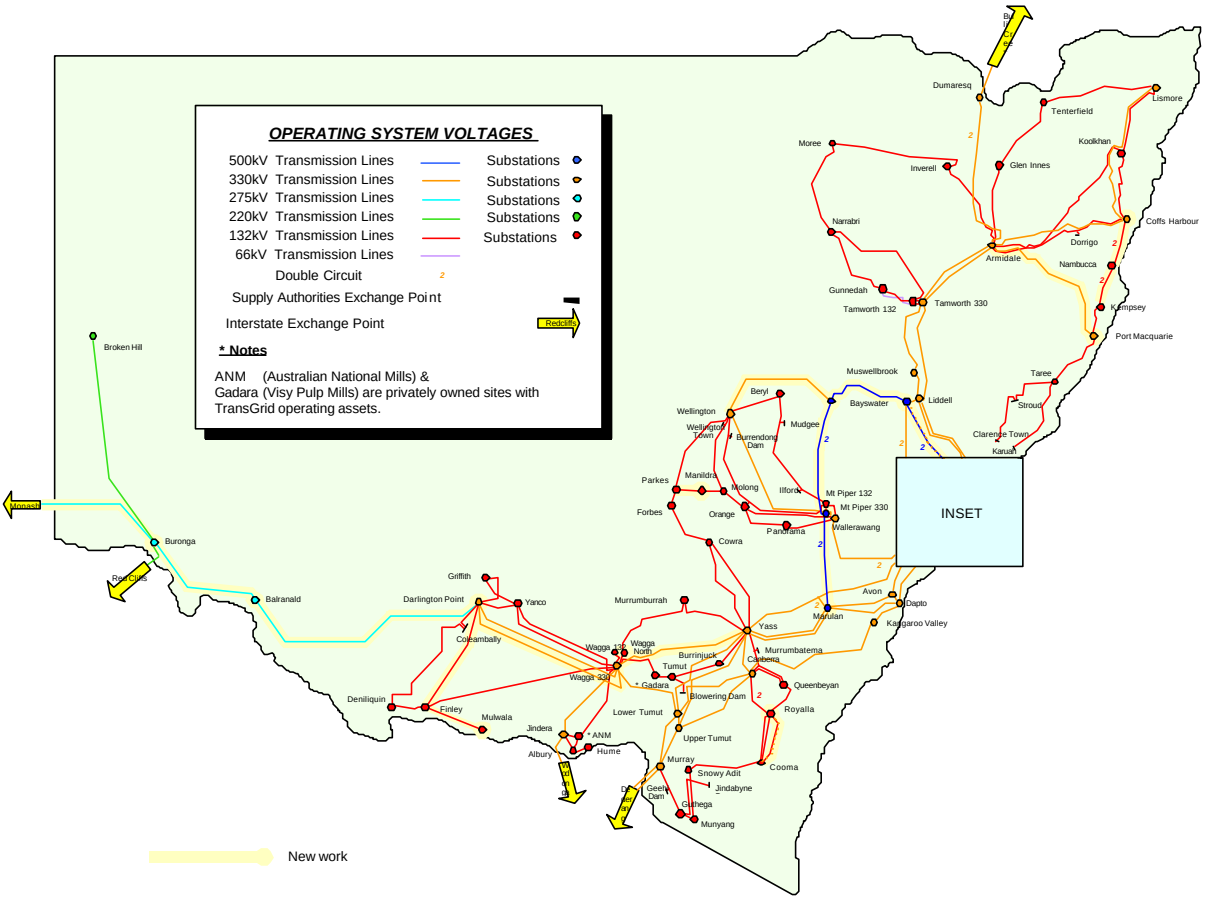
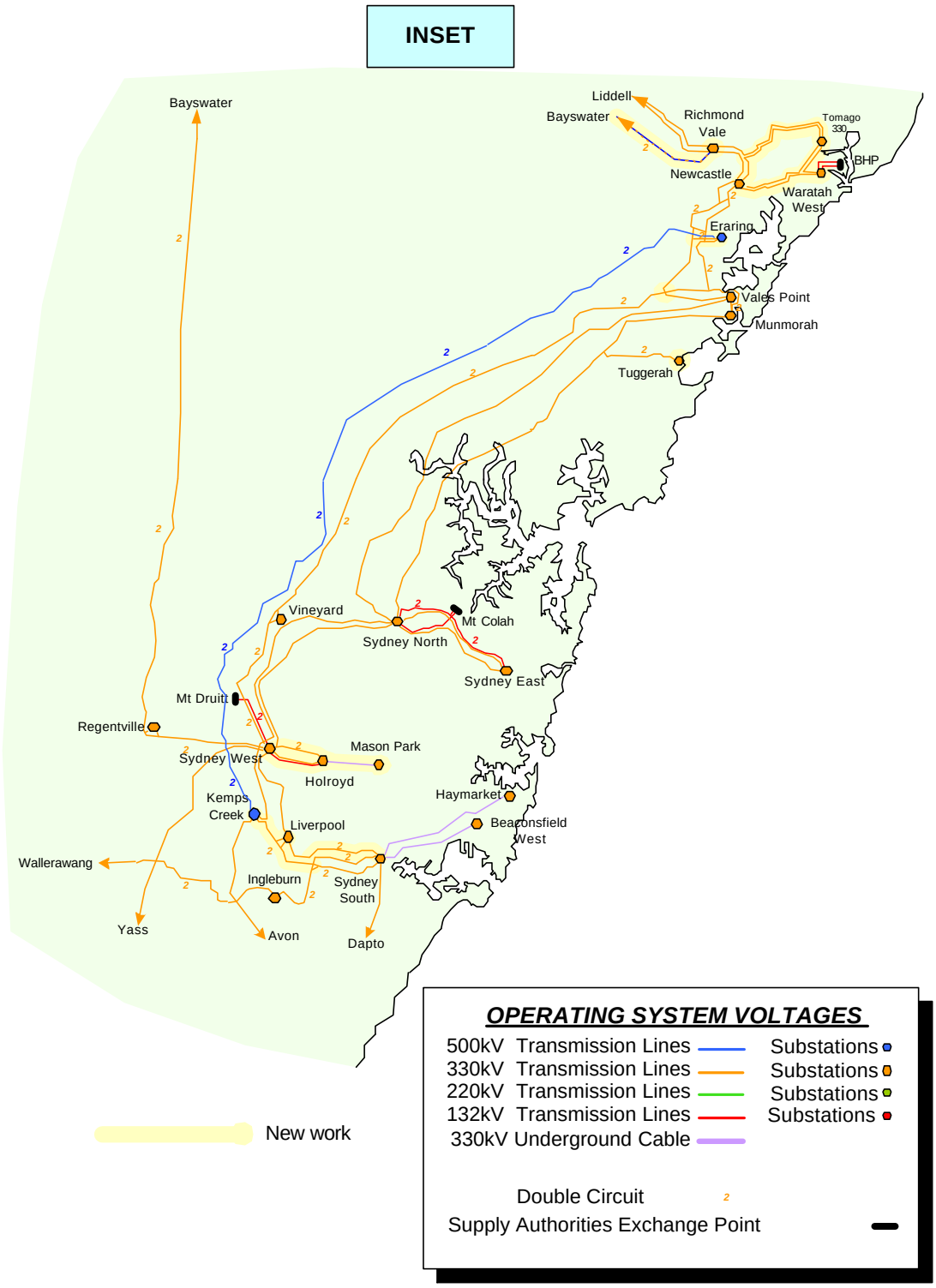

INSET
Bayswater
Liddell
Tomago
330
BHP
Newcastle
Waratah
West
Eraring
Vales Point
Munmorah
Tuggerah
Vineyard
Mt Colah
Sydney North
Sydney East
Mt Druitt
Regentville
Sydney West
Kemps
Creek
Haymarket
Beaconsfield
West
Liverpool
Wallerawang
Ingleburn
Sydney
South
Yass
Avon
Dapto
OPERATING SYSTEM VOLTAGES
500kV Transmission Lines
Substations
330kV Transmission Lines
Substations
220kV Transmission Lines
Substations
132kV Transmission Lines
Substations
330kV Underground Cable
Double Circuit
Supply Authorities Exchange Point

Figure 5-10 shows the network including prospective major developments to June 2009. While each of the prospective developments is required under one or more scenarios, not all are required under any one scenario.

Figure 5-10: Network Showing Prospective Major Developments to June 2009

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Liddell
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Richmond Vale
Tomago 330
BHP
Newcastle
Waratah West
Eraring
Vales Point
Munmorah
Tuggerah
Vineyard
Mt Colah
Sydney North
Sydney East
Mt Druitt
Regentville
Sydney West
Mason Park
Holroyd
Kemps Creek
Liverpool
Haymarket
Beaconsfield West
Wallerawang
Ingleburn
Sydney South
Yass
Avon
Dapto
New work
OPERATING SYSTEM VOLTAGES
500kV Transmission Lines
330kV Transmission Lines
220kV Transmission Lines
132kV Transmission Lines
330kV Underground Cable
Substations
Substations
Substations
Substations
Double Circuit
Supply Authorities Exchange Point

5.1.4 Network Support

As discussed above, up to approximately 1,600 MW of additional generation could be required within New South Wales during the next regulatory period. It is possible that some of this generation may be capable of providing network support in areas where it is required.

Whilst TransGrid presently has no firm plans to enter into any network support agreements, it is prudent that this revenue determination facilitates such agreements should they be appropriate. In the process of consulting on network development options proposals involving network support agreements have been raised by stakeholders.

TransGrid proposes that a pass-though mechanism, as described in Attachment 13, be incorporated in the determination. It is presently anticipated that should network support agreements be appropriate, the aggregate cost would not exceed $10 million per annum.

5.2 Maintaining Network Capability

The TransGrid asset management model is a well developed and robust business process, which has yielded significant improvements in performance and efficiency over the current regulatory reset period Strategies for the life extension or replacement of network assets are developed as outcomes of the Asset Management Strategy Process described in Attachment 5 and shown in Figure 5-11 below.

At the heart of the process are the various Working Groups that establish the asset management strategies for substations, transmission lines and underground cables, and secondary systems.

These strategies establish the range and scope of TransGrid's asset refurbishment and replacement activities for the future years and are detailed in Asset Management Strategy documentation. Specific strategies include investigations, testing programs and major overhauls or replacement programs required when equipment is not performing, or likely not to perform, its function because of some deficiency.

The determination of the appropriate response or solution to an identified asset management issue is based on prudent safety, environmental, financial and technical considerations. The strategy for a specific asset may involve overhaul, replacement, alternative maintenance or monitoring policies, or modification to the operational limitations of the particular asset. The approved strategy response and associated expenditure is subsequently classified as "operating" or "capital" based on established accounting principles. This section relates to that portion of the expenditure that is classified as "capital".

Expected capital expenditure for refurbishment projects for the next regulatory period is shown in Table 5-2 below.

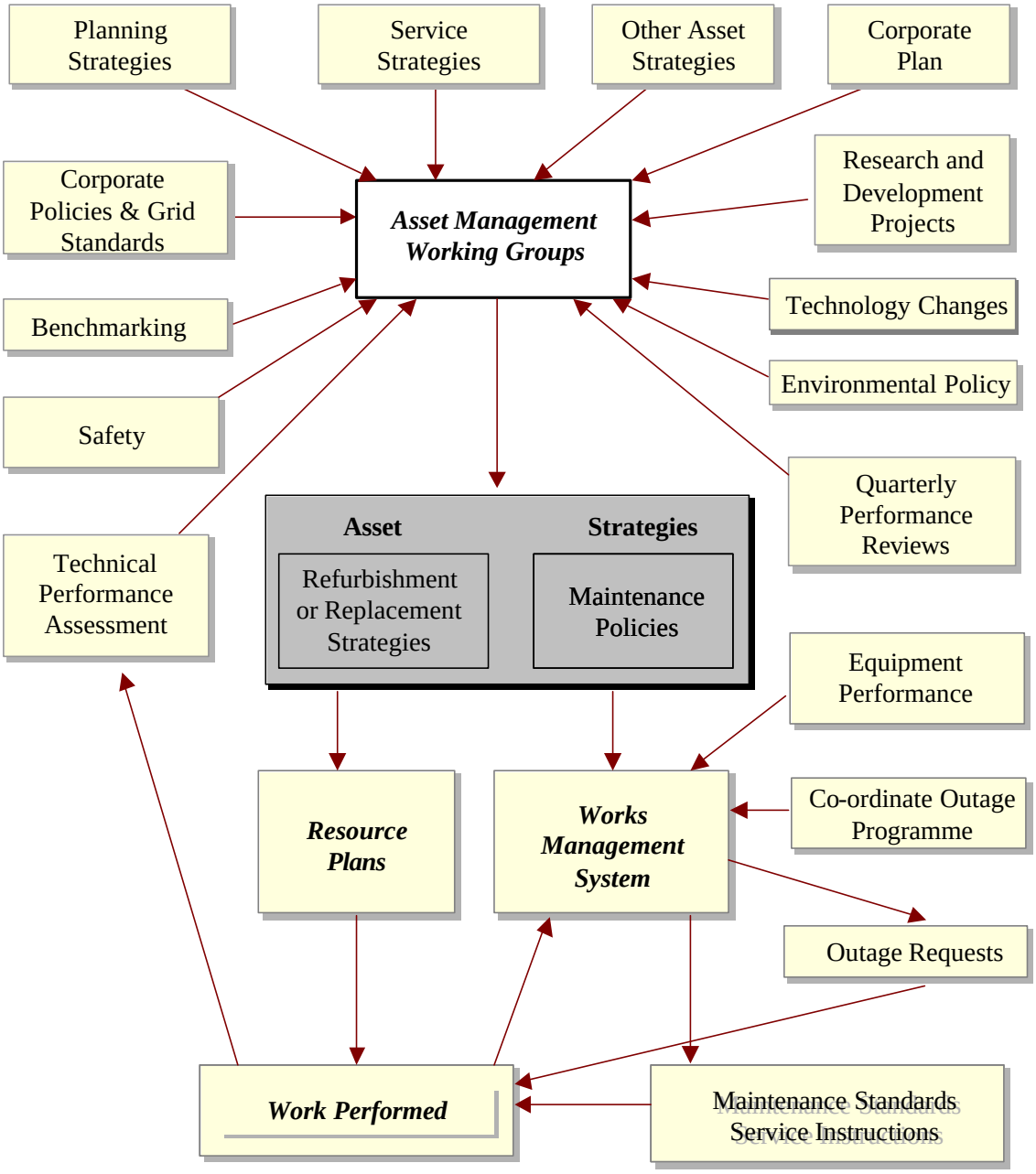
Table 5-2: Expected Refurbishment Capital Expenditure ($ million)

	2004/05	2005/06	2006/07	2007/08	2008/09	Total
Substations	28	18	22	21	20	108
Transmission Lines	4	3	3	2	3	15
Technical Services	4	2	2	2	2	12
Major Asset Security	10	10	10	10	10	50
Total	46	33	37	35	37	186

Included in the programme are:

- Substations – replacement of power transformers, circuit breakers, instrument transformers, surge arrestors and disconnectors.
- Transmission Lines – programmed wood pole replacement, cathodic tower protection, emergency transmission line structures kits, 330kV cable dynamic rating system.
- Technical Services - Installation of DAC outstations, replacement of microwave systems, telephone isolation devices and remote terminal units.
- A programme of security measures for major assets is proposed. This is expected to entail expenditure of approximately $50 million over the next regulatory period.

Figure 5-11: TransGrid's Asset Management Strategy Process



5.3 Supporting the Business

Business support Capex can be divided into three main categories, Information Technology ("IT"), Motor Vehicles/Mobile Plant and Miscellaneous Plant. These are discussed briefly below.

Efficient IT systems are vital for any business that wishes to operate effectively in today's environment. TransGrid's IT investments are controlled through the Information Technology Executive Committee which is tasked with ensuring that an appropriate business case exists prior to projects proceeding. With the increasing number and complexity of the network assets it is essential that staff are able to utilise appropriate technologies to assist in the management of these assets. Wherever possible, TransGrid uses "off the shelf" software and hardware to minimise both the purchase and support costs. Investments over the previous regulatory period included:

- Upgrades necessary as a result of Year 2000 issues.
- System upgrades to ensure supportability of both hardware and applications.
- Implementation of the TransGrid Asset Management Information System ("TAMIS") a graphical information system ("GIS") that is utilised extensively to manage both asset and property information.
- Implementation of an intranet ("TransNet") that is an integral part of our quality system being the delivery mechanism for all of TransGrid's quality documentation.
- Extension of TransGrid's wide area network to include all major substation sites to allow both remote asset monitoring and also staff access to the Corporate Data Network.
- Roll out of a standard operating environment to all desktop and laptop PCs that allows remote help and software delivery.
- Upgrading of TransGrid's IT security infrastructure to strengthen our ability to withstand and repel attack from external sources.
- Replacement of the SCADA system used to monitor and operate the transmission network.
- Upgrading of the Oracle Financial System to a Windows based version, making data entry, business reporting, and cost management more efficient and effective.

Future directions in this area will continue to be tested on a case-by-case basis, to ensure consistency with both the business direction and IT strategy. Possible projects include:

- Updates of the major ERP system to ensure ongoing supportability and increased functionality.
- Replacement of the Energy Management System used to carry out system load flow studies and contingency analysis on the system.
- Intranet upgrade.
- Further security upgrades to ensure compliance with Government standards.

All products and services related to business support capex are competitively sourced to ensure both a fair price and also access to the most up to date proven technologies.

Motor vehicles and mobile plant are essential for the day-to-day operation of the geographically dispersed workforce. In many cases specially equipped vehicles are necessary to allow access to assets located in remote and sometimes inhospitable environments, these vary from costal swamps and dunes through rainforests all the way up to alpine areas that are snow bound for long periods of the year.

Miscellaneous plant includes office machines, workshop equipment, and test equipment necessary to ensure both the condition of the assets and also to run an efficient and effective business.

The expected capital expenditure to support the business is shown in Table 5-3.

Table 5-3: Expected "Support the Business" Capital Expenditure ($ million)

	2004/05	2005/06	2006/07	2007/08	2008/09	Total
Support Expenditure	23	21	20	18	25	107

5.4 Expected Capital Expenditure Requirement

The demands being placed on the NSW transmission system, and the attendant need to reinforce it, are expected to be much greater in the next regulatory period than in the current period, as a result of:

- higher rates of demand growth, due in part to the transition to summer peaks;
- prospective major industrial developments;
- additional generation, the magnitude, location and operating regimes of which are presently uncertain; and
- through-flows of energy to end users in Queensland and Victoria.

TransGrid considers the probability weighted average capital expenditure to be the best estimate of the likely capital expenditure requirement to cater for demand growth and generation developments over the regulatory period.

The expected expenditures, on a cash flow basis in June 2003 dollars, for inclusion in the MAR are shown in Table 5-4 below.

Table 5-4: Expected Capital Expenditures ($ million)

Financial Year	2004/05	2005/06	2006/07	2007/08	2008/09	Total
Demand and Generation Dependent	168	219	271	240	222	1,121
Maintain Network Capability (Refurbishment)	46	33	37	35	35	186
Support the Business	23	21	20	18	25	107
Total	237	272	328	294	282	1,413

6 Operating Expenditure – Getting the Incentives Right

This Chapter addresses the efficient level of operating expenditure TransGrid has determined as necessary to provide transmission services at the standard required by stakeholders. TransGrid's target level of operating expenditure includes expenditure required to maintain the functionality of existing assets and operating expenditure related to planned network growth.

When account is taken of network growth and exogenous cost increases the levels of operating expenditure proposed in this Chapter are lower than would result from a simple roll forward of the Commission's estimate of efficient benchmark expenditure in its 1999 *NSW and ACT Transmission Network Revenue Caps: Decision*.

This Chapter provides a high level explanation of the expenditure targets. This Chapter is organised in the following manner:

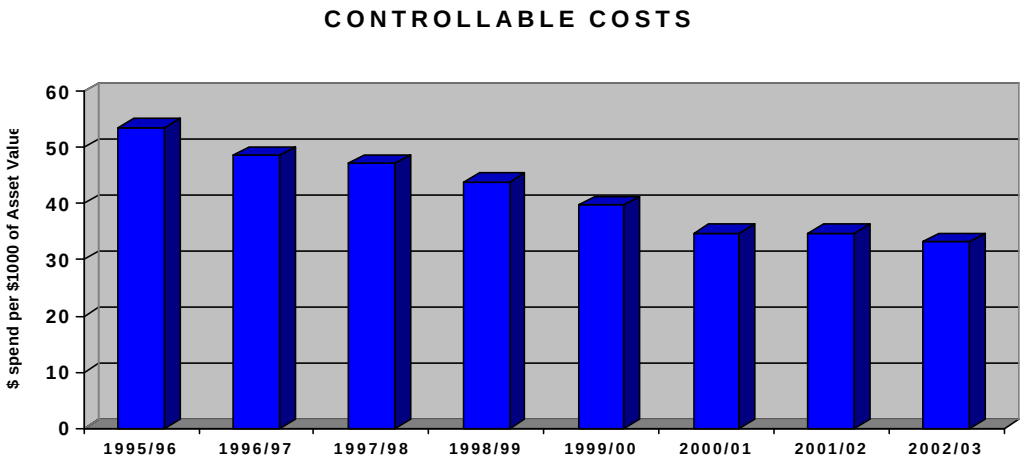
- Background to the nature of TransGrid's operating expenditure activities and its historical trends is provided (Section 6.1).
- The key cost drivers for TransGrid's operating expenditure are discussed (Section 6.2).
- TransGrid's estimates of efficient operating costs for the forthcoming regulatory period and the process by which these have been forecast are explained (Section 6.3).
- The cost effectiveness of TransGrid's operating expenditure proposals is demonstrated (Section 6.4).
- Requirements for settling the operating cost incentive regulation framework are discussed (Section 6.5).
- The discussion in the Chapter is summarised (section 6.6).

6.1 Background

Approximately 80% of TransGrid's operating expenditure relates to direct staff costs or labour hire costs. This includes employment of a highly skilled core workforce and utilisation of contracts for non-core activities or activities that lend themselves to effective competitive sourcing. The use of contract sourcing also provides increased flexibility in managing costs as workload changes.

Since vertical separation in the NSW electricity industry, cost reduction has been a key driver for TransGrid. Since 1999/00 there has been a 25% reduction in operating costs as a percentage of the regulatory asset base despite a significant increase in the average workload (utilisation) performed by those assets. This is shown in Figure 6-1 overleaf.

Figure 6-1: Controllable Costs As a Proportion of Asset Values



The assets TransGrid are maintaining and monitoring are being called upon to meet a wider range of utilisation patterns than ever before due to a combination of rising demand and market driven generation dispatch. This results in shorter 'windows' for taking assets 'offline' when maintenance is required and greater levels of monitoring must be undertaken to ensure that the network is always operating within the system security limits. In addition, the demands of the wholesale electricity market for transmission services and a major network development programme have also increased the difficulties of finding suitable outage windows for maintenance activities.

Similarly, many of TransGrid's assets are now well into their useful life. As assets reach the end of their useful life the level of operating expenditure required to maintain them increases. TransGrid is continually optimising the replacement of these assets when the cost of doing so is less than the cost of maintaining them. Nonetheless, pressure on operating costs is continuing due to the age of TransGrid's existing asset base.

In addition, the pace of demand growth has necessitated considerable investment in new assets (as opposed to replacement capital expenditure). This will see the value of TransGrid's Regulated Asset Base ("RAB") approximately double over the period 1999/2000 to 2008/09. These new assets must also be monitored and maintained placing additional upward pressure on operating expenditure.

These changes in the environment for operating expenditure present a real challenge to TransGrid in efficiently managing costs and minimising the financial burden placed on customers in meeting their needs. Wherever feasible TransGrid has attempted to limit the increase in operating expenditure both during the current regulatory period and projecting forward into the next. However, operating expenditure is a vital component of ensuring system reliability and other key service obligations and encompasses activities as varied as monitoring easements to ensure sufficient clearance of vegetation to assessing constraint equations associated with the safe operation of the network. Underspending on operation and maintenance activities can have the same serious implications for network reliability and security as underspending on capital investments.

6.2 Key Cost Drivers

The key cost drivers for TransGrid's operating expenditure budget include:

- real rates of wage cost increases in the general economy and in the electricity sector specifically;
- network growth;
- ageing workforce;
- increased network utilisation;
- exogenous cost increases (previous examples are discussed in Chapter 4); and
- the capacity to realise further workforce efficiencies above and beyond those already in place.

6.2.1 General Wage Increases that Exceed the Inflation Rate

The general movement in wages and salaries within the wider economy and specifically in the electricity sector has been considerably greater than CPI in the first four years of this regulatory period. The Australian Bureau of Statistics ("ABS") estimates that wage costs in the electricity, gas and water industries have risen at an annualised average of 4.1% compared to a (GST adjusted) CPI increase of only 3.2%.

Given that TransGrid's operating costs are dominated by labour costs, if this trend is continued, TransGrid must find annual efficiencies of 0.9% in order to prevent any increase in real operating costs.

It is expected that real wages in the economy will continue to grow faster than CPI as technological innovation (especially in relation to computing power) and increased capital accumulation increase labour productivity. However, electricity transmission is a mature industry with less scope for innovation and associated productivity improvements than the general economy. Nonetheless, electricity transmission businesses must still compete with other industries for highly skilled labour. Accordingly, increases in real labour costs are likely to continue well into the next reset period.

6.2.2 Network Growth

Increased demand for transmission services has resulted in the need to significantly increase the size of the existing network by investing in more transmission lines and more sub stations. This trend is predicted to accelerate in the next regulatory period resulting in a more than doubling in the value of assets being maintained in the ten years from 1998 to 2009. Inevitably this will place considerable upward pressure on TransGrid's operating expenditure.

6.2.3 Ageing Workforce and Increasing Scarcity of Key Specialist Skills in the Labour Market

The organisation's employee age profile also has a number of impacts regarding recruitment, training and development of staff. A disproportionate number of staff with key skill sets is reaching retirement age.

In addition, the skills and competencies necessary to maintain the range of equipment that exists in the network are in some instances not readily available in the wider market place. At the same time, the demand for certain skills has increased as wholesale Market Participants increasingly recognise the importance of power system analysis in managing risk associated with trading positions.

The reduced supply of key skills combined with increased demand is imposing additional cost drivers including the need to provide undergraduate traineeships in power engineering, and conduct graduate development and apprentice programs.

6.2.4 Increased Network Loads

Population growth and increasing living standards have resulted in increasing demand for transmission services driven by greater economic activity and increased use of appliances such as air-conditioners. Increased network load tends to increase operating expenditure in a number of ways including reduced opportunities for planned outages and an increased need for out of hours work.

As the network is augmented to meet this growing load this issue will become less pressing. However, while this augmentation is occurring more plant outages are required to allow this work to be carried out. This creates a period when network outages are more difficult to achieve because of shorter outage 'windows' but more outages are required to accommodate both maintenance and augmentation needs at the same time. Higher network load is a persisting trend that will continue to place this kind of pressure on operating costs.

6.2.5 Addressing Future Exogenous Increases in Operating Costs

By its very nature it is difficult to be expansive on this issue. However, it is useful to re-iterate some of the exogenous increases in costs that have occurred in this regulatory period and which can be expected to continue to place increased pressure on future costs.

Since TransGrid's last revenue determination there have been over 60 packages of amendments to the Code (i.e. approx 1,640 individual amendments), many of which have imposed new and extensive obligations on TNSPs. The extent of these new requirements is set out in Attachment 7. Other increased compliance costs include those arising from TransGrid's participation in the National Tax Equivalent Regime, legislative requirements to report the fringe benefits of employees, introduction of the new Tax Effect Accounting Standard, and shareholder reporting as required by NSW Government legislation.

The dispute management provisions in the Code can and sometimes have resulted in a protracted process in dealing with the dispute. The disputes may, and have in the past, involved appeals to the National Electricity Tribunal (or its successors in the Code) and various Supreme Courts, Courts of Appeal and may even include High Court. There are high associated external legal costs and enormous burden on the scarce internal resources of the organisation. The setting of the operating expenditure needs to be cognisant of this burden on the TNSPs.

During the current reset period the Commission has introduced additional regulatory compliance obligations including regulatory reporting requirements and ring fencing guidelines. There are also new data collection requirements associated with the reporting of service performance against targets to be established by the Commission at future reset decisions.

The bushfires in NSW and the ACT during December 2002 were particularly devastating. This has led to a review of all associated land management practices including the extent to which easements under high voltage transmission lines should be cleared. As a result TransGrid has a revised bushfire management plan that implies significant additional operating expenditure in the current financial year. The events of 11 September 2001 in the US have also resulted in increased recognition of the need to enhance security across a wide range of areas. Electricity provision has been one of these areas.

Increasing pressure on finite land resources due to a growing economy and population levels, as well as an extensive set of compliance requirements has resulted in more stringent

environmental standards. Attachment 11 sets out, in detail, the extent of TransGrid's current responsibilities in this regard.

It is clear from this experience that costs outside of management's control can and do occur during a five-year regulatory period. It is therefore reasonable to expect this to occur in the next regulatory period and to have a process in place for accommodating these impacts without comprising the intention of incentive regulation. Accordingly, specific categories of exogenous costs are identified for pass through in Chapter 10.

6.2.6 Management Developed Efficiencies

TransGrid has already driven substantial reductions in controllable costs per asset and is relying on these costs continuing to fall during the next regulatory period. However, this is being achieved against a backdrop of a mature industry with modest scope for short to medium term efficiency gains from technological innovation. Indeed, the average age of TransGrid's assets is about 25 years. Replacement of this asset stock with more modern equipment only occurs progressively over time and, at current rates of replacement together with new asset stock, essentially keeps the asset stock at about the 25 years average age.

6.3 Forecast Operating Expenditure

TransGrid's target operating expenditure, set out in Table 6-1 below, is a result of detailed bottom up modelling of near term expenditure requirements and the projection of these requirements based on best estimates of current trends and specific projects that are scheduled to be undertaken over the next regulatory period.

Table 6-1: TransGrid's Target Operating Expenditure ($million real)

Year	2004/05	2005/06	2006/07	2007/08	2008/09
Operating Expenditure Target	123.7	126.8	130.0	133.2	136.6

The Network Management Plan (Attachment 5) includes a number of strategies and processes aimed at minimising (operating and capital) expenditure. These include:

- A rigorous process for determining plant condition and the most appropriate options for maintaining condition.
- Strategic replacement of critical assets.

In addition, the following broader strategies are being employed to achieve the above targets:

- Harnessing new technologies, in particular, developments in communication and information technology.
- Employing human resource strategies, including performance based contracts, development of specialist 'in house' skills where there is insufficient competitive supply in the wider services market.
- Implementing effective competitive outsourcing wherever appropriate.
- Utilising detailed cost monitoring and analysis.

Key aspects of these strategies are briefly described below.

6.3.1 Harnessing New Technologies

TransGrid has an extensive communications system that supports operational communication vital to maximising the reliability of its network, as well as supporting NEMMCO's power system security and market operations responsibilities. This system also provides opportunities to improve the management of a network that is widely dispersed on a geographical basis. Improvements in the ability of remote staff to access maintenance management systems and to requisition spares are being progressively adopted over time.

The information systems that are utilised in this way are also being progressively developed. These systems support maintenance planning and co-ordination, job costing, inventory management, and electronic access to engineering drawings needed undertake maintenance and repairs. A geographical information system has been developed to manage TransGrid's transmission line assets. It records property owner and technical data associated with easements and mains assets, and it is planned to extend its use to improve management of environmental data.

6.3.2 Implementing Competitive Outsourcing

In addition to the procurement of capital projects on a competitive basis there is also strategic outsourcing of services, consumables and spares. For example:

- Delivery of information technology services is outsourced and provided by two service providers, one for applications support and the other for facilities management. The services are competitively procured on the open market. The last round of tenders were developed on a service level measure model that included provision for both penalties and credits, based on some forty-nine performance measures.
- Legal services and economic expertise are also procured on a competitive basis.
- Over 20,000 orders are issued annually for consumables including items such as oil, grease, tools, abrasives, and engineering spares, involving significant application of business-to-business electronic procurement processes.

6.3.3 Utilising Detailed Cost Monitoring and Analysis

A process of cost monitoring and analysis underpins the control of costs, and elimination of areas of inefficiency. In addition to regular budgeting and review of costs against budgets, detailed job and project costing is carried out and reviewed using automated financial and costing systems.

6.4 Demonstrated Cost Effectiveness

TransGrid's proposed operating expenditure levels going forward are based on our internal understanding of asset monitoring and maintenance requirements as well as organisational level expenditure on activities such as human resource management and finance. However, it is in the nature of the regulatory process that customers (and the Commission on behalf of customers) will wish to 'test' forward expenditure estimates.

The analysis in the following subsections demonstrates that TransGrid's current and proposed levels of operating expenditure are efficient.

6.4.1 Current Performance Relative to Current Period Regulatory Benchmarks

In assessing the efficiency of TransGrid's forward looking operating expenditure estimates it is useful to assess the efficiency of current levels of expenditure as these inevitably form the base from which forward looking estimates are derived.

Prior to the current regulatory period the Commission engaged PB Power to provide an expert opinion on the efficient level of operating expenditure for TransGrid over the current regulatory review. The Commission then relied on this report to set benchmark levels of efficient operating expenditure in the current regulatory period. These are set out in the following Table 6-2:

Table 6-2: Commission's 1999 (ex ante) Benchmarks for the Current Regulatory Period ($million nominal)

Year	1999/00	2000/01	2001/02	2002/03	2003/04
Operating Expenditure Target	101.30	102.93	104.57	106.25	107.95

The Commission's estimates were based on best estimates of forward-looking costs at that time and were inevitably based on a number of assumptions such as in relation to expected inflationary pressures and the size of the network to be maintained. As expected, not all of these assumptions have been precisely reflected in actual events and there is a need to adjust the regulatory benchmarks in these circumstances.

In order to convert the Commission's *ex ante* benchmarks for the current regulatory period into *ex post* efficient benchmarks it is necessary to make adjustments where actual circumstances materially varied from forecast. In particular, the areas where such adjustments are necessary are:

- the acquisition of the Snowy Mountains Hydro-Electric Authority ("SMHEA") assets;
- the impact of the GST on CPI tended to overstate actual input cost inflation in the September 2000 quarter while CPI in other quarters tended to underestimate input cost inflation due to wage cost inflation outstripping CPI;
- exogenous cost increases outlined in Chapter 4 (including the impact of the events of 11 September 2001 along with bushfire events in the summer of the 2002/03 on increases in insurance, self insurance and environmental protection costs); and
- increased network size resulting from around $1,000 million of new assets being installed over the current regulatory period and which now require monitoring and maintenance.

Each of these is dealt with in more detail in the following sections.

6.4.1.1 Purchase of SMHEA Assets

In 2002/03 TransGrid acquired the transmission assets of the SMHEA and the responsibility for maintaining those assets. At that time the Commission adjusted TransGrid's revenue cap to include an additional $3.0 million in operating costs in both of 2002/03 and 2003/04. For the purpose of this Chapter, TransGrid has adopted these values as a reasonable approximation of efficient operating costs associated with maintaining those additional assets.

6.4.1.2 Other Increases in Ex Post Costs Not Within TransGrid's Span of Control

In Chapter 10 of this Application TransGrid has defined several categories of events that should trigger an application for a cost pass-through during the forthcoming regulatory period. These categories are in line with those approved by the Commission for other regulated businesses, and comprise:

- A Change in Taxes Event.
- A Service Standard Event.
- An Insurance Event.
- An Unforeseen External Event.
- Grid Support Payments.

Such pass through provisions were not available in the current regulatory period. However, for the purpose of establishing an ex post estimate for efficient operating expenditure TransGrid believes it is necessary to adjust the current regulatory period benchmarks 'as if' such pass through provisions existed.

Specifically, TransGrid has experienced a number of exogenous cost increases that would have been captured by such pass through provisions. In particular, the impact of tightening re-insurance markets before and after the events of 11 September 2001 and changes in environmental standards (including those following major bushfire events) resulted in unanticipated increased insurance, self-insurance and environmental protection costs. There has also been significant new compliance requirements arise during the regulatory period. Chapter 4 discusses these issues in greater detail.

TransGrid estimates these costs to be at least $5 million above expectations in 2003/04.

6.4.1.3 Factor Cost Inflation

The Commission's estimate of efficient benchmarks were based on a starting value of operating costs of $101.3 million which were then rolled forward by an estimated input cost inflation (based on forecast CPI inflation of 3.15%) less an estimate of total factor productivity ("TFP") of 1.55%. The Commission notes in its final decision that this 1.55% TFP estimate is slightly less than preliminary TFP analysis conducted by the Commission 'in-house' that suggested TFP gains in the vicinity of 2% to 3% might be achievable.[7]

TransGrid has asked economic consulting firm NERA to advise on the robustness of this approach. NERA advises that that the approach taken is reasonable and does not involve any double counting of TFP gains provided input price inflation associated with operating expenditure is equal to 3.15%. NERA have also made a number of observations on the risks of double counting expected TFP gains when setting price paths on the basis of CPI-X where 'X' is based on expected TFP. As is explained in the NERA Attachment 10 this will generally result in double counting of expected efficiencies.[8]

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[7] Commission, *NSW and ACT Transmission Network Revenue Caps: Decision*, pg 100. At the time of writing TransGrid has not sighted these internal reports.

[8] In general terms, this is because the TFP for the general economy is already captured within the measured CPI. The higher the TFP for the economy the less businesses, on average, need to raise prices for any given input price inflation. Thus the higher the TFP for the economy the lower is CPI. If a particular industry is expected to have costs rise slower than CPI it is necessary that either its factor price inflation is lower or its TFP is greater than that for the general economy

The Commission's use of a TFP of 1.55%[9] was based on an estimate of TransGrid's actual TFP and not TransGrid's TFP above and beyond that for the economy as a whole. The implication of this is that the *ex ante* assumption in the current expenditure benchmarks was that prices for operating expenditure inputs would rise at 3.15%. In order to determine the *ex post* efficient benchmark for operating expenditure it is necessary to adjust for any difference between actual input price inflation and the assumed figure of 3.15%.

Labour related costs represent around 80% of TransGrid's operating expenditure. Consequently, TransGrid believes that the best available proxy for its actual input price inflation is the ABS wage cost index for the electricity, gas and water industries.[10] As stated in the ABS information paper[11] on the Wage Cost Index ("WCI"):

> *"The WCI was developed to provide a quarterly measure of changes over time in wage and salary rates of pay for employee jobs which would not reflect changes in the composition of the labour force, numbers of jobs, hours worked or changes in characteristics of employees and their career paths." (Para 6)*

The WCI is sufficiently removed from TransGrid such that any inefficient practices within TransGrid would not materially influence its value but is sufficiently close to TransGrid's actual scope of business operation to provide a meaningful estimate of changes in input costs within TransGrid's scope of business. Over the four years to June 2003 the WCI for electricity, gas and water industries has risen by an average of 4.1% annually compared with the 3.15% used to derive the *ex ante* benchmarks (and compared with a figure of 3.7% for the actual CPI and 3.2% for the CPI adjusted for the impact of the GST[12]). In terms of longer time period trends, the WCI was only introduced in 1997, however, since that time to the present day the WCI has averaged an annual increase of 1.1 percentage points above the CPI.

6.4.1.4 Increased Network Size

In addition to the acquisition of the SMHEA assets, TransGrid has also installed a significant number of new assets increasing the number of substations and line length requiring monitoring and maintenance. This increase in network size can be quantified by examining the change in 'maintenance units' over the regulatory period. The number of maintenance units is defined as ten times the number of switch bays plus the number of kilometres of lines. This is a unit of scale commonly used by a number of TNSPs operating in Australia.

In the four years since 1999/00 TransGrid has installed a further 1,660 maintenance units. At an annual cost of $4,300 per maintenance unit[13] this translates to around an additional $7 million of required operating expenditure. On the other hand, it is likely that newly installed maintenance units will not require as intensive monitoring and actual repair work in the early years of their life as they do in the later years of their life. However, it would be a mistake to assume that new assets make little or no call on operating expenditure in the early years of their life. While it may be true that repairs to new electrical equipment are lower in the early years of their life they still require constant monitoring and are subject to the same non-age related risks

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9 We note that the Commission discussion uses a figure of 1.5% but our attempt to replicate the final numbers results in an estimate of 1.55% for the TFP assumed.

10 TABLE 9B. Wage Cost Index - Ordinary Time Hourly Rates of Pay Excluding Bonuses, Sector by Industry

11 Available from the www.abs.gov.au website

12 This adjusted CPI is calculated by deflating the actual quarterly CPI by Econtech's estimate of the quarterly impact of the GST on CPI. This is the same approach as used by regulators (such as the Commission in relation to indexation of property rents and IPART in relation to regulated electricity distribution prices) when long run adjustments for the impact of the GST were required for CPI indexation of prices.

13 This is in 2003/04 dollars and is based on TransGrid's lowest achieved average operating expenditure per maintenance period achieved in 2001/02.

of damage (eg, storm damage). Similarly, clearance levels on easements require constant monitoring to ensure outage and bush fire risk is minimised.

Nonetheless, in recognition of lower repair related costs it may be reasonable to lag by two years the time it takes for new maintenance units to attract additional expenditure. This reduces the impact in the final year of this determination (2003/04) from $7.1 million to $4.4 million per annum.

6.4.1.5 Summary of Adjustments and Comparison with Actuals

Adjusting the *ex ante* operating expenditure benchmarks for *ex post* cost increases the following *ex post* efficient benchmarks are derived. For the avoidance of doubt, it should be noted that these adjustments still include an assumed 1.55% reduction in the number of inputs used by TransGrid to monitor and maintain its existing asset base (i.e., 1.55% TFP). It should also be noted that no increase in efficient operating expenses has been assumed for the fact that TransGrid invested in around one billion dollars worth of new assets over the existing regulatory period. That is, it has been assumed that efficiency requires TransGrid to both:

- achieve 1.55% TFP on maintaining its existing asset base as at 1999; and
- maintain all new (non SMHEA) assets at zero additional cost.

The *effective* TFP used is therefore considerably greater than 1.55% when account is taken for the cost of monitoring and maintaining new assets.

Table 6-3: Adjustments to (*Ex Ante*) Benchmarks for the Current Regulatory Period ($million nominal)

Year	1999/00	2000/01	2001/02	2002/03	2003/04
Ex ante Operating Expenditure Target	101.30	102.93	104.57	106.25	107.95
Adjusted for *ex post* input price inflation	101.72	104.40	106.97	110.17	112.95[a]
Plus adjustment for *SMHEA*	101.72	104.40	106.97	113.17	115.95
Plus adjustment for self insurance costs and exogenous events	103.22	107.90	112.47	118.64	122.49
Plus adjusted for network size	103.22	107.90	112.47	122.28	126.93

[a] Forecast based on average WCI of preceding four years

The last row on the above Table 6-3 represents an estimate of the *ex post* efficient levels of operating expenditure for TransGrid. It is now possible to compare this with actual operating expenditure over the current regulatory period. This is done in the following Table. 6-4.

Table 6-4: Comparison of Efficient and Actual Expenditure ($million nominal)

Year	1999/00	2000/01	2001/02	2002/03	2003/04	Total
Ex ante efficient expenditure	101.30	102.93	104.57	106.25	107.95	523.00
Ex post efficient expenditure	103.22	107.90	112.47	122.28	126.93	572.80
Actual expenditure	102.92	100.39	103.44	113.80	120.68 [a]	541.23
Difference	0.30	7.51	9.03	8.48	6.25	31.57

[a] Budget

From the above Table 6-4 it can be seen that TransGrid has outperformed the ex post efficient operating expenditure benchmark in every year of the current regulatory period to date and is budgeting to do so again in 2003/04. Over the entire regulatory period it is estimated that TransGrid will outperform the ex post efficient benchmark by $31.57 million or around 5.8% of total costs. This shows that TransGrid's internal processes and procedures are working to minimise costs and that the current level of expenditure is a good indication of efficient levels of expenditure.

It is of some concern to TransGrid that, this excellent efficiency performance notwithstanding, TransGrid expects to suffer a loss on its actual operating expenditure relative to the Commission's *ex ante* efficient benchmark of $12 million[14] over this regulatory period. This is because the *ex ante* assumptions used by the Commission did not turn out to accurately reflect the actual circumstances faced by TransGrid and there was no provision for appropriate pass through of costs in those circumstances.

6.4.2 Forecasting Future Expenditure Using Key Cost Drivers

Having established a base figure for efficient operating costs it is possible to examine how TransGrid's proposed future level of expenditure compares with this base rolled forward using estimates of key cost drivers. A simple approach would be to start from TransGrid's budgeted operating costs in 2003/04 of $121 million and to project this forward, assuming a TFP on existing assets of 1.55% is achievable, and that new asset growth results in an increase in operating costs in proportion with the increase in the number of assets being maintained.

Over the new regulatory period TransGrid estimates that there will be an increase in the number of maintenance units from 25,900 to 32,900. This is an increase of around 16 percent in the total size of the network to be maintained (or around 3% per annum). If a two-year lag were assumed before these assets began calling on additional maintenance costs this would still increase the number of maintenance units requiring maintenance in 2008/09 to 29,400[15] (an increase of 13.5%). Applying a 13.5% proportionate increase to the $127 million 2003/04 *ex post* efficient benchmark operating expenditure established in the previous section would result in a 2008/09 benchmark of $144 million in real 2003/04 dollars. This is equivalent to a 2.6% annual increase in efficient operating expenditure.

Rather than setting a target expenditure of $144 million in 2008/09 TransGrid has set a target of $137 million (i.e., $7 million lower). This target is based on our best estimates of operating expenditure going forward and on the achievement of a challenging total factor productivity target. This target is also consistent with a 2.5% annual increase in operating costs starting

[14] Equal to the difference between ex ante efficient expenditure and actual expenditure ($18m) less the only pass through allowed of $6m (for the acquisition of SMHEA assets).

[15] This figure includes additional maintenance units installed in the last two years of the previous regulatory period (i.e., 2002/03 and 2003/04) that were not included in the calculation of efficient benchmarks for those years.

from a base our budgeted 2003/04 expenditure (i.e., $120.7 million). For the avoidance of doubt, this target does not include any efficiency carryover from the current regulatory period notwithstanding TransGrid underspending $32 million on operating costs relative to *ex post* efficient levels. Nor does it impose any claw back of the $12 million loss suffered by TransGrid in the current regulatory period due to the lack of any explicit pass through mechanisms in the existing regulatory period.

As set out in the above Table 6-4, TransGrid is effectively setting a target of maintaining a slightly decreasing real operating cost (adjusted for network size). This target is highly challenging given that no allowance is made for the fact that wage costs tend to outstrip CPI by around 1% per annum. This means that in order to meet such a target TransGrid must find annual productivity savings of 1% in what is already a very challenging environment of increased compliance burdens and reduced outage windows for maintenance purposes.

In relation to the longer-term picture, the above figures suggest that, by 2008/09 TransGrid will have increased the size of the network under management since 1999/2000 by 24% (measured in terms of maintenance units). In the absence of any TFP improvement TransGrid would have had to increase its real operating and maintenance budget by more than 24% to respond to the increase in network size and the real increases in input costs. However, TransGrid is only proposing to increase operating expenditure by around $16 million from 1999/2000 to 2008/09.[16] This represents an increase of less than 10% in real operating expenditure since 1999/2000.

This can be converted into a cumulative proposed TFP for TransGrid since 1999/2000 of 11.3%[17]. In annual terms this is equivalent to a TFP of 3.0%. If the fact that wage costs are rising by around 1 percentage point faster than inflation this translates into a 4% annual TFP improvement.

On the basis of this analysis TransGrid considers that its current and proposed levels of operating expenditure are consistent with an efficient level.

6.5 Incentives for Future Cost Savings

It has been shown that the operating expenditure targets as set out in this Chapter are based on continuing efficiency improvements from an efficient base.

As set out in the Draft Statement of Regulatory Principles, TNSPs are permitted to keep savings that result from reductions in operating costs that exceed the Commission's provisions. In addition, to encourage efficiency gains throughout the entire reset period the Commission proposes retention of some of those gains into the next regulatory reset period. Together these elements of the regulatory regime provide TransGrid with an incentive to further outperform the operating cost provisions set by the Commission. This can benefit TransGrid by enhancing short-term commercial performance while benefiting customers over the medium to longer term by driving controllable costs down to the lowest possible levels.

This approach follows from the incentive regulation concept where the regulatory regime attempts to impose some of the disciplines of a competitive market on a regulated monopoly. Three important considerations underpin the success of such a regime.

Firstly, the operating cost performance targets should not be set at the best practice 'frontier'. To do so would convert an incentive regime into a punitive regime. In addition, in a competitive

[16] In 2002/03 dollars and after accounting for pass through of insurance and other events discussed above.

[17] (Maintenance cost increase assuming no TFP gains - Proposed maintenance cost increase)/(Maintenance cost increase assuming no TFP gains) =Cumulative TFP gain = (1.24-1.1)/1.24 = 11.3%

market average performers make normal profits while best practice performers can achieve above normal profits. By way of analogy those regulated businesses that can outperform reasonable efficiency targets should be able to make above normal profits. In any event it is not necessary to impose a punitive regime to achieve the majority of benefits associated with incentive regulation. Consistent with this, the benchmarks against which efficient outcomes are measured must be adjusted to take account of exogenous increases in costs.

Secondly, there must be regulatory consistency over time. The gains are achieved by business strategies that take time to deliver outcomes, and may involve payback periods of many years. Accordingly, changes to the regime that impacts on the sharing of efficiency gains undermine the confidence in the regime and, in the worst case, can make participation too risky.

Thirdly, there must be clear service performance targets to enure that cost reductions are not achieved at the expense service outcomes. The Commission have already developed a proposal for TNSPs in this regard in a form that is broadly acceptable to TransGrid. This matter is discussed in the next Chapter of this Application.

Finally, in line with the second point, the regulator needs to ensure that the efficiency carryover is implemented in subsequent regulatory reviews.

TransGrid would welcome further consultation with the Commission on a process for formalising the framework of any efficiency carryover regime that would apply on a prospective basis. TransGrid is not seeking a retrospective efficiency carryover to be applied in transitioning from the current regulatory period due to the lack of any transparent framework being enunciated during the current regulatory period.

6.6 Summary

TransGrid has set itself target operating expenditure levels that are very ambitious given the considerable pressures it faces as outlined in this Chapter. These targets involve a cumulative efficiency gain of around 11.3% over the ten years to June 2008/09 after adjusting for exogenous cost increases and network growth. In annual terms this is equivalent to a TFP of 3% per annum.

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7 Service Performance – Developing Incentive Regulation

The Commission's *Draft Statement of Regulatory Principles* requires TNSPs to propose a set of service standards, and proposed benchmarks for each standard, as part of their regulatory review application. This complements TransGrid's broader legal obligations as set out in Chapter 3 by specifying reference performance targets, that form the basis for improved incentive regulation by the Commission, particularly in the short to medium term.

The Draft Statement of Regulatory Principles state that:

> *"Effective incentive-based regulation will include an explicit level of service, for which the TNSP has been provided by the regulator with sufficient income to maintain the assets necessary to provide that level of service. Service standards should balance good industry practice against customer expectations. Further, the regulatory compact should specify service standards that are reasonable and appropriate for each regulated TNSP".*

Service levels as part of the regulatory compact comprise both service quantities (volume) as well as standards of service.

This section of the Application addresses a number of important considerations concerning the setting of service standards by the Commission, and sets out TransGrid's position on the performance targets to apply to TransGrid for the purpose of setting monitoring performance targets.

It also sets out a proposed approach for dealing with some stakeholder expectations that TNSP outages should be scheduled in response to market price signals.

7.1 Important Considerations

TransGrid's connection agreements with its customers set out the service quantities required by the customer, in the form of a Power Transfer Capability. The customer Power Transfer Capability and the level of service reliability for the network established through Commission service standards determine the required capacity of the shared transmission network and are closely linked to TransGrid's total revenue requirement.

The service standards included in the service standards side of the regulatory compact should reflect the inherent underlying performance of the transmission network, coupled with good asset management practices in the context of the network operating environment.

The performance incentive scheme, based on such service standards, is at an early stage of evolution. In addition, it cannot operate in isolation from TransGrid's over all statutory service obligations. Accordingly, at this stage of development it should operate within a low risk framework and preferably reward TNSPs that achieve or maintain best practice asset management.

The use of a performance incentive scheme based upon TransGrid's historical performance requires that sufficient revenue for operating and capital works, as outlined in Chapter 5 and 6, be approved by the Commission in order to continue to maintain and develop the network to standards consistent with historical practice.

7.2 TransGrid's Position on Proposed Performance Incentive Scheme

In May 2003 the Commission published its draft determination on the Performance Incentive scheme to apply to TransGrid and other TNSPs. TransGrid's response to this proposal was forwarded to the Commission in July 2003 and also discussed at the Commission conference held on this matter in the same month. TransGrid's response is set out in Attachment 14 to this Application, together with the specific incentive arrangements proposed to apply to TransGrid as part of the Commission's revenue determination for the period covered by this Application. As stated in TransGrid's response to the Commission's draft Determination on this matter, TransGrid broadly supported that Determination subject to some specific amendments.

TransGrid proposes the following service measures be adopted for the next reset period with a total of 1% of MAR per annum at risk.

- Circuit Availability (including transmission line, transformer and reactive plant availability).
- Loss of Supply Event Frequency Index (a reliability measure tracking the frequency of loss of supply events of different magnitudes), and
- Average Outage Duration (a responsiveness measure tracking how quickly main system plant is returned to service following an unplanned outage).

TransGrid also proposes the initial performance targets given in Table 7-1. These targets are consistent with TransGrid's historical performance and are considered to reflect a fair and reasonable basis for the incentive scheme. In addition, these targets are consistent with those published by the ACCC on its draft Decision on Services Standard Guidelines dated 28 May 2003 (Service Standard Guidelines). It should be noted that TransGrid, consistent with its previous submission to the Commission, is also proposing caps and collars on the revenue impacts. Among other things this achieves the objective of initially limiting the total revenue at risk to 1% of MAR.

Definitions in relation to these measures and force majeure are included in Attachment 15 to this Application and are essentially the same as contained in the Commission's Service Standard Guidelines.

Table 7-1: Service Standards – Measures, Targets and Caps/Collars

Performance Measure	Unit of Measure	Revenue at Risk %	Collar	Dead band Knee 1	Target	Dead band Knee 2	Cap
Transmission Line Availability	%	0.2	98.9	n/a	99.4	n/a	99.7
Transformer Availability	%	0.15	98.0	n/a	99.0	n/a	99.5
Reactive Plant Availability	%	0.1	97.0	n/a	98.5	n/a	99.3
Reliability (Events >0.05 system minutes)	Number	0.25	4	n/a	6	n/a	9
Reliability (Events >0.4 system minutes)	Number	0.2	0	n/a	1	n/a	3
Average Outage Restoration Time (7 day cap per event)	Minutes	0.1	2400	1800	1500	1200	800

7.3 Addressing Expectations That TNSPs Should be More Responsive to Market Conditions

The development of appropriate incentives for TNSPs to respond to market conditions remains a major area of concern to many of TransGrid's stakeholders. TransGrid's position on this has been made clear in its submissions to the Commission but is reiterated here for the convenience of the Commission and interested parties because of the considerable interest in this matter.

TransGrid notes that both the Commission and their consultants, Sinclair Knight Merz, have recognised the very real issues associated with implementing any network constraint performance measures, including the following:

- that a considerable proportion of network constraints result from factors outside the control of TNSPs and are unrelated to transmission outages, which include generator dispatch patterns;
- the adequacy of relevant data from the NEMMCO market information systems made available to Market Participants; and
- whether the issue of market efficiency is better resolved if TNSPs provided certainty of outage timing, or moving outages in response to pool price signals.

While agreeing with these observations TransGrid recognises that a number of stakeholders remain concerned about the potential impact of transmission outages on wholesale trading positions and that there is a perception that these risks are a significant factor inhibiting interregional hedging. A process is required to address these concerns in a way that improves the value delivered by transmission networks to the community. This process could involve a working group, convened by the Commission, to develop proposals for wider consideration.

TransGrid enclose initiatives undertaken by the Commission during September 2003 to establish such a process

The matters that would need to be considered by the Commission's working group are now briefly discussed. Each of these matters would need to be resolved ahead of any inclusion of transmission constraint performance targets in TransGrid's next revenue determination.

The Predictability of Outage Scheduling vs. Outage Scheduling in Response to Spot Prices:

No meaningful progress could be made on performance Measures 4 and 5 (intra and inter-regional constraints) while the relative importance of predictability of the timing of future outages, compared with outage timing to spot prices, remains unresolved. TransGrid is aware that some Market Participants value the predictability of future outages as being more important because it enables them to enter into hedging arrangements for the future with greater certainty. Other Participants, however, clearly support the notion that TNSPs should reschedule outages, when such outages create 'significant' price separation between regions, or require generators to be constrained on or off, especially in times of high prices. This dilemma needs to be resolved as a matter of priority.

Measuring the Potential Economic Benefits of Removing the Trading Risk Associated with Transmission Outages

This involves a number of important considerations. Firstly, significant interregional pool price separation is much an indicator of short-term market power involving transfers of wealth from customers to generators than net economic impacts. Secondly, it is not clear that the elimination of all transmission outages would do much to remove the uncertainty associated with interconnector capability as much of this uncertainty arises in any case with all transmission elements in service.

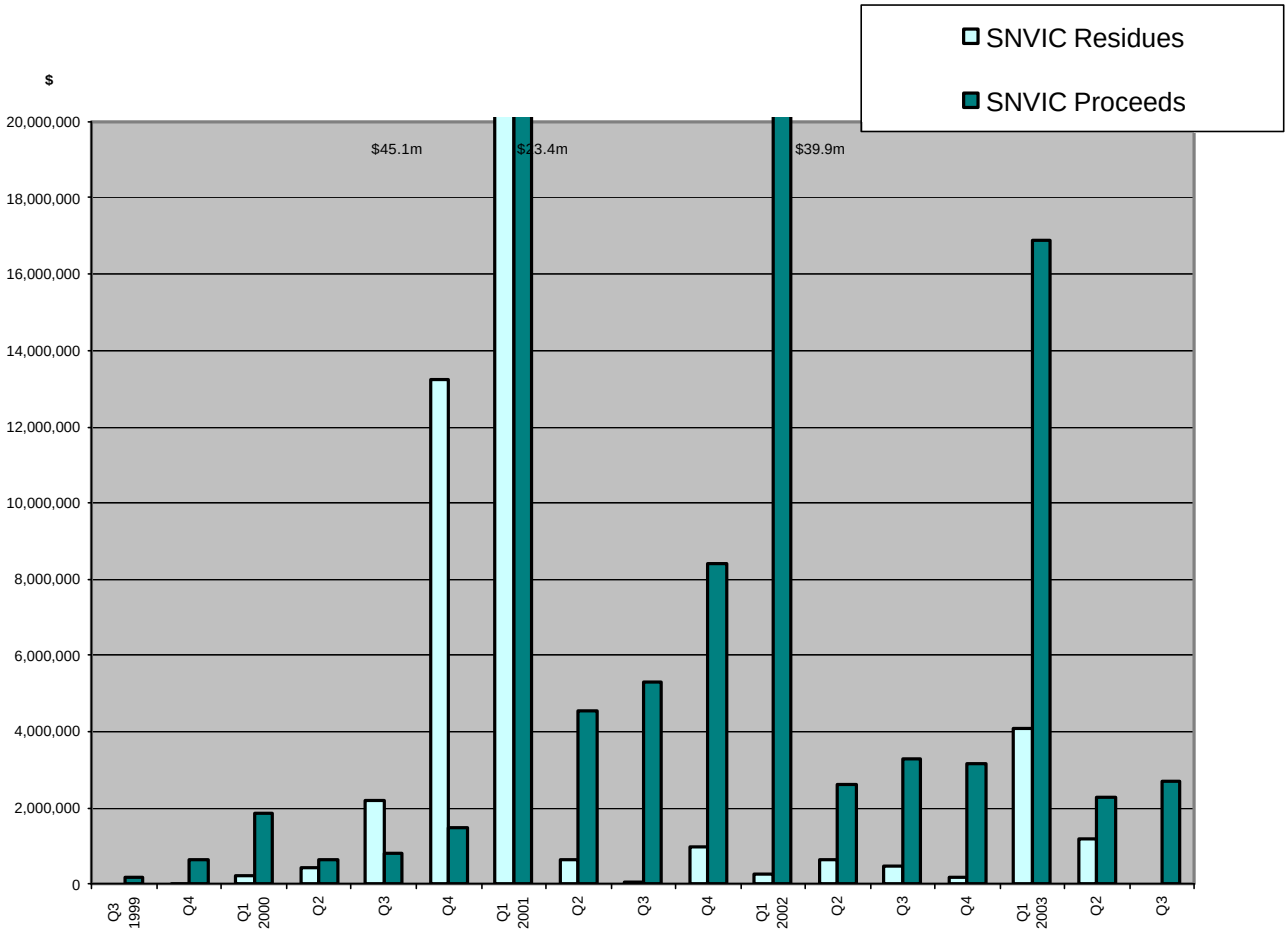
Finally, quantification of the possible economic benefits of changed TNSP outage timing is essential in order to determine the level of benefits that can be shared with TNSPs under an incentive scheme.

The Need for Meaningful Price Signals for the Timing of Transmission Outages

In the event that it is decided that TNSPs should reschedule outages in response to price signals, the nature of these signals needs to be determined. Pool prices have proven unhelpful in this regard because of the rebidding that occurs after a TNSP has committed resources to a planned outage.

Pre-dispatch prices do not measure economic benefits and would be very disruptive and costly for TNSPs to respond to. One possibility is the use of Settlement Residue Auction prices as an indication to TNSPs as to the periods to avoid outages that affect the capability of certain interconnectors. For example, TransGrid already avoids scheduling outages that impact on the Snowy to Victorian transfer capability during summer at its own cost. This position is vindicated by the value that Participants currently place on the relevant settlement residues at auction as shown in Figure 7-1 overleaf.

Figure 7-1: Snowy to Victoria – Settlement Residues and Auction Proceeds



Understanding the Impact of the RIEMNS Stage 1 Implementation (Network Constraints)

With the gazettal of the Code changes in response to the Review into the Integration of the Energy Market and Network Services "(RIEMNS Stage 1)" in late January 2003, TNSPs continue to work with NEMMCO in the monthly publication of transmission outage information. In implementing the RIEMNS Code changes, it has become apparent that these changes merely reinforce the existing 'passive' role of TNSPs in relation to the wholesale market. That is, these Code changes encourage TNSPs to schedule outages well in advance, to advise the market and NEMMCO of any intended outages, and to endeavour to meet the scheduled arrangements.

These Code changes have the effect of discouraging TNSPs from responding to short-term changes in market conditions, because of the importance placed by the RIEMNS Stage 1 arrangements on improving the information (and reducing the risk) to market traders of transmission outages and their possible impact on network capability.

A move to a more 'active' role, where transmission outages are rescheduled at short notice in response to pool or FCAS price spikes, is a significant change to the 'passive information' effect of the RIEMNS Code changes (favoured by some Market Participants). It needs to be recognised that RIEMNS Code changes have only just come into being after extensive Participant consultation, suggesting that there is a general preference for greater predictability

of the impact of transmission outages than for the uncertainty associated with the more active role advocated by some parties.

Adoption of system constraints performance measures and targets before the above matters are resolved is clearly inappropriate and unlikely to occur ahead of the Commission's revenue determination in response to this Application. In the meantime, to ensure that TransGrid is not penalised for making adjustments to outage programs in response to emerging market conditions, the Commission revenue determination should include provisions for revenue adjustments to reflect additional costs associated with such adjustments where they a demonstrably economic. It should also include explicit provision for the inclusion of an incentive scheme during the reset period without having to re-open the whole revenue determination, once these matters are resolved.

7.4 Summary – Service Standards

TransGrid supports moves by the Commission towards improved incentive based transmission regulation. The service measures and targets set out in Table 7-1 provide a sound basis for implementing service performance incentives linked to TransGrid's MAR. Implementation of these arrangements for the reset period covered by this Application is supported subject to:

- the Commission incorporating TransGrid's required capital and operating expenditure in the Commission's MAR decision;
- achieving an appropriate definition of 'force majeure' events; and
- satisfactorily clarifying the definition of the performance measures involved.

In relation to incentives for TransGrid to be more responsive to market conditions it is proposed that:

- additional costs associated with rescheduling of outages to improve wholesale market efficiency be treated as a 'pass through' for TransGrid's next reset period pending agreement on an improved incentive framework; and
- work continues jointly with the Commission and Market Participant representatives to develop improved TNSP incentive arrangements.

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