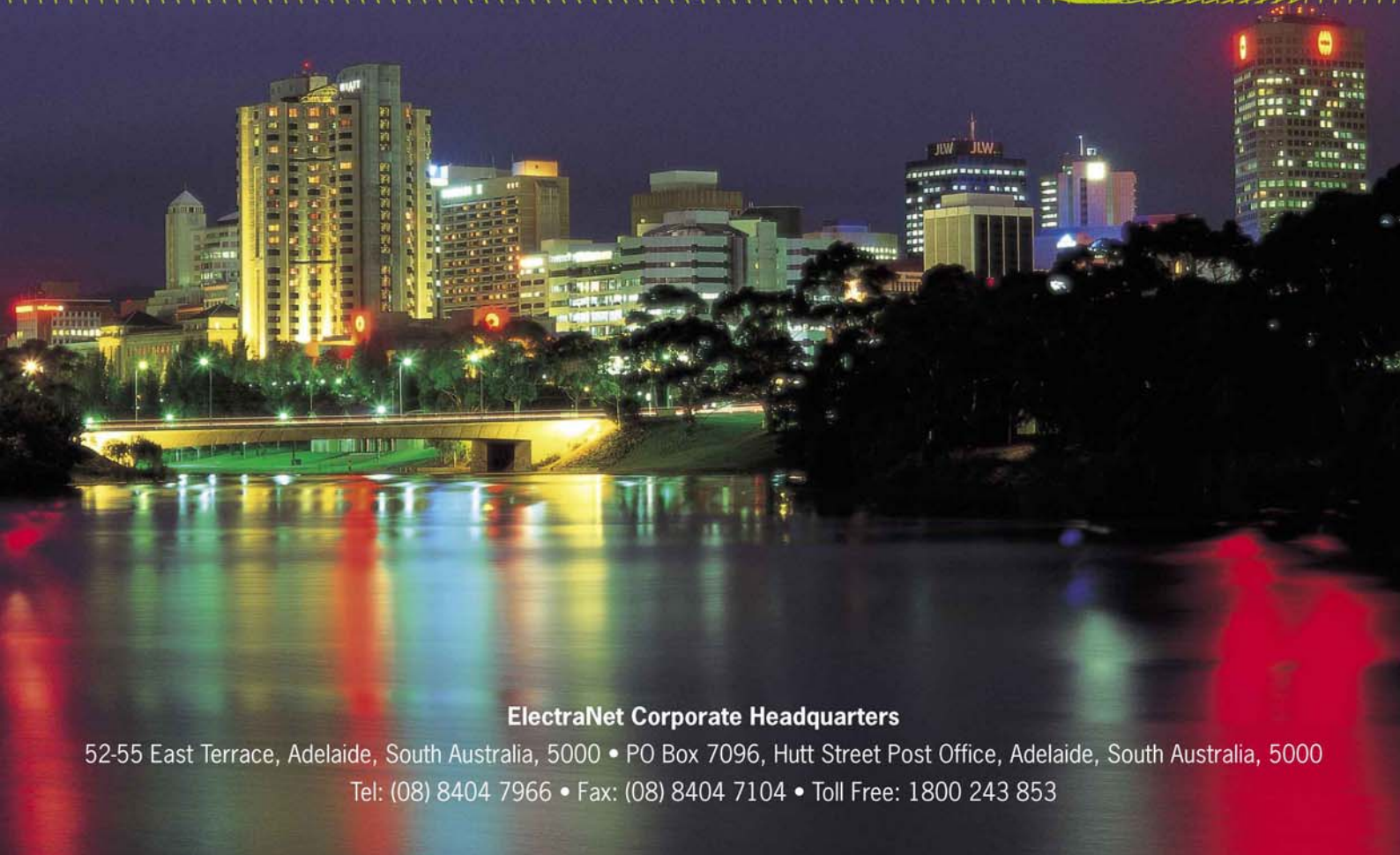
ElectraNet Transmission Network Revenue Proposal – Volume 1

1 July 2008 to 30 June 2013

31 May 2007



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ElectraNet Pty Ltd (ElectraNet) is the principal electricity transmission network service provider (TNSP) in South Australia.

At ElectraNet we:

- Recognise that a strong and reliable electricity transmission system is important to the economy and future security of supply
- Consult with stakeholders and take their views into consideration
- Respond appropriately to our customers' needs
- Provide efficient electricity transmission services
- Meet the challenge to keep costs down when key drivers are pushing costs up

For information about ElectraNet visit www.electranet.com.au.

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1. Executive Summary

ElectraNet Pty Ltd (ElectraNet) is the principal electricity transmission network service provider (TNSP) in South Australia.

This Revenue Proposal to the Australian Energy Regulator (AER) is for the five year regulatory control period from 1 July 2008 to 30 June 2013 and is submitted in accordance with the requirements of the National Electricity Rules (Rules) and the relevant Guidelines issued by the AER.

ElectraNet is confident that its Revenue Proposal fully satisfies the requirements of the Rules.

This Executive Summary provides a brief overview of ElectraNet's Revenue Proposal.

1.1 Stakeholder Consultation

South Australia's electricity transmission network is a strategic asset underpinning the State's economic development and the prosperity of the South Australian community. The views of stakeholders and the wider community are important to ElectraNet. In light of this, ElectraNet has consulted with a broad range of stakeholders and considered their views in developing plans for the future, including the capital and operating expenditure plans in this Revenue Proposal.

In November 2006, ElectraNet published a Network 2025 Vision consultation paper to assist ElectraNet in discussing with government, industry, user groups and community stakeholders the long term needs of South Australia for electricity transmission services and how these might best be met. The following themes were prominent in stakeholder feedback:

- Supply reliability is a critical issue for the transmission network;
- An appropriate balance should be struck between reasonable transmission service costs and appropriate levels of investment to address demand growth and asset condition (ageing);
- Effective joint planning with the distributor ETSA Utilities is essential; and
- An expectation that demand side management should be an increasingly important part of the South Australian electricity system over the next decade.

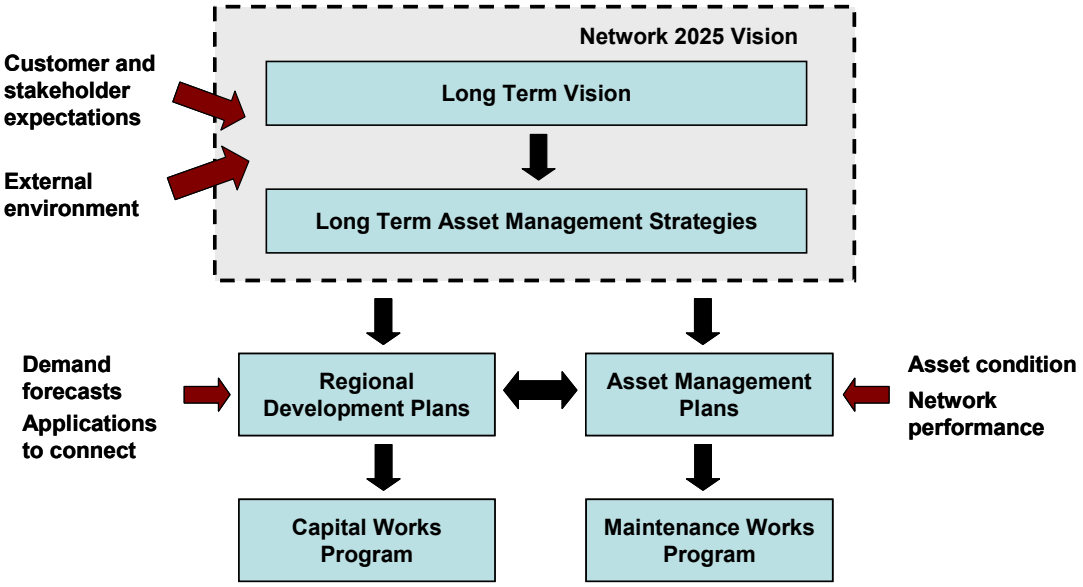
ElectraNet has reviewed and refined its Network 2025 Vision taking into account comments received from stakeholders during the consultation process and has also reflected this feedback in the capital and operating expenditure forecasts included in this Revenue Proposal.

1.2 ElectraNet's Approach to Asset Management

Consistent with the above stakeholder expectations, a primary objective for ElectraNet is the efficient delivery of reliable electricity transmission services to its customers. ElectraNet's approach to asset management is, therefore, based on best practice asset management principles that seek to optimise the total life cycle costs of the transmission network. This requires a longer term view and holistic approach to

asset management and developing capital and operating expenditure plans. Figure 1.1 shows a high level summary of ElectraNet's approach, which is explained in more detail in later chapters of this Revenue Proposal.

Figure 1.1: ElectraNet's asset management approach.



1.3 Historic Cost and Service Performance

ElectraNet has performed well during the current regulatory period, both in terms of total cost efficiencies, and also in terms of service performance.

In this period commencing 2003, ElectraNet will have invested $390 million (nominal) to meet growing customer demand and to maintain the reliability of the transmission network. ElectraNet has managed changing network priorities in the light of the actual circumstances that have eventuated over the course of the period, and has done so within 1 per cent of the ACCC's approved capital expenditure allowance.

ElectraNet has responded positively to the applicable regulatory incentives and achieved significant overall operating expenditure cost savings (relative to the revenue cap allowance). Long term sustainable savings have been achieved largely in corporate costs through the restructuring of business operations and other initiatives.

However, the substantial savings achieved have been, and continue to be, overtaken by other cost increases resulting from the need to address a growing number of assets nearing the end of their useful lives and the higher input costs which have emerged in recent years (these cost drivers are explained in more detail below). These underlying drivers of higher input costs and ageing assets are expected to continue well into the future and impact on costs in the forecast period.

ElectraNet has been subject to service performance incentives in the current regulatory period to maintain and improve service quality. The scheme's performance indicators include circuit availability, average outage duration and loss of supply event frequency. ElectraNet's performance against these indicators shows an overall trend of improved performance, as shown in Table 1.1.

Table 1.1: Performance against ACCC service standards indicators.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Availability (%)	99.23	99.25	98.82	99.29	99.32	99.30	99.38	99.59	99.35	99.57	99.42
Average Outage Duration (Minutes)	88.3	360.9	151.4	85.1	60.1	132.0	70.0	70.1	48.9	114.1	88.5
No of events >0.2 System minutes	3	5	3	7	7	2	4	2	7	0	4
No. of events >1.0 system minutes	3	2	1	1	1	1	0	1	0	0	0

ElectraNet has proposed changes to the service incentive scheme for the forecast regulatory period that will provide additional focus on improving the availability of critical transmission circuits at peak times when transmission outages are more likely to result in significant market impact.

1.4 Capital and Operating Expenditure Forecasts

ElectraNet has developed its capital and operating expenditure forecasts to meet the expenditure objectives specified in the Rules and is forecasting a capital expenditure requirement of $778 million; and a controllable operating expenditure requirement of $292 million[1]. Figures 1.2 and 1.3 compare these expenditure forecasts with actual/ forecast expenditure in the current regulatory period.

The requirements for network capital expenditure have been developed in consultation with ETSA Utilities and the Electricity Supply Industry Planning Council (ESIPC)[2].

The ESIPC has confirmed, on the basis of its own analysis, that the capital "*projects proposed by ElectraNet broadly match the emerging limitations identified by the Planning Council*"[3].

The profile of the capital expenditure forecast is largely driven by the mandated timing requirements for reliability augmentations and connection projects required by the reliability standards specified in the Electricity Transmission Code.

1 Controllable operating expenditure excludes network support payments and benchmark financing costs.

2 ETSA Utilities is the distributor in South Australia and the ESIPC provides independent oversight of transmission planning in South Australia.

3 Letter from ESIPC "Review of Capital Projects for the 2008-2013 Regulatory Period", 30 May 2007 (included as Appendix I).

Figure 1.2: Capital expenditure 2003-04 to 2012-13 ($ 2007-08).

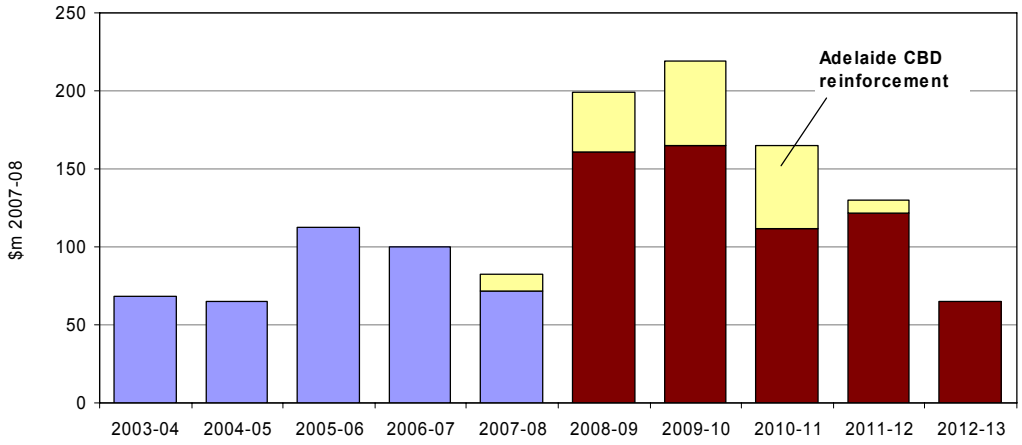
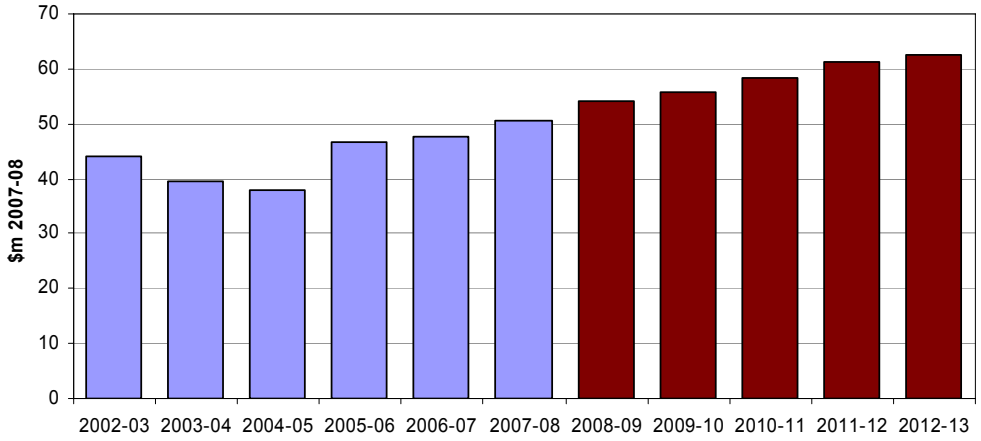


Figure 1.3: Controllable operating expenditure 2002-03 to 2012-13 ($ 2007-08).



The cost drivers contributing to higher levels of forecast capital and operating expenditure are both "volume of work" related and "price of work" related, and include the following.

Growth in demand and new ETC standards

Growth in demand is driving the need for significant transmission investment to meet mandated reliability standards specified in the Rules and the Electricity Transmission Code (ETC). New reliability standards resulting from a recent review of the ETC by the Essential Service Commission of South Australia (ESCOSA) also require additional investment. For example, the mandated reinforcement of the Adelaide CBD is expected to cost approximately $138 million during the forthcoming regulatory period. This is a major project and the most significant single reason for the higher capital expenditure requirement in the forecast period (there has been no project of this significance or magnitude in the current regulatory period).

A growing network also necessitates an increase in operating expenditure, and therefore an allowance for growth has been incorporated in ElectraNet's operating expenditure forecast. This forecasting method utilises the approach recently accepted by the AER in its draft revenue cap decision for Powerlink, and recognises the economies of scale associated with a growing network.

Assets nearing the end of their useful lives

South Australia now has one of the oldest networks in Australia. This has most important implications for the future reliability of transmission services. Approximately 35 per cent of ElectraNet's transmission assets are 40-60 years old and are nearing the end of their useful lives. It is essential that ElectraNet maintains existing service capacity and acts now to plan for the replacement of these assets. If timely action is not taken, maintaining service reliability will become an insurmountable challenge as the risk of asset failures increases and the costs of maintenance in future will be considerably higher.

An important initiative that ElectraNet has taken in the current regulatory period is the introduction of a new maintenance regime to address the particular risks associated with a growing number of assets that are nearing the end of their useful lives.

The need for higher levels of investment to prudently address risks associated with an ageing asset base has been recognised by a number of ElectraNet's stakeholders.

Labour costs

Labour cost increases are a key driver of ElectraNet's costs.

A widely publicised skills shortage exists in Australia, including in the electricity supply industry and in the construction sector which services the electricity industry. In particular, a marked strengthening in employment demand in the mining, construction and manufacturing sectors in South Australia is driving a scarcity of skilled resources. Surging mining investment (including the very large scale Olympic Dam expansion project) and defence-related work are key factors in this strengthening of employment demand.

As a result of these labour market conditions, wages growth has been strong in the current regulatory period, particularly in the later years, and this is expected to continue well into the future.

Plant and equipment costs

Strong global demand has seen copper, aluminium and steel prices, and plant and equipment costs rising well above inflation. While some optimistic analysts are predicting that the rate of cost increases will slow during the forecast period, annual cost increases are still expected to exceed the rate of inflation.

Critical infrastructure

Electricity transmission infrastructure has been identified as "critical infrastructure" in the context of the counter terrorism initiatives being undertaken co-operatively by Commonwealth and State governments. ElectraNet's capital expenditure forecast includes additional investment to address concerns about the physical security of critical infrastructure.

Other key challenges

Other key challenges facing ElectraNet that have implications for the cost of providing transmission services include:

- growing environmental restrictions that affect the development of new line routes as well as access to existing infrastructure;

- increasing difficulty in securing land and development approvals for new assets due to residential encroachment; and

- consumers in a modern, digital and energy-intensive economy have increasing expectations for a highly reliable and secure electricity supply.

Summary

Despite persistent and pervasive increasing cost pressures, ElectraNet has sought to manage the increase in required expenditure by focussing on the network investments which are required to meet mandated reliability and planning standards and those necessary to address the highest priority asset condition (ageing) and critical infrastructure security needs.

ElectraNet has factored economies of scale resulting from a larger network, as well as future efficiency gains negotiated in maintenance service provider contracts, into its operating expenditure forecast.

ElectraNet is confident that its capital and operating expenditure forecasts are both efficient and prudent in today's cost environment, and that they meet the required expenditure objectives set out in the Rules.

1.5 Relative Cost Efficiency

The physical environment within which ElectraNet operates is the most challenging in the National Electricity Market (NEM). External factors have, and will continue to, shape the cost and prices of electricity transmission services in South Australia. These external factors - and their associated costs - reflect the requirements of ElectraNet's customers, including their location and demand for energy at peak times.

The key characteristics driving a relatively higher level of efficient costs in South Australia include:

- Scale: South Australia's geographical size and smaller population, limit the potential for economies of scale;

- Energy density: South Australia has the lowest energy density in the NEM, reflecting its decentralised population – increasing the level of investment required to connect each end user;

- Load factor: South Australia has the lowest load factor in Australia (measured as the ratio of average demand to peak demand) – increasing the level of capacity investment required to transport a unit of energy; and

- Transmission and distribution asset boundary: ElectraNet's transmission system has a higher proportion of lower voltage radial lines that in other States are more typically found in distribution systems – increasing the relative cost of transmission in South Australia.

It is the greater investment demands of these external factors and operating conditions that impose a higher cost base on ElectraNet (see Figures 1.4 and 1.5).

This is an important consideration when assessing ElectraNet's costs against the "costs of a prudent operator in the *circumstances* of the relevant network operator"[4].

Figure 1.4: Line length required to transport 1 GWh energy[5].

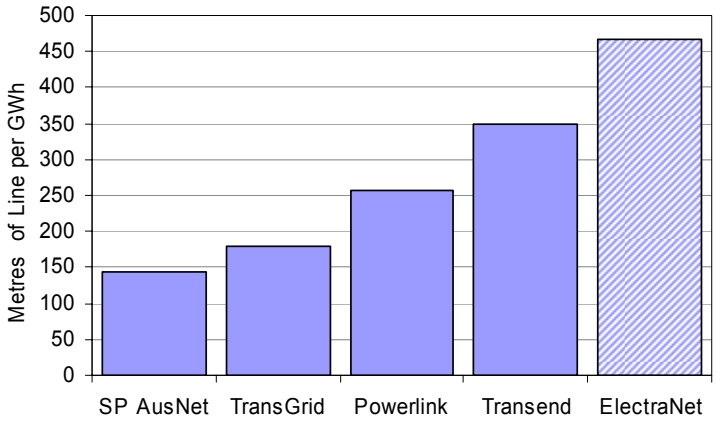
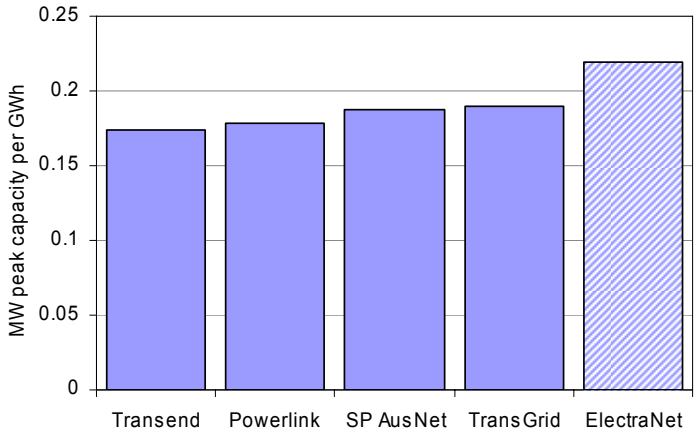


Figure 1.5: Peak demand capacity required to transport 1 GWh energy[5].



1.6 Revenue Requirement and Average Price Path

ElectraNet has followed the requirements in the Rules and AER Guidelines and used the AER's Post Tax Revenue Model (PTRM) to calculate the revenue required for ElectraNet to meet growing customer demand, maintain reliability of supply and meet its regulatory obligations (see Table 1.2).

ElectraNet estimates that its Revenue Proposal will result in an increase in average transmission prices of about 6.8 per cent per annum (nominal) over the regulatory period (see Figure 1.6) and that this average increase will add approximately $7.50 to the average residential customer's annual electricity bill of $1,058 (0.7 per cent)[6].

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4 As the AER is required to do in accordance with clauses 6A.6.6 and 6A.6.7 of the Rules.

5 Source data is from the AER's Transmission Network Service Providers Electricity Regulatory Report for 2004-05, www.aer.gov.au.

6 Customer billing data from ESCOSA 2005-06 Annual Performance Report - SA Energy Retail Market, November 2006, p71-73.

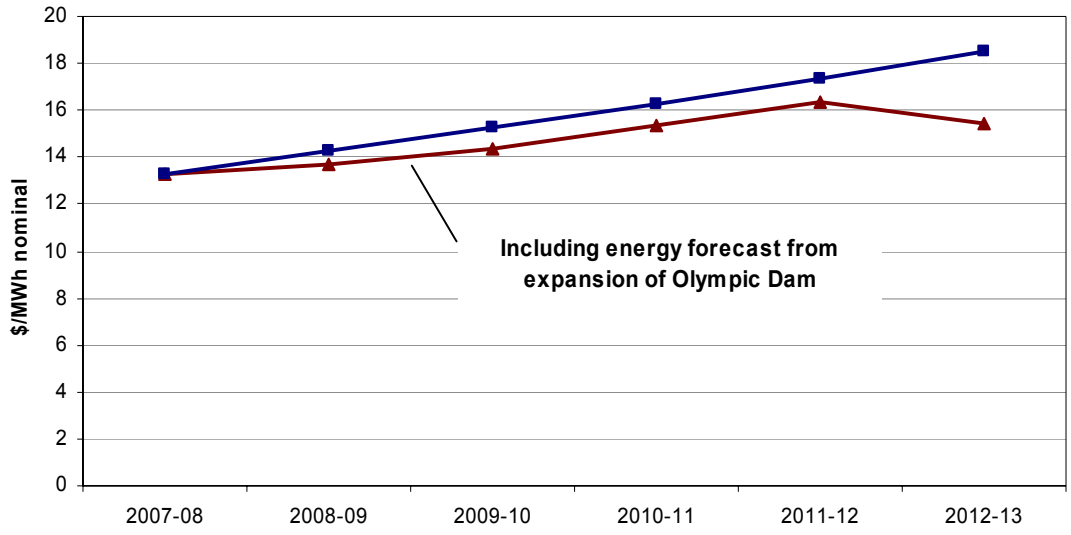
Table 1.2: Revenue requirement 1 July 2008 to 30 June 2013 ($m nominal).

Component	2008-09	2009-10	2010-11	2011-12	2012-13
Return on capital	112.3	129.1	148.4	163.5	175.8
Return of capital	20.4	17.7	12.9	10.8	19.1
Operating expenses	61.4	65.2	70.3	76.2	81.6
Opex efficiency payment	3.2	2.7	2.1	1.4	0.7
Net tax allowance	9.2	10.1	9.5	9.5	10.3
Total Revenue Requirement	**206.5**	**224.8**	**243.2**	**261.5**	**287.5**
X factor	(8.4%)	(4.9%)	(4.9%)	(4.9%)	(4.9%)
Smoothed Revenue	**208.5**	**225.1**	**243.1**	**262.5**	**283.4**
Energy (GWh) [7]	14.6	14.8	14.9	15.1	15.3
Average Trans. Price ($/MWh)	14.2	15.3	16.3	17.3	18.5

The average increase in transmission prices in South Australia reduces to 3.0 per cent per annum (nominal) when taking into account the latest forecasts of higher demand that would result from the proposed large scale expansion of mining operations at Olympic Dam (see Figure 1.6)[8].

The increase in average transmission prices is directly related to the significantly higher capital expenditure requirement and the higher input cost drivers discussed in section 1.4. A part of the increase is also attributable to the AER's change in capital expenditure regulatory accounting methodology (discussed in section 7.4).

Figure 1.6: Average transmission price path ($/MWh nominal).



7 Forecast energy figures are medium growth figures taken from NEMMCO's 2006 Statement of Opportunities with addition of the new committed Prominent Hill load.

8 Note that this comparison does not include any prescribed capital expenditure that may be required to facilitate the Olympic Dam expansion.

2. Introduction

2.1 Background

ElectraNet Pty Ltd (ElectraNet) is the principal electricity transmission network service provider (TNSP) in South Australia.

ElectraNet is presently subject to a revenue cap in accordance with a decision made by the Australian Competition and Consumer Commission (ACCC) in December 2002[9]. That revenue cap expires on 30 June 2008.

On 1 July 2005 the Australian Energy Regulator (AER) assumed the ACCC's responsibilities for the economic regulation of electricity transmission networks. The AER's regulatory functions and powers are conferred upon it by the National Electricity Law (NEL). The AER must undertake its regulatory functions in accordance with the National Electricity Rules (the Rules).

ElectraNet is required to submit to the AER a Revenue Proposal and a proposed pricing methodology relating to the provision of prescribed transmission services 13 months before the expiry of the current regulatory control period[10]. At the same time ElectraNet must also submit to the AER a proposed negotiating framework in relation to negotiated transmission services.

This document is ElectraNet's Revenue Proposal for the forthcoming regulatory period, which is submitted in accordance with, and complies with the requirements of Chapter 6A of the Rules and the relevant Guidelines issued by the AER pursuant to Chapter 6A. ElectraNet is confident that its Revenue Proposal fully satisfies the requirements of the Rules.

The remainder of this chapter is structured as follows:

- Section 2.2 specifies the commencement date and length of the regulatory control period proposed by ElectraNet;
- Section 2.3 describes the services provided by ElectraNet that are the subject of this Revenue Proposal;
- Section 2.4 provides an overview of the Rules, including a brief description of their recent development. The section also identifies a number of regulatory matters that are relevant to this Revenue Proposal;
- Section 2.5 outlines the fundamental importance of the South Australian Electricity Transmission Code (the ETC) for ElectraNet's Revenue Proposal. The ETC requires ElectraNet to plan and operate its transmission system in accordance with specified standards;
- Section 2.6 explains the roles of the ESIPC and ElectraNet in planning the South Australian transmission network; and
- Section 2.7 explains the overall structure of the Revenue Proposal.

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9 ACCC, *South Australian Transmission Network Revenue Cap 2003-2007-08*, 11 December 2003, File No: C2001/1094.

10 National Electricity Rules, clause 6A.10.1.

2.2 Length of Regulatory Control Period

ElectraNet's Revenue Proposal is for a five-year regulatory control period commencing on 1 July 2008 and finishing on 30 June 2013.

2.3 Services Provided by ElectraNet

ElectraNet's Revenue Proposal relates to the provision of prescribed transmission services. These services include:

- Shared transmission services provided to customers directly connected to the transmission network and connected network service providers (prescribed TUOS services);
- Connection services provided to connect the ETSA Utilities distribution network to the transmission network (prescribed exit services);
- Grandfathered connection services provided to generators and customers directly connected to the transmission network that were in place on 9 February 2006 (prescribed entry and exit services); and
- Services required under the Rules or in accordance with jurisdictional electricity legislation that are necessary to ensure the integrity of the transmission network, including through the maintenance of power system security and assisting in the planning of the power system (prescribed common transmission services).

The quality, reliability and security of supply of the prescribed transmission services provided by ElectraNet are prescribed in the Rules, the ETC and customer connection agreements. The required reliability, safety and security of the transmission system is prescribed in the Rules, the ETC and jurisdictional electricity legislation. The requirements of the Rules, the ETC and jurisdictional electricity legislation are regulatory obligations on ElectraNet in accordance with clauses 6A.6.6 and 6A.6.7 of the Rules[11].

For the avoidance of doubt, the prospective costs and revenues associated with negotiated transmission services are excluded from this Revenue Proposal.

Other transmission services provided by ElectraNet (non-regulated transmission services) are not subject to economic regulation under Chapter 6A of the Rules.

2.4 National Electricity Rules

ElectraNet's revenue cap for the current regulatory period was determined by the ACCC in accordance with Chapter 6 of the National Electricity Code (the predecessor to the Rules).

In November 2006, following its review of the arrangements for the economic regulation of electricity transmission services, the Australian Energy Market Commission (AEMC) made Rule number 18[12] which gave effect to Chapter 6A of the Rules. In December 2006, following its review of transmission pricing arrangements,

[11] These regulatory obligations are described in more detail in Chapters 5 and 6 of this Revenue Proposal in relation to ElectraNet's capital and operating expenditure forecasts.

[12] AEMC, "National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 Number 18: Rule Determination", 16 November 2006.

the AEMC made Rule number 22[13], which incorporated into Chapter 6A new arrangements for pricing of transmission services in the NEM.

The new Chapter 6A of the Rules supersedes Chapter 6 of the National Electricity Code for the transmission sector, subject to the savings and transitional provisions set out in Chapter 11 of the Rules. It is important to note that clauses 11.6.9 and 11.6.10, which relate to the determination of the regulatory asset base and the calculation of a carry-over mechanism to reward efficiency improvements, are applicable to ElectraNet's Revenue Proposal. These provisions and their application to ElectraNet are explained in Chapters 7 and 11 of this Revenue Proposal.

In addition to clauses 11.6.9 and 11.6.10, a transitional provision which applies specifically to ElectraNet is set out in clause 11.6.13 of the Rules. In particular, clause 11.6.13(b) states:

> *"Without limiting the operation of the new Chapter 6A, in establishing the opening regulatory asset base for ElectraNet for the regulatory control period subsequent to ElectraNet's current regulatory control period, the AER may also consider adjustments to the regulatory asset base for ElectraNet that relate to easements, as agreed by letter dated 3 August 2004, between the ACCC and ElectraNet."*

ElectraNet has addressed the application of this transitional provision in Chapter 7 of this Revenue Proposal.

The Rules also provide for the AER to publish guidelines in relation to the following matters:

- the post-tax revenue model referred to in rule 6A.5.2;
- the roll forward model referred to in rule 6A.6.1;
- an efficiency benefit sharing scheme referred to in rule 6A.6.5;
- a service target performance incentive scheme referred to in rule 6A.7.4;
- submission guidelines referred to in rule 6A.10.2; and
- cost allocation guidelines referred to in rule 6A.19.3.

For regulatory periods commencing after the forthcoming period, ElectraNet must ensure that each of its Revenue Proposals complies with the relevant guidelines published by the AER and in force at that time. However, clause 11.6.18(b) of the Rules states that the guidelines that will apply in relation to this Revenue Proposal, are the first proposed guidelines published by the AER on 31 January 2007 in accordance with clause 11.6.17 of the Rules.

In all respects, ElectraNet believes that this Revenue Proposal complies with the requirements of the Rules, including:

- Chapter 6A;
- the transitional arrangements in Chapter 11;

[13] AEMC, "National Electricity Amendment (Pricing of Prescribed Transmission Services) Rule 2006 Number 22: Rule Determination", 21 December 2006.

- the proposed guidelines published by the AER; and
- the planning and operational requirements of Schedule 5.1.

Relevant aspects of the Rules are explained in further detail in subsequent chapters of this Revenue Proposal.

2.5 South Australian Electricity Transmission Code

ElectraNet is licensed by the Essential Services Commission of South Australia (ESCOSA) to operate its transmission network (including all powerlines, substations and switchyards) in South Australia[14]. As a condition of its licence, ElectraNet is required to comply with the Electricity Transmission Code (ETC)[15] made by ESCOSA pursuant to section 28 of the Essential Services Commission Act 2002. The ETC is a regulatory obligation on ElectraNet in accordance with clauses 6A.6.6 and 6A.6.7 of the Rules.

The ETC sets out the obligations on ElectraNet in relation to the provision of transmission services in South Australia. In particular, the ETC contains provisions relating to:

- Service Standards
- Interruptions
- Design Requirements
- Technical Requirements
- General Requirements
- Access to Sites
- Telecommunications Access
- Emergencies

Section 1.6.1 of the ETC makes it clear that any obligations imposed under the ETC are in addition to those imposed under the National Electricity Rules and the Act (and regulations). ElectraNet must therefore comply with both the ETC and the Rules.

In September 2006, ESCOSA completed a review of the reliability standards specified in the ETC. In its Final Decision, ESCOSA explained the rationale for, and scope of its review as follows[16]:

> *"While it is important to retain the simplicity and certainty of the existing structure, it is also important that the reliability standards are reviewed regularly. Such a review should take into consideration load growth and consider how ElectraNet can provide flexible solutions to reliability augmentations at the lowest possible cost to SA electricity consumers.*

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14 www.escosa.sa.gov.au/webdata/resources/files/030527-D-ElectranetTransLicence.pdf

15 www.escosa.sa.gov.au/webdata/resources/files/060906-R-ElecTransCodeET05.pdf

16 ESCOSA, "Review of the Reliability Standards Specified in clause 2.2.2 of the Electricity Transmission Code Final Decision", September 2006, p3.

Therefore, in August 2004, the Commission requested the Electricity Supply Industry Planning Council (ESIPC) to review the transmission connection point reliability standards as specified in clause 2.2.2 of the ETC.

Specifically, the ESIPC was asked to consider:

- *How connection point reliability should be established*
- *The appropriateness of the existing connection point standards*
- *Whether the reliability standards for any connection point should be improved as a result of changes in load, demographics and/or network developments and*
- *The indicative capital cost to meet any changes to the existing reliability standards."*

ESCOSA also noted that the AER's revenue determination for ElectraNet will take effect from 1 July 2008. ESCOSA therefore determined that the amended clause 2.2.2 reliability standards arising from its review will take effect at the same time. ESCOSA commented that[17]:

"Publication of the Commission's decision on this matter in 2006 will enable ElectraNet to incorporate the necessary capital expenditure into its application to the AER in 2007, and provide adequate time to ElectraNet to plan for and implement the required network changes in accordance with the revised ETC."

ElectraNet's capital and operating expenditure plans take proper account of its obligations under the ETC that will apply from 1 July 2008. Further information in relation to the requirements of the ETC is provided in Chapters 3, 5 and 6 of this Revenue Proposal.

2.6 Planning Responsibilities in South Australia

The Electricity Supply Industry Planning Council (ESIPC) was established primarily to provide expert, independent advice to the South Australian Government and the Essential Services Commission of South Australia (ESCOSA) in relation to the state of the electricity supply industry in South Australia[18].

The ESIPC has responsibility for network planning in South Australia in accordance with Clause 9.28.3 of the Rules and is responsible for preparing and publishing the Annual Planning Report (APR) for networks in South Australia from information provided by licensed transmission and distribution entities. Amongst other things the APR describes the current state of South Australia's electricity supply system, provides information on South Australian demand forecasts, and includes an assessment of the adequacy of the generation and transmission network capacity.

The ESIPC is the nominated Jurisdictional Planning Body under the Rules and South Australia's representative on the Inter-Regional Planning Committee (IRPC).

17 Ibid, page 6.

18 www.esipc.sa.gov.au

ElectraNet's responsibilities under the Rules include[19]:

- Communicating the results of planning activities undertaken by ElectraNet to the ESIPC in a manner, form and within a time reasonably determined by the ESIPC.
- As soon as possible, advising the ESIPC of the details of any augmentation plans arising under clause 5.6.2(c).
- As soon as possible, providing the ESIPC with the forecasts, technical limits and details of the proposed corrective actions that are developed in accordance with clause 5.6.2(e).
- Preparing the information specified in clause 5.6.2A(b) and supplying it to the ESIPC by April 30 each year, or by some later date as directed in writing by the ESIPC.
- When proposing to establish a new large transmission network asset under clause 5.6.6 provide the ESIPC with a draft summary of the application notice 10 business days prior to providing a summary of the application notice to NEMMCO.

As noted above, the ESIPC provides independent oversight of transmission planning in South Australia. Therefore, ElectraNet's capital expenditure plans have been developed in consultation with the ESIPC and take proper account of the feedback received as part of that consultation.

2.7 Structure of the Document

The remainder of this Revenue Proposal is structured as follows:

- Chapter 3 describes ElectraNet's business environment, the transmission network in South Australia and the key challenges faced in the forthcoming regulatory period;
- Chapter 4 explains ElectraNet's recent cost and service performance;
- Chapters 5 and 6 describe ElectraNet's capital and operating expenditure forecasts, respectively;
- Chapter 7 calculates the regulated asset base for the forthcoming regulatory control period;
- Chapter 8 describes the depreciation allowance;
- Chapter 9 explains capital financing costs and taxation;
- Chapter 10 presents ElectraNet's proposed service target performance incentive scheme;
- Chapter 11 applies an efficiency gain sharing mechanism to take account of operating expenditure cost improvements achieved during the current regulatory control period; it also describes ElectraNet's proposed benefit sharing scheme for the forthcoming regulatory period;

[19] National Electricity Rules, clause 9.28.3.

- Chapter 12 presents an overview of the revenue and average price outcomes that will be delivered under this Revenue Proposal, including a summary of each revenue building block component, the proposed X factors and estimated average price outcomes;

- Chapter 13 provides a glossary of terms; and

- Chapter 14 presents a table of Appendices to the Revenue Proposal.

3. Business Environment and Key Challenges

3.1 Summary

This chapter provides a brief overview of ElectraNet's business environment and the key challenges facing the company in the forthcoming regulatory period. This background information provides a foundation for consideration of ElectraNet's recent cost and service performance, and its future expenditure requirements that are set out in subsequent chapters of this Revenue Proposal.

The physical environment within which ElectraNet operates is the most challenging in the NEM. External factors have, and will continue to, shape the cost and prices of electricity transmission services in South Australia and inevitably lead to efficient transmission service costs in South Australia being higher than those in other States. These external factors - and their associated costs - reflect the requirements of ElectraNet's customers, including their location and demand for energy at peak times.

The key characteristics driving a relatively higher level of efficient costs in South Australia include:

- Scale: South Australia's geographical size and smaller population, limit the potential for economies of scale;

- Energy density: South Australia has the lowest energy density in the NEM, reflecting its decentralised population – increasing the level of investment required to connect each end user;

- Load factor: South Australia has the lowest load factor in Australia (measured as the ratio of average demand to peak demand) – increasing the level of capacity investment required to deliver a unit of energy; and

- Transmission and distribution asset boundary: ElectraNet's transmission system has a higher proportion of low voltage radial lines that, in other States, are more typically found in distribution systems (for example, the long 132 kV radial lines connecting the main transmission network to country areas of South Australia) – increasing the relative cost of transmission in South Australia.

A number of cost drivers will increase efficient transmission costs in the forthcoming regulatory period including:

- The combination of demand growth and new mandated reliability standards – in formulating its investment and expenditure plans, ElectraNet must comply with the reliability standards mandated in the Rules and the recently updated ETC;

- Assets nearing the end of their useful lives – South Australia now has one of the oldest networks in Australia. Assets aged over 40 years account for approximately 35 per cent of replacement value. The need for higher levels of investment to prudently address risks associated with an increasing number of assets nearing the end of their useful lives has been recognised by a number of ElectraNet's stakeholders;

- Higher input costs including wages growth and the rising price of copper, aluminium, steel and transmission plant and equipment; and

- Additional investment required to address concerns about the physical security of critical infrastructure.

The remainder of this chapter is structured as follows:

- Section 3.2 provides a brief description of ElectraNet's transmission system and the cost implications of its physical characteristics for transmission services in South Australia; it also describes ElectraNet's customer base;
- Section 3.3 describes the mandated reliability standards that drive the planning, development and maintenance of ElectraNet's transmission system;
- Section 3.4 provides an overview of ElectraNet's Network 2025 Vision and the company's approach to stakeholder consultation;
- Section 3.5 describes ElectraNet's approach to asset management;
- Section 3.6 focuses on the key challenges and cost drivers facing ElectraNet in the forthcoming regulatory period; and
- Section 3.7 provides concluding observations.

3.2 ElectraNet's Transmission System and Customers

3.2.1 Physical characteristics of the transmission system

ElectraNet's transmission system is the backbone of the electrical power system that connects major generation sources at Port Augusta, Torrens Island and the eastern states via the Heywood and Murraylink interconnectors. Additional generation sources are connected in the South East of the State and on the Eyre and Yorke peninsulas. The main transmission network extends for more than 1,000 km from the Victorian border near Mount Gambier in the State's south east to Port Lincoln on the Eyre Peninsula. In addition there are significant radial extensions of over 200 km each from the main network to Leigh Creek and Woomera in the State's north and the Yorke Peninsula.

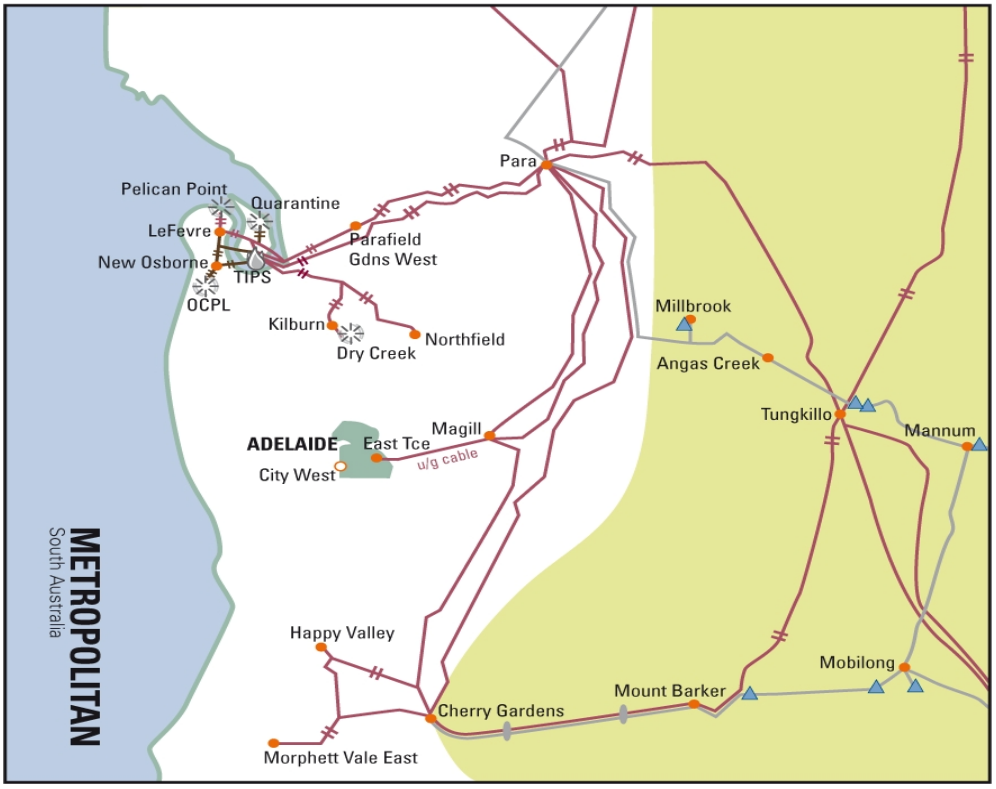
In aggregate, ElectraNet's transmission system consists of 5,611 circuit kilometres of transmission lines that operate at nominal voltages of 275 kV, 132 kV and 66 kV[20]. Transmission from the main network to country areas of South Australia is characterised by long radial 132 kV lines.

Figures 3.1 and 3.2 provide an overview of the transmission system and the metropolitan network as at 31 March 2007.

[20] As of 31 March 2007.

Figure 3.1: ElectraNet Transmission Network.

Figure 3.2: ElectraNet's Metropolitan Network.



The lengths of line for each voltage are given in Table 3.1.

Table 3.1: Circuit kilometres of line.

Voltage	Overhead Lines (Circuit km)	Underground Cables (Circuit km)
275 kV	2,571	7.8
132 kV	3,072	-
66 kV	22	3.0
Total	**5,601**	**11**

ElectraNet operates and maintains 76 substations, which include 8,828 MVA of installed transformer capacity[21]. Details of ElectraNet's substation assets are summarised by voltage level in Table 3.2.

Table 3.2: Summary of substation assets.

Voltage	Number of Substations	Circuit Breakers[22]	Transformers	
			Number	MVA
275 kV	22	150	36	6,185
132 kV	51	176	95	2,643
66 kV	3	61	0	0
Total	**76**	**387**	**131**	**8,828**

21 As of 31 March 2007.

22 Circuit breakers may not be located in substations of the same voltage.

3.2.2 Cost implications for transmission services in South Australia

As noted earlier, the physical environment within which ElectraNet operates is the most challenging in Australia. ElectraNet has the lowest energy density[23] and the lowest load factor[24] of other NEM transmission network operators. This means that, on average, ElectraNet requires comparatively more assets per customer or unit of consumption, which in turn tends to drive a higher capital and operating expenditure requirement.

For example, to transport one GWh of energy ElectraNet must provide line assets 80 per cent greater than those of Queensland and peak demand capacity 20 per cent greater than all other networks (See Figures 3.3 and 3.4).

Figure 3.3: Line length required to transport 1 GWh energy[25].

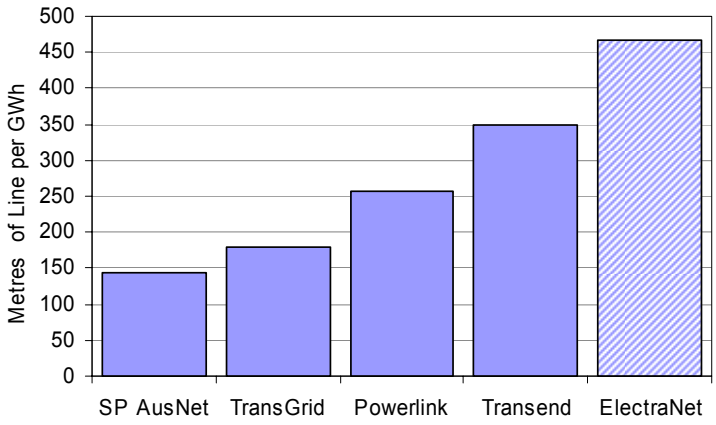
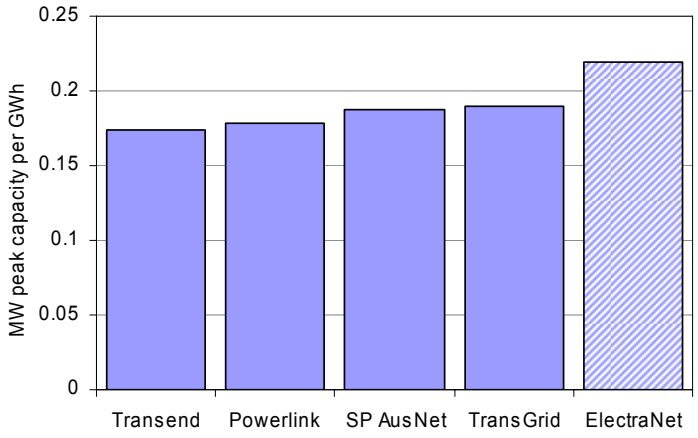


Figure 3.4: Peak demand capacity required to transport 1 GWh energy[25].



ElectraNet cannot control the energy density and load factor within South Australia, they are the result of the location and consumption choices of end-users.

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23 Measured as energy delivered GWh per line length.

24 Measured as average demand MW per peak demand MW.

25 Source data from the AER's "Transmission Network Service Providers Electricity Regulatory Report for 2004-05", www.aer.gov.au.

While 70 per cent of the demand in South Australia is located within 30 kilometres of the Adelaide CBD, the remaining 30 per cent stretches over nearly 2,000 km of low density line extending from Woomera to the Victorian border, from Leigh Creek to Port Lincoln, and from Davenport to Wattle Point.

It is the greater investment demands of these external factors and operating conditions that impose a higher cost base on ElectraNet and inevitably lead to efficient transmission service costs in South Australia being higher than those in other States.

This is an important consideration when assessing ElectraNet's costs against the "costs of a prudent operator in the *circumstances* of the relevant network operator"[26].

3.2.3 ElectraNet's customers

ElectraNet's customers comprise the South Australian distributor ETSA Utilities, 12 generators and 6 directly connected loads. ElectraNet's customers and the number of connection points associated with each customer group are summarised in Table 3.3.

Table 3.3: ElectraNet's customer base.

Customer Type	No. of Customers	No. of Connection Points
Distributors	1	21
Generators	12	48
Direct connect loads	6	18
TNSPs	2	2
Total	**20**	**88**

ElectraNet's transmission connection agreements with its customers set out the specific terms and conditions that have been agreed for the provision of connection and transmission network services. The services required by the customer are specified in the relevant transmission connection agreement, including the agreed maximum demand for each connection point.

In South Australia, the required capacity of the transmission system is driven by these customer requested agreed maximum demands (rather than forecast load growth) and mandated reliability standards.

3.3 Mandated Reliability Standards

Section 2.4 of this Revenue Proposal introduced ElectraNet's obligations under the Electricity Transmission Code (ETC). Clause 2 of the ETC mandates specific reliability standards at each transmission exit point (a customer connection point) or group of exit points and supply restoration standards.

3.3.1 ElectraNet's obligations

ElectraNet must plan, develop and maintain its transmission system such that the standards specified in the ETC are met in relation to each connection point or group

[26] As the AER is required to do in accordance with clauses 6A.6.6 and 6A.7.7 of the Rules.

of connection points. Clause 2 also requires that ElectraNet must not contract for an amount of agreed maximum demand (AMD), as specified in the connection agreement between ElectraNet and the relevant "transmission customer", greater than 100 per cent of installed line and transformer capacity.

The terms "N", "N-1" and "N-2" are commonly used within the electricity industry to categorise reliability, and hence are used in clause 2 of the ETC to specify required reliability for the ElectraNet transmission system.

- **N reliability** means that the transmission system is planned and developed to supply the maximum demand, provided that all network elements are in service. This means that the loss of a single transmission element (a line, a transformer or other associated equipment) could cause supply interruption to some customers.

- **N-1 reliability** provides a higher level of reliability**.** It means that no customers would be affected even with any one network element out of service.

- **N-2 reliability** means that no customers would be affected even if any two network elements were out of service. This is a very high level of security that is generally only used for Central Business District (CBD) areas, which exhibit a high concentration of customer load.

The ETC specifies reliability standards for N, N-1 or N-2 capacity for a number of load categories and allocates each transmission exit point to one of these categories.

As load growth increases, the ETC requires ElectraNet to augment the relevant connection point and, where necessary, the transmission network either by providing additional transmission capacity or network support arrangements. ElectraNet is required by the ETC to use its best endeavours to correct any breach of the agreed maximum demand (AMD) reliability standards in the ETC within twelve months, and in any event, no later than three years.

In the case of a new connection point, ElectraNet is required by clause 2.2.2 to seek the approval of ESCOSA for the applicable reliability standards. Those standards must be developed having regard to a range of factors including size of the load, value of lost load, types and numbers of customers supplied through the connection point, and location.

As explained above growth in customer demand together with the ETC clause 2 reliability standards are the key driver for connection point reinforcement and transmission system augmentation. Over 50 per cent of ElectraNet's capital expenditure forecast presented in Chapter 5 of this Revenue Proposal is driven by these requirements.

3.3.2 New ETC standards

The new ETC commencing on 1 July 2008 increases the applicable standards at a number of connection points, resulting in a requirement for additional capital expenditure during the forthcoming regulatory control period. The most significant of these changes is in relation to the area defined as Adelaide Central (essentially the Adelaide CBD).

Supply to the Adelaide Central area is currently provided through the integrated transmission and distribution networks with a single transmission connection point located within the Adelaide Central area. However, ESCOSA has sought to ensure in

its review of the ETC that adequate transmission line and transformer capacity are available in the Adelaide Central area in the future[27].

The new ETC mandates the establishment of a second independent transmission connection point within the Adelaide Central area. The new transmission substation must be commissioned and commercially available by 31 December 2011[28].

Adelaide Central is assigned the highest reliability standard because it has the highest density of government, business and commercial activity in the State. It is common practice for CBD regions around Australia to enjoy N-2 reliability.

The establishment of the new transmission connection point is a major project and the most significant single reason for a higher capital expenditure requirement in the forthcoming regulatory control period (there has been no project of this significance or magnitude in the current regulatory period).

Other projects driven by the new ETC standards include connection point upgrades at Ardrossan West, Kadina East, Mount Barker, Whyalla and Wudinna.

3.4 ElectraNet's Network 2025 Vision and Stakeholder Consultation

South Australia's electricity transmission network is a strategic asset underpinning the State's economic development and the prosperity of the South Australian community. Its future direction should draw upon the commitment of all stakeholders to shared objectives for its management and long term development.

The views of stakeholders and the wider community are important to ElectraNet in formulating a vision for the future of the electricity transmission network. In light of this and the significant challenges noted in section 3.5, ElectraNet has consulted with stakeholders and considered their views in developing ElectraNet's plans for the future.

An important aspect of this consultative approach has been the development of ElectraNet's "Network 2025 Vision", which sets out objectives and a vision for the management and development of the transmission network and a framework for developing expenditure plans.

In November 2006, ElectraNet published a Network 2025 Vision consultation paper to assist ElectraNet in discussing with government, industry, user groups and community stakeholders the long term needs of South Australia for electricity transmission services and how these might best be met[29].

The consultation paper proposed long term objectives for South Australia's transmission system and a set of clear principles to guide decision making related to its management and development.

The consultation paper also projected that the transmission system will need to be capable of handling a peak electricity demand in 20 years that is 70 per cent higher than today (that is, an increase in peak demand from the present level of

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27 ESCOSA, "Review of the Reliability Standards Specified in clause 2.2.2 of the Electricity Transmission Code Final Decision", September 2006, p19.

28 Electricity Transmission Code, clause 2.10.

29 ElectraNet, "Network 2025 Vision Consultation Paper", November 2006 at www.electranet.com.au/consultation.html

approximately 2,920 MW to 5,000 MW). The uneven pattern of load growth across the State, and the increasing uncertainty regarding future generation and inter-connection flows mean that ElectraNet must be sufficiently flexible in its planning to address customers' evolving needs, as well as uncertainties regarding the location and development of new generation sources.

Stakeholders and interested parties were specifically invited to comment on ElectraNet's:

- understanding of the needs of the South Australian community and electricity market;
- Network 2025 Vision objectives and guiding principles;
- approach to demand forecasting and scenario planning; and
- assessment of strategic drivers and responses impacting on implementation of the Network 2025 Vision and network development plans.

The following parties made submissions in response to the Network 2025 Vision consultation paper.

Table 3.4: Network 2025 Vision consultation submissions.

Stakeholder	Stakeholder
Australian Energy Regulatory (AER)	ETSA Utilities
Australian Pipeline Trust	Flinders Power
ATCO Power Australia Pty Ltd	Limestone Coast Regional Development Board Inc.
Department of Transport, Energy and Infrastructure	Origin Energy
Energy Consumers' Coalition of South Australia (ECCSA)	Southern Flinders Ranges Development Board
Essential Services Commission of South Australia (ESCOSA)	Synergen (International Power)
Electricity Supply Industry Planning Council (ESIPC)	Tarong Energy
Energy Users Association of Australia (EUAA)	

The following themes were prominent in the feedback ElectraNet received from stakeholders:

- Supply reliability is a critical issue for the transmission network;
- An appropriate balance should be struck between reasonable transmission service costs and appropriate levels of investment to address demand growth and assets nearing the end of their useful lives;
- Effective joint planning with the distributor ETSA Utilities is essential; and
- An expectation that demand side management should be an increasingly important part of the South Australia electricity system over the next decade.

Stakeholder comments in relation to increasing demand and the ageing asset base included:

"Our general view is that even putting aside specific path augmentations required for large spot loads, generation or further interconnectors, the general increase in demand will require major network augmentation." (Electricity Supply Industry Planning Council).

"It is acknowledged that your paper does recognise the ageing asset base and we agree that it is critical to address that issue." (Limestone Coast Regional Development Board Inc).

"From a generator's perspective, we are concerned that our access to the market and hence the viability of our significant capital investments may be jeopardised if aging transmission assets are not replaced and augmented in a timely manner, and furthermore if load management initiatives become exceedingly binding on either consumers and generators." (Tarong Energy).

Other stakeholders focused on the importance of reliability and security of supply. In particular, the Energy Consumers' Coalition of South Australia commented as follows:

"The reliable supply of electricity is an essential element of each member's business operations."

Stakeholders also commented on ElectraNet's approach to forecasting demand as follows:

"Forecast demand seems consistent with current experience and knowledge of high growth areas including Adelaide and the mining areas in the north of the State." (Limestone Coast Regional Development Board Inc).

"In general we support the approach proposed to demand forecasting and scenario planning envisaged and in particular the interaction with ESIPC and the probabilistic approach." (Energy Users Association of Australia)

ElectraNet has reviewed and refined its Network 2025 Vision taking into account comments received from stakeholders during the consultation process. These changes are included in an updated vision document released in May 2007[30], which is a key input to ElectraNet's long term planning of South Australia's electricity transmission system.

In terms of the forthcoming regulatory period, ElectraNet's detailed response to the challenges facing the company is reflected in the capital and operating expenditure forecasts set out in Chapters 5 and 6 of this Revenue Proposal.

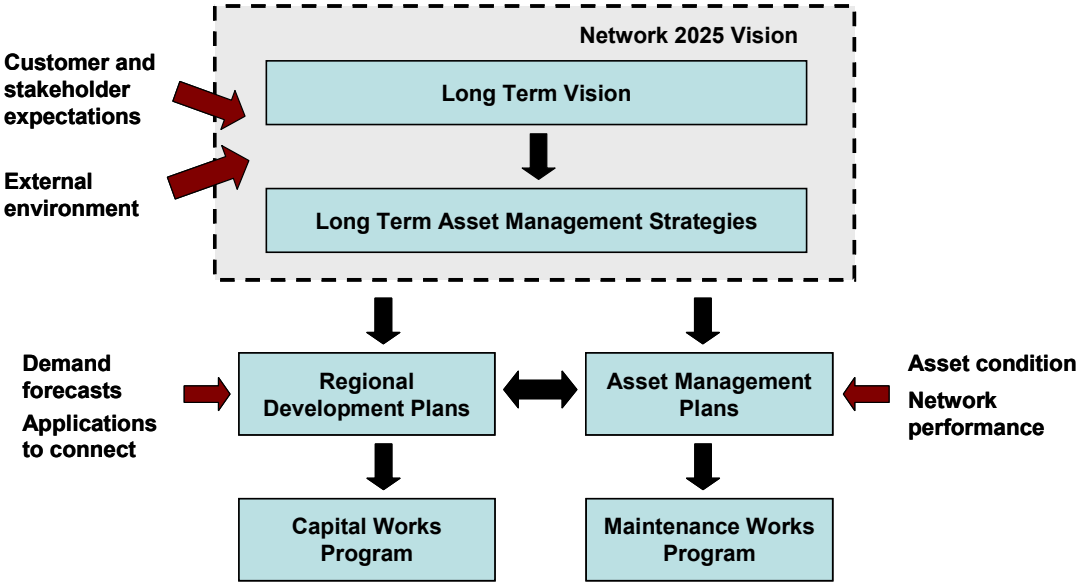
3.5 ElectraNet's Approach to Asset Management

Consistent with stakeholder expectations, a primary objective for ElectraNet is the efficient delivery of reliable electricity transmission services to its customers. ElectraNet's approach to asset management is, therefore, based on best practice asset management principles that seek to optimise the total life cycle costs of the transmission network. This requires a longer term view and holistic approach to asset management and developing capital and operating expenditure plans. Figure 3.5

[30] ElectraNet, "Network 2025 Vision", May 2007 at www.electranet.com.au/consultation.html.

shows a high level summary of ElectraNet's approach, which is explained in more detail below and in later chapters of this Revenue Proposal.

Figure 3.5: ElectraNet's asset management approach.



Network 2025 Vision

ElectraNet first commenced development of its Network 2025 Vision (discussed in section 3.4) in 2003 to establish a longer term vision and corresponding strategies for network development. The Network 2025 Vision recognises that there are a range of factors, in addition to demand growth and asset condition, that need to be considered in developing asset management plans including:

- Customers needs;
- Technology;
- Community expectations;
- Environmental issues;
- Regulatory environment; and
- NEM development.

In summary the Vision is to provide a safe, secure and value for money transmission service for customers.

As discussed in section 3.4, ElectraNet has engaged with customers, government, industry, user groups and community stakeholders in the development of its Network 2025 Vision.

The Network 2025 Vision has driven the development of longer term strategies and plans relating to:

- Network topology;

- Risk profile;
- Functionality; and
- Asset class replacement priorities.

Regional Development Plans

Each of ElectraNet's Regional Development Plans provides a single integrated plan that identifies all known augmentation, connection and asset replacement project requirements and their timings for a particular region of the network, taking into account Network 2025 strategies. An important linkage exists between the Regional Development Plans and the Asset Management Plan. Asset condition and performance issues that drive asset replacement from the asset management plan feed into the regional development plans to optimise the timing of replacements in the context of augmentation developments. The replacement timing then provides guidance to the asset management plan to enable the development of appropriate intermediate term maintenance plans. Regions have been defined so that their development needs are largely independent of other regions (see Figure 3.1). The key outcomes of the regional development plans appear publicly in ElectraNet's Annual Planning Review.

Asset Management Plan

The asset management plan considers the existing asset condition and performance of assets with particular risk profiles and determines the most economic solution to manage the risk of asset failure. ElectraNet has undertaken extensive asset condition assessments during the current regulatory period and developed a much improved understanding of the condition and performance of its assets to guide prudent decision making. The solutions that emerge from the asset management plan are essentially to either maintain the asset with an appropriate maintenance regime or to replace the asset. Again these plans are developed in the context of the Network 2025 Vision strategies.

Capital Works Program

The capital works program is a rolling five year program that contains all of the augmentation, connection and replacement works required. The scope of the capital works program is derived from the regional development plans. The cost of the program is driven both by the scope of works as well as the various "price of work" cost drivers discussed in section 3.6 and in Chapter 5 of this Revenue Proposal.

Maintenance Works Program

The maintenance works program is embedded in ElectraNet's integrated business information system. The maintenance requirements are described within the system in terms of maintenance tasks and maintenance interval. The cost of the program is driven both by the scope of works as well as other "price of work" cost drivers. The cost drivers and efficiency factors that impact on the delivery cost of the maintenance works program are discussed in section 3.6 and in Chapter 6 of this Revenue Proposal.

3.6 Key Challenges and Cost Drivers

A major challenge for ElectraNet in the forthcoming regulatory period is to keep costs down when a number of cost drivers are creating upward cost pressures. A brief discussion of the key cost drivers impacting on ElectraNet's costs follows.

Growth in demand and new ETC standards

Growth in demand is driving the need for significant transmission investment to meet mandated reliability standards specified in the Rules and the ETC. As noted above new ETC standards also require additional investment. For example, the required reinforcement of the Adelaide CBD is expected to cost approximately $138 million during the forthcoming regulatory period.

A growing network also necessitates an increase in operating expenditure, and therefore an allowance for growth has been incorporated in ElectraNet's operating expenditure forecast. This forecasting method utilises the approach recently accepted by the AER in its draft revenue cap decision for Powerlink, and recognises the economies of scale associated with a growing network.

Assets nearing the end of their useful lives

South Australia now has one of the oldest networks in Australia. This has most important implications for the reliability of transmission services in the forthcoming and subsequent regulatory periods. Approximately 35 per cent of ElectraNet's transmission assets are in the 40-60 year age group, reflecting major transmission development in the 1950s and 1960s (see Figure 3.6). There is an increasing number of assets nearing the end of their useful lives.

Demand forecasts and development scenario studies for South Australia do not reveal any opportunities to manage the ageing asset base by reducing service capacity. Therefore, it is essential that ElectraNet maintains existing service capacity and acts now to plan for the replacement of these assets. If timely action is not taken, maintaining service reliability will become an insurmountable challenge as the risk of asset failures increases and the costs of maintenance in future will be considerably higher.

Figures 3.6 shows the profile of remaining transmission line asset lives now and at the end of the 1 July 2008 to 30 June 2013 regulatory period. Proposed replacement capital expenditure has been included in the comparison but augmentation capital expenditure has been excluded. Figure 3.7 similarly shows the profiles of substation and other assets.

Figure 3.6: Transmission line remnant life profile.

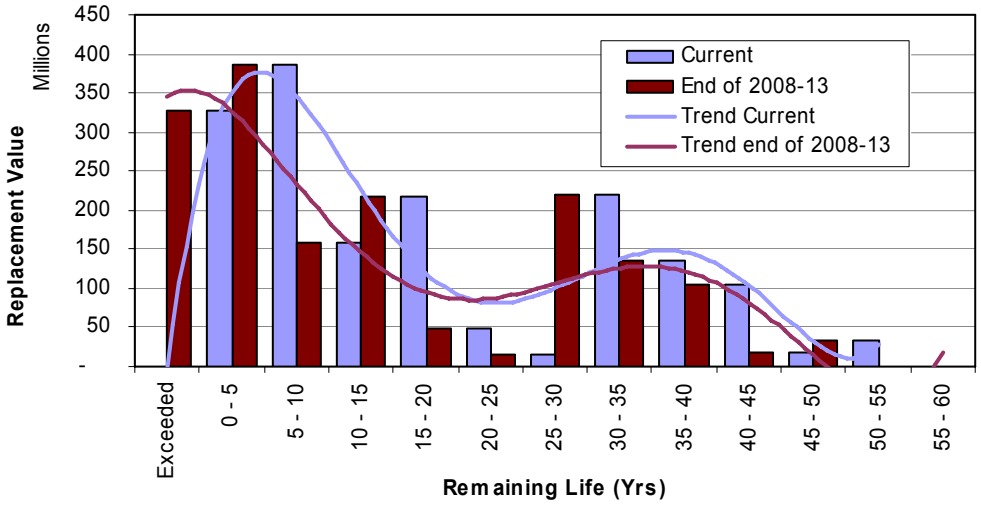
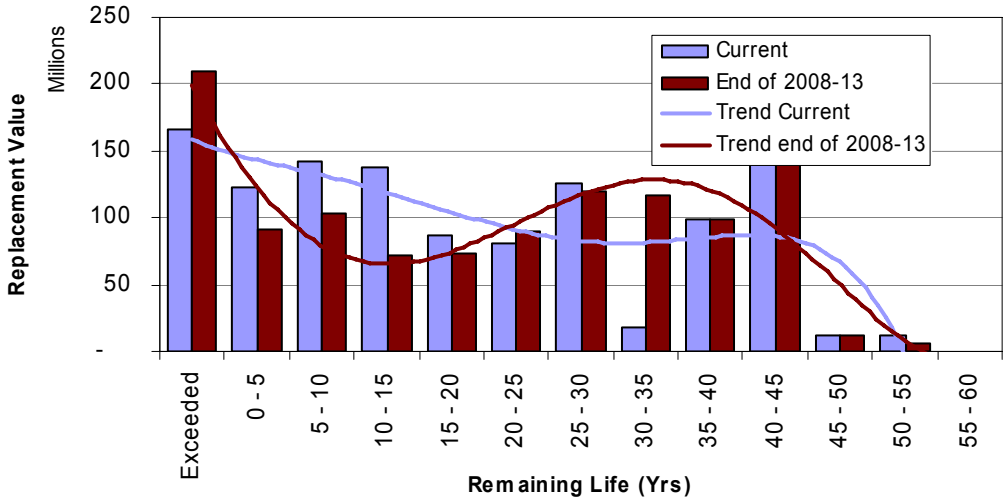


Figure 3.7: Substation and other assets remnant life profile.



The charts show that a significant proportion of ElectraNet's assets have, or will exceed their standard asset lives within the next 5 years despite the proposed asset replacement program included in ElectraNet's capital expenditure forecast.

While age itself is not the prime factor in developing asset replacement programs, it does provide a good indicator of the assets nearing the end of their useful lives and overall asset replacement needs. The charts demonstrate that an increasing number of assets are indeed nearing the end of their useful lives and that this will be a significant challenge for a number of future regulatory periods.

ElectraNet's asset management strategy seeks to meet this challenge by a prudent mix of asset replacement and increased maintenance to meet the required service reliability of older assets.

An important initiative that ElectraNet has taken in the current regulatory period is the introduction of a new maintenance regime to address the particular risks associated with a growing number of assets that are nearing the end of their useful lives.

Labour costs

Labour cost increases are a key driver of ElectraNet's costs.

A widely publicised skills shortage exists in Australia, including in the electricity supply industry and in the construction sector which services the electricity industry. In particular, a marked strengthening in employment demand in the mining, construction and manufacturing sectors in South Australia is driving a scarcity of skilled resources. Surging mining investment (including the very large scale Olympic Dam expansion project) and defence-related work are key factors in this strengthening of employment demand.

As a result of these labour market conditions, wages growth has been strong in the current regulatory period, particularly in the later years, and labour costs are expected to continue to increase significantly ahead of the rate of inflation over the next regulatory period and beyond.

Plant and equipment costs

Strong global demand has seen copper, aluminium and steel prices, and plant and equipment costs rising well above inflation. While some analysts are predicting that the rate of cost increases will slow during the forecast period, annual cost increases are still expected to exceed the rate of inflation.

Critical infrastructure

Electricity transmission infrastructure has been identified as "critical infrastructure" in the context of the counter terrorism initiatives being undertaken co-operatively by Commonwealth and State governments. The National Guidelines for Protecting Critical Infrastructure from Terrorism requires owners and operators of critical infrastructure, such as ElectraNet, to address the security of that infrastructure.

The National Guidelines state that regulators "*should consider the need for investment in resilient, robust infrastructure in market regulation decisions*". The capital expenditure forecast included in this Revenue Proposal includes additional investment to address concerns about the physical security of critical infrastructure.

Other key challenges

Other key challenges facing ElectraNet that have implications for the cost of providing transmission services include:

- Growing environmental restrictions that affect the development of new line routes as well as access to existing infrastructure;
- Difficulty (availability) in securing land and development approvals for new assets due to continued residential encroachment; and
- Consumers in a modern, digital and energy-intensive economy have increasing expectations for ElectraNet to maintaining a highly reliable and secure supply.

3.7 Concluding Comments

ElectraNet's transmission system has physical characteristics that inevitably lead to efficient transmission service costs in South Australia being higher than those in other States. These physical characteristics including limited potential for economies of scale, the lowest energy density in the NEM and the lowest load factor in Australia - and their associated costs - reflect the requirements of ElectraNet's customers, including their location and demand for energy at peak times.

When the external factors and different operating conditions discussed in this section are taken into account, ElectraNet's operating cost performance compares well with that of its peers.

A number of cost drivers are creating upward cost pressures in the forthcoming regulatory period including:

- The combination of demand growth and new mandated reliability standards – in formulating its investment and expenditure plans, ElectraNet must comply with the reliability standards mandated in the Rules and the ETC; for example the ETC mandates the establishment of a second transmission connection point within the Adelaide Central area, which is a major project and the most significant single reason for a higher capital expenditure requirement in the forthcoming regulatory control period;

- The ageing asset base – the need for increasing levels of investment to prudently address the risks associated with an ageing asset base has been recognised by a number of ElectraNet's stakeholders;

- Higher input costs including wages growth, copper, aluminium and steel prices, and transmission plant and equipment costs; and

- Additional investment required to address concerns about the physical security of critical infrastructure.

Despite persistent and pervasive increasing cost pressures, ElectraNet has sought to manage the increase in required expenditure by focussing on the network investments which are required to meet the mandated reliability and planning standards and those necessary to address the highest priority ageing asset base and critical infrastructure security needs.

ElectraNet also recognises that the views of stakeholders and the wider community are important in formulating a vision and long term plans for the future of the South Australian electricity transmission network. ElectraNet has, therefore, consulted with stakeholders and considered their views in developing ElectraNet's plans for the future. An important aspect of this consultative approach has been the development of ElectraNet's "Network 2025 Vision".

ElectraNet's detailed plans for the forthcoming regulatory period are set out in this Revenue Proposal. It is important that these plans are assessed in the context of a longer-term vision for the development of the network. ElectraNet's Network 2025 Vision provides this longer term planning focus for the company, and properly reflects the views of stakeholders.

4. Historic Cost and Service Performance

4.1 Summary

This chapter describes ElectraNet's cost and service performance during the current regulatory period. The information presented in this chapter demonstrates that ElectraNet has performed well during the current regulatory period, both in terms of total cost efficiencies, and also in terms of service performance. The information presented also demonstrates that ElectraNet's costs are efficient.

ElectraNet is confident that its capital expenditure over the current regulatory control period has been prudent, and meets the requirements for incorporation into the regulatory asset base. The remainder of this chapter is structured as follows:

- Section 4.2 summarises the key requirements of the Rules that relate to historical capital and operating expenditure;
- Section 4.3 presents an analysis of ElectraNet's capital expenditure performance during the current regulatory period. This section also discusses the prudence of ElectraNet's capital expenditure over the current regulatory period;
- Section 4.4 presents an analysis of ElectraNet's operating expenditure performance during the current regulatory period;
- Section 4.5 explains ElectraNet's service performance during the current regulatory period; and
- Section 4.6 provides some concluding observations.

4.2 Rules Requirements

Clauses 6A.6.6(e)(5) and 6A.6.7(e)(5) of the Rules require the AER, when assessing expenditure forecasts, to have regard to the actual and expected operating expenditure and capital expenditure of the provider during any preceding regulatory control periods. This chapter is intended to provide the information that the AER needs to address this Rule requirement.

Clause S6A.1.1(6) requires ElectraNet to provide an annual summary of capital expenditure for the current regulatory period categorised in the same way as for the capital expenditure forecast. Similarly clause S6A.1.2(7) requires ElectraNet to provide an annual summary of operating expenditure categorised in the same way as the operating expenditure forecast. The information provided in this chapter fulfils this requirement.

4.3 Analysis of Historic Capital Expenditure

4.3.1 Comparison of forecast and actual capital expenditure

The purpose of this section is to provide a high-level analysis of ElectraNet's best estimate of capital expenditure in the current regulatory control period compared to the capital expenditure allowance contained in the ACCC's 2002 revenue cap decision.

Recognising the uncertainties inherent in forecasting demand and generation, ElectraNet used a probabilistic approach to derive its capital expenditure forecast for the 2003-2008 regulatory period. ElectraNet identified 24 plausible future generation and load development scenarios based on probabilistic scenario themes. Capital development plans and expenditure forecasts were developed for each of the 24 scenarios with no single scenario having an assessed probability of occurrence greater than 13 per cent[31].

The capital expenditure forecast proposed by ElectraNet and (following detailed review) the capital expenditure allowance approved by the ACCC was based on a probability weighted average of the forecasts for the 24 scenarios. The ACCC approved an aggregate capital expenditure allowance of $358 million ($2002-03).

This forecast was developed on an "as-commissioned" basis consistent with the regulatory principles applicable at the time. Under this approach capital expenditure is recognised when the assets come into service and includes financing costs associated with construction in progress.

ElectraNet's forecast and the ACCC's approved capital expenditure allowance were not based on a single list of projects. The probabilistic approach recognises that the future is uncertain and that project priorities will change.

ElectraNet has managed changing network priorities within the ACCC's approved capital expenditure allowance and is confident that it has made prudent investment decisions in the light of the actual circumstances that eventuated over the course of the regulatory period.

Table 4.1 compares the 2002 decision capital expenditure allowance with actual and expected capitalisations by year. It shows that ElectraNet is forecasting to spend within 1 per cent of the approved allowance.

Table 4.1: Annual capitalisation ($m nominal).

	Jan-Jun 2003	2003-04	2004-05	2005-06	2006-07	2007-08	Total
ACCC allowance ($2002-03)	9.7	68.2	87.8	78.6	68.6	45.4	**358.3**
ACCC allowance (CPI escalated)	9.7	70.5	92.6	84.8	76.2	52.0	**385.9**
Actual/ forecast (net disposals)	2.1	34.9	42.8	65.5	98.0	146.5	**389.8**
Variation	(7.6)	(35.6)	(49.8)	(19.3)	21.7	94.4	**3.9**

The following factors have contributed to the apparent delay between the actual/ forecast and ACCC allowance capitalisation profiles:

- a shift in the required timing of major projects (see explanation below); and
- delays in obtaining development approvals – for example the protracted delays related to the South East to Snuggery 132 kV transmission line project.

[31] ElectraNet SA, "Transmission Network Revenue Cap Application 2003 – 2007-08", 16 April 2002, p6-7.

The majority of capital expenditure to be commissioned in 2007-08 is associated with three major projects that are well advanced – the Tungkillo substation establishment, the South East to Snuggery 132 kV transmission line and Cherry Gardens substation replacement. ElectraNet is confident that it will achieve its budgeted capital program for 2007-08.

Table 4.2 shows actual and expected annual capitalisations in the current period by capital expenditure category. This same categorisation is used to present ElectraNet's capital expenditure forecast for the 1 July 2008 to 30 June 2013 regulatory period in Chapter 5 of this Revenue Proposal[32].

Table 4.2: Actual and expected capitalisations by category ($m nominal)[33].

Category	Jan-Jun 2003	2003-04	2004-05	2005-06	2006-07	2007-08	Total
Augmentation	0.5	4.8	5.0	14.4	24.1	75.4	**124.2**
Connection	1.2	10.7	21.5	0.8	5.3	0.0	**39.6**
Replacement	0.0	4.7	13.2	40.0	49.8	61.3	**169.1**
Strategic land/ easements	0.0	0.0	0.0	0.0	2.7	3.8	**6.5**
Security/ compliance	0.1	0.0	0.2	0.0	0.0	1.6	**1.9**
Inventory/ spares	0.0	0.4	1.0	2.9	8.5	1.0	**13.9**
Business IT	0.0	14.4	0.7	7.3	5.4	3.3	**31.2**
Buildings/ facilities	0.3	0.0	1.1	0.1	2.0	0.1	**3.5**
Total	2.1	34.9	42.8	65.5	98.0	146.5	**389.8**

Table 4.3 compares ElectraNet's actual and expected capitalisations during the current regulatory period with the ACCC's capital expenditure allowance by category.

Table 4.3: Comparison of capitalisations in current regulatory period by category ($m nominal).

Category	ACCC Decision	Actual/ Forecast
Augmentation	207.3	124.2
Connection	69.2	39.6
Replacement	95.0	169.1
Strategic land/ easements	0.0	6.5
Security/ compliance	0.0	1.9
Inventory/ spares	4.2	13.9
Business IT	6.5	31.2
Buildings/ facilities	3.8	3.5
Total	**385.9**	**389.8**

32 In accordance with clause S6A.1.1 (6) of the Rules.

33 Figures for 2006-07 and 2007-08 are expected capitalisations.

As noted earlier, ElectraNet has managed changing priorities within 1 per cent of the ACCC's approved capital expenditure allowance. However, this has only been possible because:

- lower than forecast demand growth has allowed the deferral of some major load driven projects – for example the required timing of reinforcement of the southern suburbs was impacted by the closure of the Port Stanvac oil refinery;

- establishment of network support arrangements as part of the conversion of the Murraylink interconnector to regulated status has allowed the deferral of reinforcement of the Riverland 275/ 132 kV system; and

- market benefits driven projects have not eventuated – for example the South Australian component of SNI and an upgrade to the Heywood interconnector.

The above deferrals have made it possible for ElectraNet to manage the following offsetting factors within 1 per cent of the ACCC's capital expenditure allowance:

- the need to undertake a higher than forecast level of replacement expenditure – detailed condition assessments of substation and transmission line assets during the period have led to a more comprehensive understanding of asset condition, which has influenced the decision to commit higher levels of replacement expenditure within the period;

- an increase in project costs due to underestimating the required scope and, therefore, cost of projects;

- the higher than forecast input costs experienced later in the period (unrelated to scope changes) – for example wages growth, metal prices and plant and equipment costs (discussed in section 3.6)[34]; and

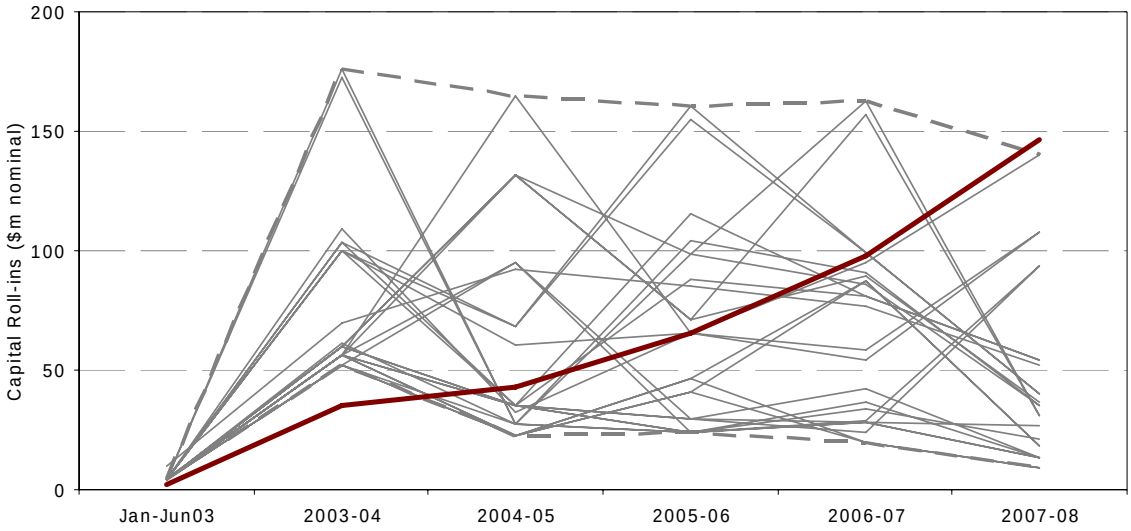
- the need for capital expenditure above forecast levels on strategic land/ easements, inventory and spares, and business IT.

Without the above deferrals, ElectraNet could not have managed these offsetting factors within the ACCC's capital expenditure allowance.

In summary, ElectraNet's expected actual capital expenditure for the current regulatory control period is $390 million (on an as-commissioned basis). This expected actual capital expenditure is shown in Figure 4.1 as the heavy line superimposed on the 24 plausible future scenarios considered in 2002. The chart shows that, despite the changing circumstances that have eventuated over the regulatory period, the expected expenditure is generally within the upper and lower bounds of the plausible scenarios, consistent with the probabilistic approach to capital expenditure forecasting.

[34] Section 5.7.11 includes an assessment of historical projects, which shows that actual project costs have exceeded capital expenditure forecasts by on average about 22 per cent – this includes the impact of both "volume of work" scope changes and "price of work" input cost increases.

Figure 4.1: Actual capitalisations compared to revenue cap application scenarios ($m nominal).



ElectraNet has formulated its capital projects to address the most pressing network issues that eventuated during the regulatory period. The changes required are not surprising given the challenges noted earlier of forecasting capital expenditure in an environment of uncertain generation and load conditions.

In fact, the uncertain nature of capital expenditure forecasting is the principal reason ElectraNet adopted a probabilistic forecasting approach in its 2002 revenue application, and ElectraNet has adopted a similar forecasting approach in this Revenue Proposal.

However, as is explained in Chapter 5, ElectraNet's capital expenditure requirement for the forecast period exhibits a much higher degree of certainty than the requirement forecast at the beginning of the current regulatory period.

4.4 Analysis of Operating Expenditure Performance

The purpose of this section is to provide a high-level analysis of ElectraNet's best estimate of operating expenditure in this current regulatory period compared to the operating expenditure allowance contained in the ACCC's 2002 revenue cap decision.

ElectraNet's revenue cap application in 2002 explained the need to increase operating expenditure in a number of areas including:

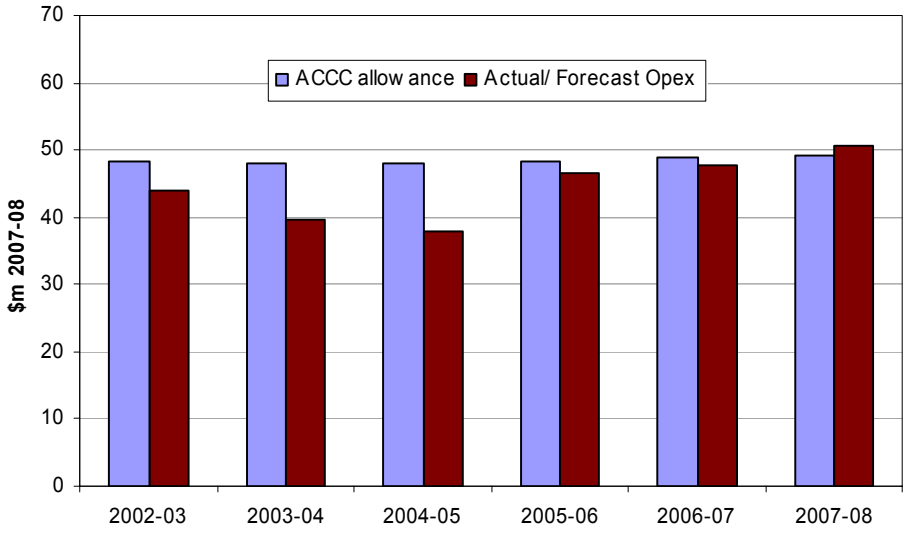
- Increased expenditure on asset refurbishment and network monitoring to address ElectraNet's ageing network and to maintain network reliability, consistent with best practice asset management and expenditure levels of other Australian TNSPs;
- Higher insurance costs; and
- Additional obligations under the National Electricity Code to co-ordinate planning and operation of the transmission network with the National Electricity Market.

Table 4.4 and Figure 4.2 provide an overview of the ACCC's operating expenditure allowance in its 2002 revenue cap decision, and ElectraNet's estimate of its operating expenditure in the current regulatory period (which includes actual expenditure to date and forecast figures for the remainder of 2006-07 and 2007-08).

Table 4.4: Controllable operating expenditure in current regulatory period ($m 2007-08).

	Jan-Jun 2003	2003-04	2004-05	2005-06	2006-07	2007-08	Total
ACCC allowance	24.1	48.1	48.0	48.4	49.0	49.3	**266.9**
Actual/ forecast	26.7	39.6	37.8	46.6	48.0	50.8	**249.5**
Variation	(2.6)	8.5	10.1	1.8	1.0	(1.5)	**17.4**

Figure 4.2: Comparison of 2002 decision and actual/ forecast controllable opex ($m 2007-08).



Note: The full 2002-03 financial year has been included for comparison purposes

ElectraNet has responded positively to the applicable regulatory incentives and achieved significant overall cost savings (relative to the revenue cap allowance) in the current regulatory period. Long term sustainable savings, primarily in corporate costs, have been achieved through the restructuring of business operations and other initiatives.

However, the substantial and sustainable savings achieved have been, and continue to be, overtaken by other cost increases resulting from the impacts of the cost drivers outlined in Section 3.6. In particular, the introduction of a new maintenance regime to address the risks associated with a growing number of assets that are nearing the end of their useful lives will result in maintenance costs in the current period exceeding the maintenance cost allowance by about 20 per cent. The underlying drivers of higher input costs and ageing assets are expected to continue well into the future and impact on costs in the forecast period.

In aggregate terms, ElectraNet's operating expenditure has been lower than the allowance set by the ACCC in its 2002 revenue cap decision. However, as noted above, operating expenditure has been increasing steadily from a low point in 2004-05 and is expected to be in line with the ACCC operating expenditure allowance by 2007-08. Table 4.5 shows ElectraNet's annual operating expenditure in the current

regulatory period by category. This same categorisation is used to present ElectraNet's operating expenditure forecast for the forthcoming regulatory period in Chapter 6 of this Revenue Proposal.

Table 4.5: Operating expenditure in current regulatory period by category ($m 2007-08).

Category	Jan-Jun 2003	2003-04	2004-05	2005-06	2006-07	2007-08	Total
Field maintenance	5.8	11.2	10.2	18.0	21.0	21.4	**87.4**
Field support	2.6	4.8	6.5	6.5	6.6	6.9	**33.7**
Operations	1.0	2.4	1.7	1.8	1.8	2.0	**10.7**
Asset manager support	4.1	5.8	5.9	5.4	5.4	5.5	**32.2**
Corporate support	13.3	15.5	13.5	15.0	13.2	15.0	**85.5**
Total controllable	**26.7**	**39.6**	**37.8**	**46.6**	**48.0**	**50.8**	**249.5**
Other opex	2.3	4.2	5.1	4.5	5.1	4.9	**26.0**
Total	**28.9**	**43.8**	**42.9**	**51.1**	**53.1**	**55.7**	**275.5**

Table 4.6 provides a brief description and explanation of ElectraNet's operating expenditure by category during the current regulatory period.

Table 4.6: Description of operating expenditure in current regulatory period by category.

Category	Description and explanation of operating expenditure
Field Maintenance	Field maintenance includes the direct costs of preventative, condition based, and corrective maintenance. Long term savings have been made through restructuring of vegetation clearance activities from a two year to three year cycle. As explained in Chapter 6 of this Revenue proposal, ElectraNet is in the process of implementing a new maintenance regime to address the ageing asset base, which has a greater focus on condition assessment. The transition to the new regime has resulted in a temporary reduction in some maintenance activities, as condition assessments are completed and the new maintenance regime transitions to full implementation.
Field Support	This activity includes monitoring and managing the delivery of field maintenance services to ElectraNet by service providers. An increase in expenditure has been required to support the increase in direct maintenance works under the new maintenance regime for assets reaching end of life.
Operations	This activity includes the network control centre functions, as well as investigation of network outages and network performance monitoring. Savings have been achieved through upgrades to the control centre and restructuring of the operations centre, which now allows single person shifts during the weekend period and overnight.
Asset manager Support	Asset Manager Support activities include activities that directly relate to supporting the development, operations and management of the asset. They include network planning, customer and regulatory support, and IT support. The costs of this activity have been relatively stable. ElectraNet has obtained some longer-term efficiency improvements by restructuring its supports services, particularly in relation to IT. Network planning activities have increased to address increased complexity arising from the analysis of system limitations and constraints.
Corporate Support	Corporate support activities are those activities required to ensure adequate and effective corporate governance and business administration. This includes financial and HR management, corporate governance and insurance costs. Long term sustainable savings have been achieved through the restructuring of business operations including in relation to consolidation of IT business systems, and through negotiation of Workcover exempt status.

The analysis presented in this section illustrates that ElectraNet's actual operating expenditure has been lower than the allowance set by the ACCC in 2002, but has been increasing markedly since 2004-05. A number of the factors identified in driving up operating expenditure in ElectraNet's 2002 revenue application have indeed led to cost increases. As noted in section 3.6 of this Revenue Proposal, the challenges arising from an ageing asset base will remain relevant for the forthcoming and subsequent regulatory periods.

4.5 Service Performance

The ACCC's 2002 revenue cap decision includes a service standards performance incentive scheme to provide incentives to maintain and improve service quality. The scheme's performance indicators include circuit availability, average outage duration and loss of supply event frequency.

ElectraNet's performance against these indicators during the current regulatory control period exhibits an overall trend of improved performance, as shown in the remainder of this section.

Table 4.7: Performance against ACCC service standards scheme.

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Availability (%)	99.23	99.25	98.82	99.29	99.32	99.30	99.38	99.59	99.35	99.57	99.42
Average Outage Duration (Minutes)	88.3	360.9	151.4	85.1	60.1	132.0	70.0	70.1	48.9	114.1	88.5
No of events >0.2 System minutes	3	5	3	7	7	2	4	2	7	0	4
No. of events >1.0 system minutes	3	2	1	1	1	1	0	1	0	0	0

Table 4.7 shows that since the introduction of the ACCC and the preceding ESCOSA performance incentive schemes, ElectraNet has responded positively to incentives to improve network availability and reliability.

This has been achieved in part by a significantly heightened level of management focus on network performance that has resulted in the implementation of a number of performance improvement initiatives including:

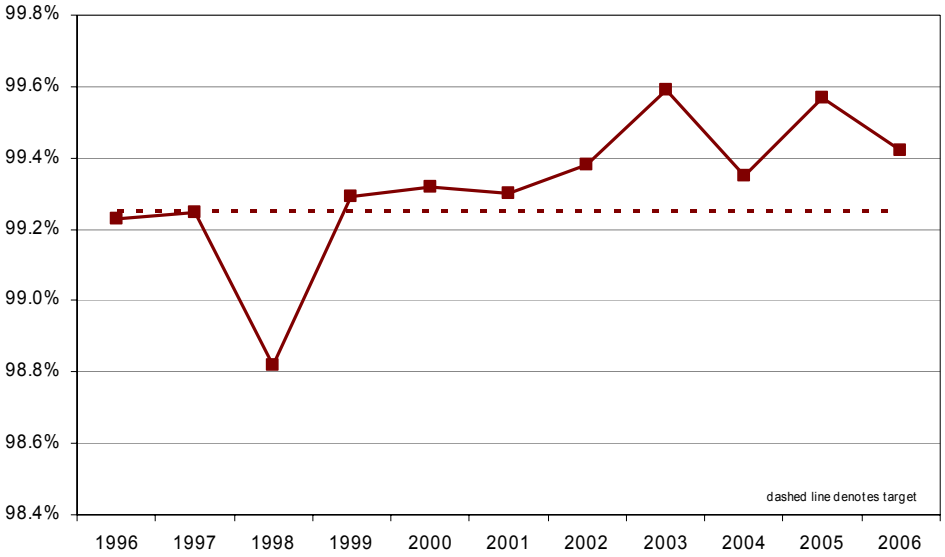
- outage risk assessments conducted for scheduled capital and operational work to identify possible modes of failure and remediation;
- providing incentives to out-sourced service providers by integrating outage and availability impacts into contracts for capital and maintenance works. Typically this involves the sharing of both the bonus and penalty impacts of outage events to reflect the performance incentive schemes put in place by the regulators;
- more rigorous investigation of all transmission system faults and interruptions to supply in order to determine root causes and develop action plans to minimise reoccurrence of faults; and
- condition assessments of ageing infrastructure to identify and progress refurbishment and replacement needs.

The following sections discuss ElectraNet's performance against each of the service performance indicators in Table 4.7 and compare this performance with the performance targets set by the ACCC.

4.5.1 *Transmission line availability*

The progressive implementation of performance management initiatives has resulted in improvements in this indicator over the last 10 years, having started from an already high base as shown in Figure 4.3 below.

Figure 4.3: Transmission line availability from 1996 to 2006.



This high level of performance achieved by ElectraNet suggests that:

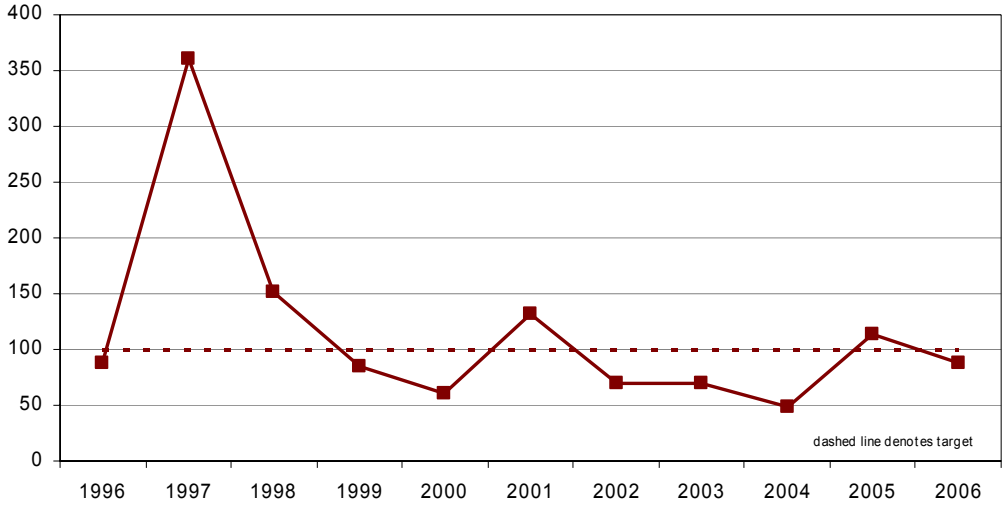
- further improvements will be increasingly difficult and costly to achieve; and
- therefore, this should be recognised in future incentive schemes by including an asymmetric cap and collar to recognise the higher degree of difficulty in achieving further improvements.

4.5.2 *Average outage duration*

The reduction in average outage duration during the current regulatory period was achieved in part through the implementation of performance management initiatives and also from the absence of long return period major outages on the radial network in subsequent years. Figure 4.4 below shows the trend in average outage duration from 1996 to 2006.

In setting future targets for this indicator it is important to recognise that a single outage involving a transmission line North of Port Augusta or West of Yadnarie may take many hours to restore due to the remote locations and lengths of these lines, and the prudent (public safety) requirement to patrol all or part of the lines following an unplanned outage. Such outages could result in the movement of the measure by as much as 100 minutes or more. The maximum outage duration during the period 2002 to 2006 was 258 minutes versus outages in excess of 700 minutes for remote lines in the previous 5 years. ElectraNet proposes to exclude such outages as outliers from both future target setting and performance reporting for this indicator.

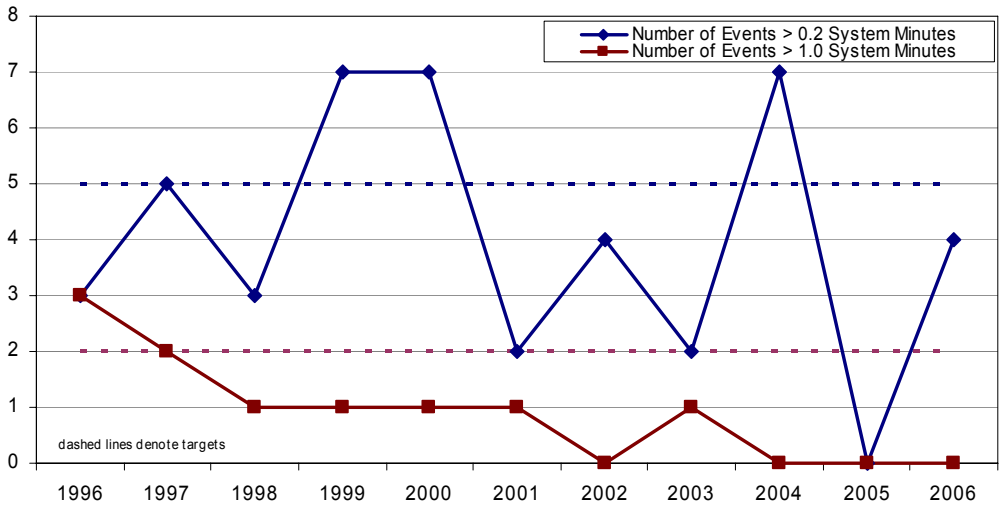
Figure 4.4: Average outage duration from 1996 to 2006.



4.5.3 *Loss of supply event frequency*

The progressive implementation of performance management initiatives has resulted in improvements over the last 10 years particularly in Events > 1.0 System Minutes. Performance against this measure has improved due to the implementation of enhanced outage risk assessments for scheduled capital and operational work to identify modes of failure and, more importantly, remediation. As shown in Figure 4.5, the Events > 0.2 System Minutes has improved marginally.

Figure 4.5: Outage event frequency from 1996 to 2006.



ElectraNet has been the subject of performance incentive schemes since 1 April 2000 and is operating at or near 'best practice' levels for a network with its characteristics.

As already noted:

- there are limited opportunities to make further cost-effective improvements; and therefore

- in designing future service incentive schemes it is appropriate to recognise the asymmetric nature of performance risk (i.e. there is more chance of a deterioration in performance than of an improvement).

Accordingly it is appropriate to set asymmetric caps and collars to recognise the inherent difficultly faced by ElectraNet in improving from an already extremely high base, where performance can be dominated by unpredictable events beyond the reasonable control of the company. This would involve setting the cap for achieving full bonus closer to the target than the collar for maximum penalty recognising that improvement opportunities are principally due to management effort whilst degradation is driven by random events. ElectraNet provides details of its proposed service incentive scheme for the forthcoming regulatory control period in Chapter 10 of this Revenue Proposal.

For the purposes of this section of the Revenue Proposal, however, it is important to note that ElectraNet's service performance shows an overall trend of improved performance. This outcome should provide the AER and other stakeholders with confidence that the company has been delivering improving levels of performance whilst also managing total expenditure efficiently.

4.6 Concluding Comments

This chapter has described ElectraNet's cost and service performance during the current regulatory period. The information presented demonstrates that ElectraNet has performed well during the current regulatory period, both in terms of total cost efficiencies, and also in terms of service performance.

5. Forecast Capital Expenditure

5.1 Summary

This chapter presents ElectraNet's capital expenditure forecast for the forthcoming regulatory control period.

ElectraNet's capital expenditure performance in the current regulatory period was discussed in Section 4.3. ElectraNet has responded positively to regulatory incentives and managed changing capital investment priorities within 1 per cent of the ACCC's approved capital expenditure allowance.

ElectraNet is forecasting a significantly higher capital expenditure requirement in the forthcoming regulatory period. ElectraNet has sought to manage this increase by carefully balancing the cost of increased network investment against the increased risk of reliability failures if investment is not increased.

The key cost drivers contributing to higher levels of forecast capital expenditure are as follows:

- Growth in demand and the new ETC standards are driving the need for significant transmission investment to meet mandated reliability standards. For example, the required reinforcement of the Adelaide CBD is expected to cost approximately $138 million over the forthcoming regulatory period;
- An increasing number of assets nearing the end of their useful lives, which requires increased levels of asset replacement expenditure;
- Additional investment required to address concerns about the physical security of critical infrastructure;
- Real wages growth caused by a marked strengthening in employment demand in the mining, construction and manufacturing sectors in South Australia; and
- The price of transmission equipment currently rising well above inflation due to strong global demand.

The combined effect of these cost drivers is an increased capital expenditure requirement in the forecast period.

ElectraNet is confident, however, that its capital expenditure forecast is both efficient and prudent and that it meets the required expenditure objectives set out in the Rules.

This chapter is structured as follows:

- Section 5.2 summarises the key requirements of the Rules that relate to the forecasting of capital expenditure;
- Section 5.3 describes ElectraNet's compliance obligations related to the Rules capital expenditure objectives;
- Section 5.4 describes ElectraNet's Cost Allocation Methodology;

- Section 5.5 describes ElectraNet's capital expenditure categories used in presenting the capital expenditure forecast;
- Section 5.6 explains the capital expenditure forecasting methodology;
- Section 5.7 describes the key inputs and assumptions underlying the capital expenditure forecast and provides substantiation for these inputs and assumptions;
- Section 5.8 presents and explains ElectraNet's capital expenditure forecast;
- Section 5.9 presents information relating to proposed contingent projects;
- Section 5.10 demonstrates that ElectraNet has complied with the requirements of the Rules in relation to its capital expenditure forecast; and
- Section 5.11 provides concluding comments.

5.2 Rules Requirements

ElectraNet's Revenue Proposal must contain a capital expenditure forecast which ElectraNet considers is required to achieve each of the following capital expenditure objectives[35]:

- meet the expected demand for prescribed transmission services over the period;
- comply with all applicable regulatory obligations associated with the provision of prescribed transmission services;
- maintain the quality, reliability and security of supply of prescribed transmission services; and
- maintain the reliability, safety and security of the transmission system through the supply of prescribed transmission services.

In addition the forecast of required capital expenditure must:

- comply with the requirements of the AER's submission guidelines;
- be for expenditure that is properly allocated to prescribed transmission services in accordance with the principles and policies set out in the Cost Allocation Methodology for the Transmission Network Service Provider; and
- include both: the total of the forecast capital expenditure for the relevant regulatory control period; and the forecast of the capital expenditure for each regulatory year of the relevant regulatory control period.

The AER must accept the forecast of required capital expenditure that is included in a Revenue Proposal if the AER is satisfied that the total of the forecast capital expenditure for the regulatory control period reasonably reflects the following capital expenditure criteria:

- the efficient costs of achieving the capital expenditure objectives;

[35] Clause 6A.6.7 of the Rules.

- the costs that a prudent operator in the circumstances of the relevant TNSP would require to achieve the capital expenditure objectives; and

- a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives.

Schedule 6A.1.1 specifies other minimum information that must be provided to explain and substantiate the forecast of required capital expenditure including amongst other things an appropriate categorisation of the capex forecast, the methodology used for developing the forecast, key input variables and assumptions that underlie the forecast and a certification of the reasonableness of the key assumptions by the directors of ElectraNet.

In addition to the capital expenditure forecast, a Revenue Proposal may also include proposed contingent capital expenditure, which the TNSP considers is reasonably required for the purpose of undertaking a proposed contingent project. Contingent projects must satisfy the following criteria[36]:

- the proposed contingent project must be reasonably required to be undertaken in order to achieve any of the capital expenditure objectives;

- the proposed contingent capital expenditure must not be otherwise provided for (either in part or in whole) in the total of the forecast capital expenditure, must reasonably reflect the capital expenditure criteria and exceed either $10 million or 5 per cent of the TNSP's maximum allowed revenue for the first year of the regulatory control period, whichever is the larger amount;

- information provided in relation to proposed contingent projects must satisfy the AER's submission guidelines; and

- the trigger event for the proposed contingent project must be reasonably specific and capable of objective verification, must relate to a specific location rather than a condition or event that affects the transmission network as a whole, and must be probable but not sufficiently certain with respect to the likelihood of occurrence or the associated cost.

5.3 Compliance Obligations

This section describes ElectraNet's compliance obligations, which relate to the capital expenditure objectives set out in the Rules.

ElectraNet must comply with its obligations under the South Australian Electricity Act and its Transmission License[37]. As noted in Chapter 2, ElectraNet must also plan and operate its transmission system in accordance with the mandated reliability and security standards set out in the Rules and in the ETC. The Rules require ElectraNet to comply with the power system performance and quality of supply standards in schedule 5.1. The Rules mandate system security requirements (operation allowing for next contingency) and reliability requirements (e.g. N-1 for meshed network). For example, clause S5.1.2.1 states:

> *"Network Service Providers must plan, maintain and operate their transmission and distribution networks to allow the transfer of power from*

[36] Clause 6A.8.1 of the Rules.

[37] www.escosa.sa.gov.au

> *generating units to Customers with all facilities or equipment associated with the power system in service and may be required by a Registered Participant under a connection agreement to continue to allow the transfer of power with certain facilities or plant associated with the power system out of service and may be required by a Registered Participant under a connection agreement to continue to allow the transfer of power with certain facilities or plant associated with the power system out of service, whether or not accompanied by the occurrence of certain faults (called "credible contingency events")."*

As discussed in Chapter 2 and section 3.3.2, ESCOSA has recently consulted on and reviewed the mandated reliability standards in the ETC for the period commencing 1 July 2008, (i.e. the commencement of the forthcoming regulatory period). Inherent in the new connection point reliability standards is recognition of the cost of unserved customer energy. This translates directly into specific levels of required transformer and transmission line redundancy at each connection point; ranging from no redundancy to full redundancy.

Clause 2.3.1 of the ETC (which will apply from 1 July 2008) states:

> *"A transmission entity must plan and develop its transmission system such that each connection point or group of connection points allocated to a category in accordance with clause 2.4 meets the relevant standards for that category as set out in clauses 2.5 to 2.10."*

Clauses 2.1.1 and 2.1.2 of the ETC additionally impose specific obligations on ElectraNet in relation to planning, developing and operating the network:

> *"A transmission entity must use its best endeavours to plan, develop and operate the transmission network to meet the standards imposed by the National Electricity Rules in relation to the quality of transmission services such that there will be no requirement to shed load to achieve these standards under normal and reasonably foreseeable operating conditions."*

> *"A transmission entity must use its best endeavours to plan, develop and operate the transmission network to meet the standards imposed by the National Electricity Rules in relation to the transmission network reliability such that there will be minimal requirement to shed load under normal and reasonably foreseeable operating conditions."*

The ETC standards are important drivers of the level of investment needed to deliver capacity at both the connection points and in the deeper transmission system. For example, as discussed in Section 3.3.2, the revised ETC requires ElectraNet to provide additional transformer and line capacity to supply the Adelaide Central area for 100 per cent of Agreed Maximum Demand (AMD) under single contingency [N-1] operating conditions by 31 December 2011.

The ETC also requires, for example, that sufficient spares of each type of transformer must be available to meet minimum restoration times in the event of a transformer failure.

In addition to the requirements of the Rules and the ETC, ElectraNet complies with all applicable National and International Standards, Codes of Practice, Safety Standards and practices generally accepted as appropriate by the Australian electricity supply industry. These standards and guidelines determine for example, how assets are to be designed and operated (e.g. Loading Guide for Oil-Immersed Transformers AS2374.7:1997, Electromagnetic compatibility (EMC) AS61000.3.7:2001 and ESAA

C(b)-1 Guideline for the Design and Maintenance of Overhead Distribution and Transmission Lines).

In considering efficient solutions to meet its compliance obligations under the Rules and the ETC, ElectraNet must also have regard to the requirements of other mandatory obligations including environmental and planning approval processes.

ElectraNet is confident that by developing its capital expenditure forecast to meet the above compliance obligations it has developed a forecast that meets the Rules capital expenditure objectives.

5.4 Cost Allocation Methodology

As noted in Section 5.2, a TNSP's capital expenditure forecast must be for expenditure that is properly allocated to prescribed transmission services in accordance with the principles and policies set out in its Cost Allocation Methodology[38]. However,

- for the purpose of this Revenue Proposal, the Rules define "Cost Allocation Methodology" as the methodology approved or taken to be approved by the AER under clause 11.6.18(d); and

- the applicable guidelines state that each TNSP must submit its proposed Cost Allocation Methodology to the AER for approval by no later than 28 March 2008, in accordance with clause 6A.19.4(a)(1) of the Rules.

While ElectraNet is not yet required to have a formally approved Cost Allocation Methodology under the Rules, its expenditure forecasts have been prepared in accordance with its internally-approved Cost Allocation Methodology[39]. A brief explanation of this methodology follows.

ElectraNet's SAP general ledger chart of accounts has been appropriately structured so that each category of transmission services can be separately identified. Labour costs are directly allocated to appropriate cost centres and account numbers reflecting the activities undertaken by staff members. Materials and service costs are directly allocated by appropriate coding of invoices. Corporate overheads that are not able to be directly attributed to a category of transmission services are allocated between categories of services using a percentage of asset base as an appropriate causal allocator.

ElectraNet's capital expenditure forecast (and similarly its operating expenditure forecast, which is the subject of Chapter 6 of this Revenue Proposal) include only that expenditure which has been properly allocated to prescribed transmission services in accordance with ElectraNet's internally approved Cost Allocation Methodology. ElectraNet considers that methodology to be consistent with the cost allocation principles set out in clause 6A.19.2 of the Rules, and the AER's first proposed cost allocation guidelines.

[38] In accordance with clause 6A.6.7(b)(2).

[39] ElectraNet, "Cost Allocation Methodology", May 2007.

5.5 Capital Expenditure Categories

ElectraNet's capital expenditure forecast must be presented by reference to well accepted categories of capital expenditure[40]. For material assets the location of the proposed asset, the anticipated or known cost of the proposed asset and the categories of prescribed transmission services to be provided by the proposed asset should also be identified.

ElectraNet's capital expenditure categories are shown in Table 5.1 together with the prescribed transmission services to which they relate.

Table 5.1: Capital expenditure categories.

Category	Description	Prescribed Transmission Services
Augmentation	As defined in the Rules, works to enlarge or increase the capability of the network to transmit active energy. Projects generally involve the construction of new transmission lines or substations, and reinforcement of the existing shared network and may be either a reliability augmentation or a market benefits augmentation.	TUOS services
Connection	Works to either establish new customer connections or to increase the capacity of existing customer connections based on a specific customer requirement. Under recent changes to the Rules only connection works between regulated networks are treated as prescribed services[41].	Exit services
Replacement	Works to replace transmission lines, substation primary plant, secondary systems, communications equipment and other transmission system assets in order to maintain reliability of supply. Replacement projects are generally undertaken due to the increased risk of plant failure as assets age, obsolescence or safety issues[42].	Exit services and TUOS services
Strategic land/ easements	Strategic land and easement acquisitions for future augmentation, connection and replacement requirements.	Common transmission services
Security/ compliance	Projects required to ensure the physical security of critical infrastructure assets.	Entry services, exit services, TUOS services and common transmission services
Inventory/ spares	Spare holdings required to respond to asset failures in accordance with restoration times specified in the ETC and good electricity industry practice.	Common transmission services
Business IT	Projects to develop and maintain IT capacity and to improve the functionality of business systems to support business growth.	Common transmission services
Buildings/ facilities	Projects to replace and upgrade office accommodation and services to suit growing business needs.	Common transmission services

40 National Electricity Rules, clause S6A.1.1.

41 A request from a generator or a direct connect customer to increase the capacity of an existing prescribed entry or exit service would be treated as a negotiated transmission service under the Rules.

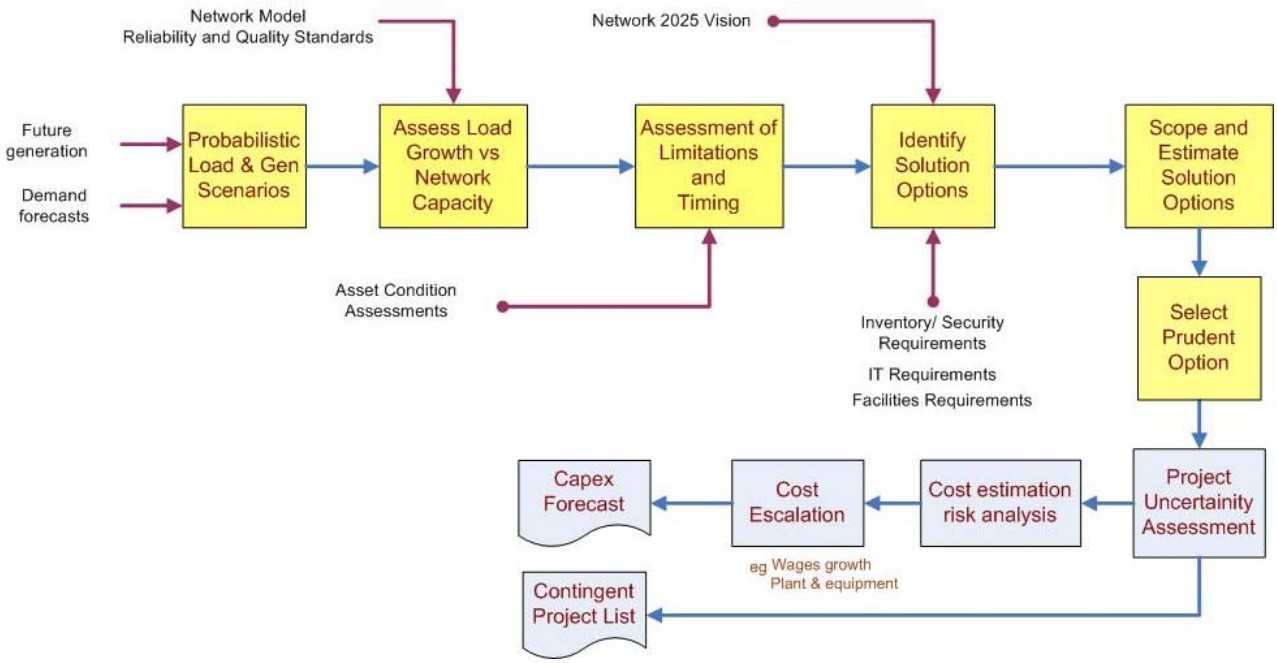
42 ElectraNet understands that under recent Rule changes the replacement of assets providing prescribed entry or exit services to a generator or direct connect customer would be treated as a negotiated service.

Section 5.8 presents ElectraNet's capital expenditure forecast against the categories described in Table 5.1, including details of material assets, their estimated cost and location.

5.6 Forecasting Methodology

This section describes ElectraNet's capital expenditure forecasting methodology as required by clause S6A.1.1 of the Rules. The methodology is shown diagrammatically in Figure 5.1.

Figure 5.1: Capital expenditure forecasting methodology.



In developing a capital expenditure forecast, it is necessary to model the network in order to assess whether or not it has sufficient capacity to meet forecast increases in customer demand, taking into account the age and condition of assets.

Key factors in making this assessment include ElectraNet's detailed models of the electrical power system (including the transmission system), the mandated reliability and quality of supply standards that ElectraNet is required to meet (planning standards) and forecasts of demand and the location of future generation.

Where network limitations are identified (i.e. where the network does not have sufficient capacity to meet forecast increases in customer demand) both network and non-network solution options are identified. Potential solution options are scoped and cost estimates prepared to allow the solution options to be compared in terms of their cost. For reliability driven network limitations the solution option selected for inclusion in the capital expenditure forecast is typically the one that delivers the lowest present value cost over the analysis period.

Important factors taken into account when assessing network limitations and potential solution options include asset condition and ElectraNet's Network 2025 Vision guiding principles. For example, the condition of assets in a substation where augmentation is

required may influence a decision on the most prudent solution option or a decision to align the timing of an otherwise identified asset replacement project with the augmentation. Similarly Network 2025 Vision guiding principles (e.g. a view of future functionality requirements) may influence a decision on the most prudent solution option or the scope of that option.

As part of its forecasting methodology ElectraNet has excluded from the capital expenditure forecast projects that are considered not sufficiently certain in terms of either their required timing, scope or cost. However, where the requirement for such a project is considered probable during the regulatory period, that project is included in this Revenue Proposal as a contingent project (in accordance with clause 6A.8.1 of the Rules). Proposed contingent projects are presented in Section 5.9.

The final steps in ElectraNet's forecasting methodology are to recognise cost estimation risk across the forecast portfolio of projects and cost escalation.

Cost estimation risk analysis is based on a statistical approach to understanding the uncertainties and probabilities associated with project cost estimates. In reality the inherent uncertainties in the cost estimating process mean that a cost estimate should be seen as a range of possible outcomes rather than a single point estimate and there is a higher probability that costs will increase rather than decrease (explained in section 5.7.11). The risk analysis undertaken determines a factor that is applied to the portfolio of projects to ensure that the overall capital expenditure forecast is unbiased (i.e. to ensure that the probability of actual cost outcomes exceeding the forecast is no higher than the probability of a cost underrun).

The cost escalation step of the forecasting methodology involves escalating cost estimates for expected wages growth and expected non-labour construction cost increases, including copper, aluminium, steel and plant and equipment price rises.

Table 5.2 provides additional information about the assessment of needs and identification of solutions steps of the forecasting methodology by capital expenditure category.

Section 5.7 describes and provides substantiation for the key inputs and assumptions used in the forecasting methodology.

Table 5.2: Identification of needs and solutions by capital expenditure category.

Category	Description
Augmentation and Connection	Connection point and network limitations are identified by static loadflow analysis; typically concentrating on the thermal capacity of lines, transformers, circuit breakers and current transformers under normal and contingent operating conditions. Consideration is also given to other performance issues such as: • Voltage stability – concerned with ensuring sufficient reactive power support to maintain voltage levels under normal and contingent operating conditions; • Transient stability – concerned with large disturbances due to faults causing generation and power system instability; • Small signal stability – concerned with small switching disturbances causing oscillations across the interconnected power system; and • Fault capacity – concerned with the fault rupturing capability of circuit breakers, mechanical strength of substation infrastructure and earth potential rise.

Table 5.2: Identification of needs and solutions by capital expenditure category (continued).

Category	Description
Augmentation and Connection (continued)	Where a system performance issue is identified, the following hierarchy of solutions (based generally on increasing order of cost) is examined: • operational management (e.g. manual tap changing on transformers to shift reactive loading); • control systems (e.g. automatic runback and tripping schemes to alter power flows and generation dispatch limiters; • reconfiguration of existing network (e.g. splitting busses to reduce fault levels); • demand side management initiatives (e.g. contract allowing tripping of one load to restore another); • procurement of network support services (e.g. distribution network support and generation network support); • distribution augmentation (e.g. 66kV network reinforcement); and • transmission augmentation. Regular joint planning with ETSA Utilities is undertaken to ensure that both transmission and distribution performance issues are taken into account, in accordance with clause 5.6.2 of the Rules. As the transmission and distribution systems are electrically connected, either may be in a position to provide a means of addressing system performance issues. For augmentations, the solution option selected must satisfy ElectraNet's compliance obligations, be technically feasible, be deliverable in the timeframe required (timeframes are mandated for reliability augmentations) and in any case, minimise the total expected costs (or maximise the total expected net present value) to customers in accordance with the requirements of the Regulatory Test.
Replacement	ElectraNet's asset replacement strategy is based on condition assessment and risk management. Where it is considered prudent and cost effective, replacement expenditure is deferred by installing asset condition monitoring systems. Factors contributing to asset replacement decisions include lack of functionality to meet operational requirements, lack of availability of spares and expertise to service equipment, and deterioration of asset condition resulting in an unacceptable risk of unpredictable failure. Decisions to complete major asset replacement projects are based on condition assessment, economic reliability analysis and consideration of network augmentation plans. The detailed methodology for determining asset replacement requirements is set out in ElectraNet's Asset Management Plan.
Strategic land/ easements	Recent experience with difficulties in obtaining development approvals for both the South East to Snuggery and the Templers to Dorrien 132 kV transmission lines has demonstrated the need for early investigation and in some cases pre-purchase of strategic land and future line easements where it is prudent to do so. The strategic acquisitions identified relate to large developments that will be required in subsequent regulatory periods. In some cases, a lack of action now will mean that the required land and easements will not be available at all in the future, or at best without significant additional expense.
Security/ compliance	ElectraNet has identified projects required to improve the physical security of ElectraNet's critical infrastructure. Both electronic and physical barrier security have been identified through processes outlined in ElectraNet's Asset Management Plan. Other expenditure is required to meet various technical, safety and environmental compliance requirements, which is also identified in ElectraNet's Asset Management Plan.
Inventory/ spares	The ETC specifies restoration times that drive the requirements for spare transformer holdings and other equipment. The Asset Management Plan outlines the overall strategy for inventory and spares holdings.
Business IT	Business IT requirements are identified in ElectraNet's IT strategy and plan.
Buildings/ facilities	Buildings and facilities requirements are identified in ElectraNet's facilities plan.

5.7 Key Inputs and Assumptions

The purpose of this section is to describe the key inputs and assumptions underlying the capital expenditure forecast and to provide substantiation for these inputs and assumptions.

5.7.1 Demand forecasts

Growth in customer demand is the principal driver of transmission system augmentation and connection point reinforcement. In determining its capital expenditure forecast, ElectraNet has relied upon the connection point demand forecasts independently provided by ETSA Utilities and ElectraNet's direct-connect customers in accordance with clause 5.6.1 and Schedule 5.7 of the Rules.

ETSA Utilities has provided three demand forecasts representing high, medium and low economic activity under summer peak demand conditions.

Connection point reinforcements are driven by increasing demand at the connection point level. These projects are typically initiated by a customer request for an increase in Agreed Maximum Demand (AMD) in accordance with the customer connection agreement[43]. Network augmentation projects are also driven by increasing demand at the connection point level. However, for the purpose of identifying some network limitations the connection point demand forecasts can generally be diversified to recognise that not all connection points will be experiencing maximum demand at the time of system peak.

Historical increases in AMD have generally followed the medium demand forecast. For this reason, ElectraNet's capital expenditure forecast is based on the medium demand forecast provided by ETSA Utilities.

Table 5.3 and Figure 5.2 show the relationship between the medium growth connection point forecasts that ElectraNet has relied upon and the medium growth forecast included in the 2006 NEMMCO Statement of Opportunities (SOO). It is necessary to make the following adjustments to the demand forecasts so they can be compared on a like for like basis at transmission network exits:

- Connection point forecast – diversity is applied and assumed embedded and non-scheduled generation, and direct load curtailments are subtracted; and

- NEMMCO SOO forecast – new direct connect customer demand is added and transmission and power station auxiliary losses are subtracted.

These adjustments follow the methodology and assumptions used by the ESIPC in its 2006 Annual Planning Report (APR)[44].

The comparison in Figure 5.2 shows a close alignment between the connection point and NEMMCO SOO forecasts.

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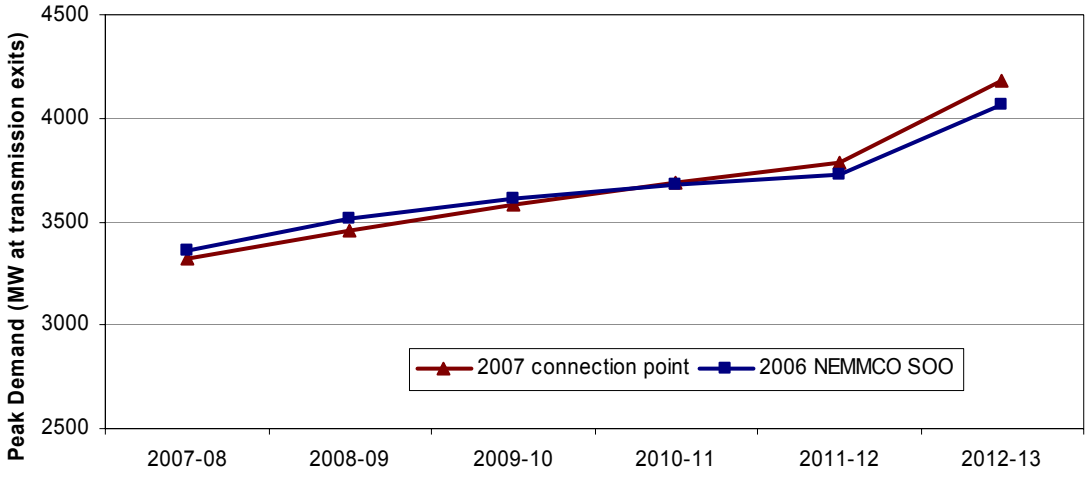
[43] Only distributor connection point reinforcements are included in the capital expenditure forecast – a request from a generator or direct connect customer to increase the capacity of an existing prescribed connection would be treated as a negotiated transmission service or a non-regulated transmission service under the Rules.

[44] Electricity Supply Industry Planning Council "Annual Planning Report", June 2006, www.esipc.sa.gov.au

Table 5.3: Derivation of comparable 2007 connection point and 2006 NEMMCO SOO demand forecasts (summer peak demand, medium economic growth).

Forecast	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
ETSA Utilities connection point peak demands	3,188	3,275	3,365	3,458	3,553	3,651
4% diversity applied	3,092	3,176	3,263	3,353	3,446	3,541
Plus direct connect customer demand	3,373	3,508	3,631	3,741	3,838	4,229
Total connection point diversified and adjusted[45]	**3,326**	**3,460**	**3,582**	**3,692**	**3,789**	**4,180**
2006 NEMMCO SOO	3,506	3,609	3,680	3,730	3,778	3,824
2006 SOO plus new direct connect customer loads	3,560	3,716	3,818	3,889	3,943	4,300
2006 SOO less 5.5% losses	**3,364**	**3,512**	**3,608**	**3,675**	**3,726**	**4,064**

Figure 5.2: Comparison of 2007 connection point and 2006 NEMMCO SOO demand forecasts (summer peak demand, medium economic growth).



5.7.2 Load and generation scenario analysis

ElectraNet engaged ROAM Consulting to conduct an assessment of potential generation and load developments for South Australia through the application of a probabilistic scenario analysis methodology[46].

The key inputs to ElectraNet's capital expenditure forecasting methodology derived from the ROAM Consulting analysis are:

- The location of future generation to meet demand growth for the purpose of modelling future network limitations; and

[45] Adjustments include subtracting assumed embedded and non-scheduled generation and subtracting assumed direct load curtailment. These assumptions are the same as those applied by the ESIPC in the 2006 Annual Planning Report (APR).

[46] ROAM Consulting, "2007 South Australian Generation and Load Scenario Analysis", 28 May 2007 (included as Appendix C).

- Eighteen plausible market development scenarios with varying external generation development and demand forecast assumptions, which ElectraNet has used to model the transmission network and identify the need for load driven reliability augmentations and distribution connection reinforcements.

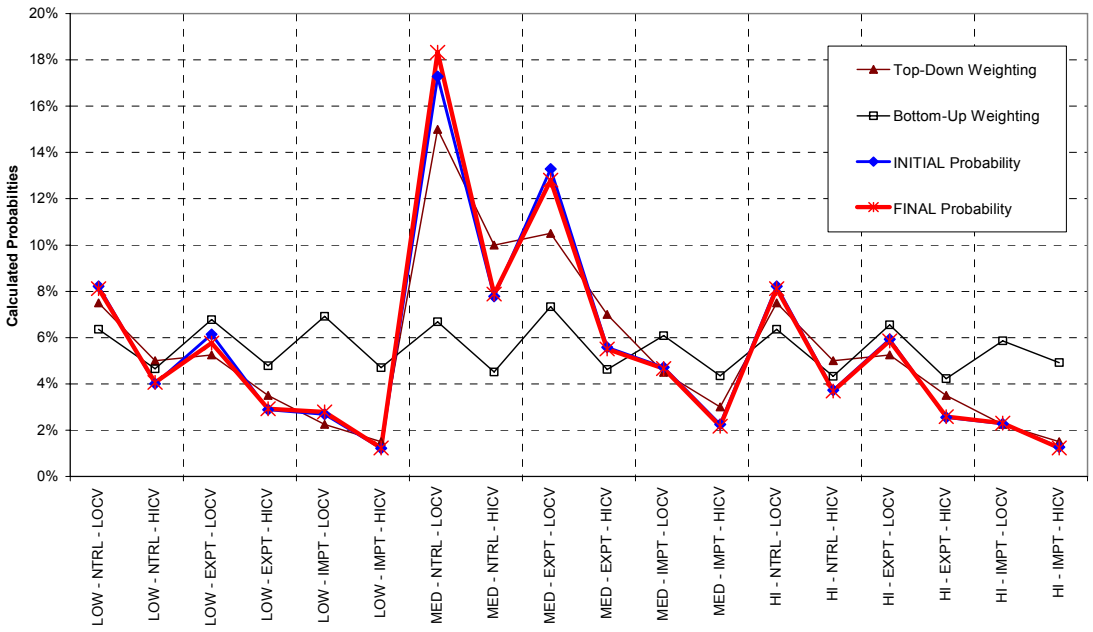
Table 5.4 summarises the scenario themes examined by ROAM Consulting, which were developed in consultation with the ESIPC and ETSA Utilities.

Table 5.4: ROAM Consulting market development scenarios.

Load Growth Theme		Inter-regional Trade Theme		Carbon Value Theme	
Low	Low load growth, with addition of occasional industrial loads and delayed expansion of Olympic Dam	Neutral	'As is' inter-regional trading	Low	'As is' carbon values/ abatement schemes
Medium	Moderate load growth, with additional of industrial loads, and forecast timing for expansion of Olympic Dam	Export	Significantly higher average power export from SA	High	Significantly increased carbon value and roll-out of carbon abatement schemes
High	High load growth, with addition of industrial loads, and forecast timing for expansion of Olympic Dam	Import	Significantly higher average power import to SA		

Using different plausible combinations of these themes, eighteen discrete development scenarios were constructed encompassing a range of differing market development paths. The relative likelihood of each of these development paths was assessed as shown in Figure 5.3, which summarises the relative probabilities determined for each of the eighteen scenarios (final probability marked in red).

Figure 5.3: ROAM Consulting scenario analysis.



Further details of the analysis undertaken by ROAM Consulting, including underlying assumptions, can be found in the report included as Appendix C of this Revenue Proposal.

ElectraNet has developed capital expenditure plans and forecasts for each of the 18 scenarios with no single scenario having an assessed probability of occurrence greater than 18 per cent.

ElectraNet's capital expenditure forecast is derived from a combination of the capital expenditure requirements determined for the 18 scenarios. However, as is explained later in section 5.8.1 there is little variation in the capital expenditure requirements across the 18 scenarios analysed.

5.7.3 Network model

ElectraNet uses the Siemens PSS/E suite of power system analysis programs as the platform for identifying both operational and future network limitation, as is the case for most other Australian TNSPs, DNSPs and NEMMCO.

The network model used to develop ElectraNet's capital expenditure forecast is the same as that provided by ElectraNet to both NEMMCO and the ESIPC and is, therefore, subject to regular scrutiny by power industry experts external and independent of ElectraNet.

Plant data is based on primary sources such as transmission line tests, generator tests and transformer test certificates and on secondary sources such as line impedances calculated from first principles.

5.7.4 Planning and design standards

ElectraNet's planning standards are embodied mainly in the Rules and the ETC and are presented comprehensively in ElectraNet's Annual Planning Review[47]. These standards relate to the compliance obligations described in section 5.3 and the performance issues described in Table 5.2. Planning standards such as connection point power factor requirements are also reflected in customer connection agreements.

ElectraNet has developed and maintains a comprehensive set of design and construction standards in order to comply with the requirements of its Safety, Reliability, Maintenance and Technical Management Plan. This Plan is required by section 15 of the Electricity Act 1996 (SA) to demonstrate that ElectraNet's infrastructure complies with good electricity industry practice and the standards referred to in the Act, or to achieve, to the satisfaction of the Technical Regulator, the same or better safety and technical outcomes.

5.7.5 Asset condition assessments

ElectraNet has undertaken asset condition assessments on all ElectraNet substations and selected transmission lines during the current regulatory period. As a result ElectraNet has developed a much improved understanding of the condition of its assets.

[47] www.electranet.com.au

Substation condition assessments have been undertaken for ElectraNet by Transfield Services. The transmission line assessments have been undertaken by ElectraNet and Sinclair Knight Merz (SKM).

The condition assessments and the resulting improved understanding of asset condition are key inputs to the development of asset replacement plans and maintenance plans (discussed in Chapter 6).

5.7.6 Network 2025 Vision

ElectraNet's Network 2025 Vision and guiding principles are an important input to developing the capital expenditure forecast. The Network 2025 Vision guides the development of solutions to short term network limitations, which also consider the longer term needs of the network. The development of ElectraNet's Network 2025 Vision was discussed in Section 3.4. The application of the Network 2025 Vision guiding principles is discussed in ElectraNet's Asset Management Plan.

5.7.7 Project cost estimates

ElectraNet has developed its project cost estimates as follows.

Project briefs

Project briefs were prepared involving consultation with all internal stakeholders to develop the optimum project definition.

Project scopes and estimates

The projects included in the capital expenditure forecast are at different stages of development. Approved projects have been subject to a more detailed cost assessment than those in the concept phase.

ElectraNet engaged Powerlink to develop detailed scopes of work for each project in the concept phase. These scopes identify all of the known requirements to deliver the projects. Powerlink were also engaged to develop project cost estimates using ElectraNet base planning objects (BPOs). With the largest annual transmission capital expenditure in the NEM, Powerlink has a comprehensive database of modern day transmission construction costs.

The project cost estimates are by necessity high-level estimates, where the numbers of items of key plant are estimated, and the costs of these key plant items are based on the BPO's.

For projects at the concept phase, the size and location of the project may not be known precisely and the associated uncertainty in the estimates is therefore high. The accuracy of cost estimates at the project concept phase is generally considered to be within 20 per cent of the actual cost, but likely outcomes are expected to be asymmetric.

Check Estimates

ElectraNet obtained independent check estimates from two other project estimating firms, Maunsell Australia and Worley Parsons. A comparison of cost estimates was made based on a sample of six substation projects that are representative of approximately 75 per cent of ElectraNet's capital expenditure forecast.

The comparison shows that the variations in the check estimates are in each case within the range of accuracy expected from ElectraNet's cost estimates. The total variation across the sample of substation projects was less than 1 per cent.

5.7.8 Wages growth

Labour cost increases are a key driver of ElectraNet's capital and operating expenditure forecast. Wages growth has been strong in the current regulatory period, particularly in the later years, and this is expected to continue well into the future.

ElectraNet engaged BIS Shrapnel to provide an expert opinion regarding the outlook for labour costs and labour market issues relevant to the electricity sector. BIS Shrapnel recommends that movements in average weekly ordinary time earnings (AWOTE) for the electricity, gas and water sector should be used for the purposes of estimating wage cost movements in ElectraNet's capital and operating expenditure.

BIS Shrapnel has forecast wages growth (AWOTE) in the South Australian utilities sector to average 5.9 per cent over the next regulatory period[48]. This represents slightly faster growth in AWOTE in South Australia (compared to the national average), because of a marked strengthening in employment demand in the mining, construction and manufacturing sectors in the state. Employment growth in these key competing sectors in South Australia is collectively expected to outpace the Australian average, particularly over 2009-10 to 2011-12, with surging mining investment (including the very large scale Olympic Dam expansion project) and defence-related work key factors in the strengthening of employment demand over this period. Table 5.5 shows the wages growth escalation factors that have been applied to the internal and external labour components of the capital expenditure forecast.

Table 5.5: Wages growth forecast for SA utilities sector (% nominal).

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Wages growth	6.2	5.6	5.6	6.0	6.3	5.9	5.6

5.7.9 Land value escalation

Land values are increasing at a rate above CPI. ElectraNet has forecast escalation factors based on statistics from the ABS for unimproved land values in South Australia. Table 5.6 shows the average annual increase in residential, commercial and rural land values over the six year period from June 2000 to June 2006.

Table 5.6: Land value escalation factors (% pa).

Land Valuation Index	Average annual increase (Jun 2000 to Jun 2006)
Residential	16.5
Commercial	14.4
Rural	13.0

Source: ABS statistics for South Australia

[48] BIS Shrapnel, "Outlook for Labour Markets and Costs to 2016-17: Electricity, Gas and Water Sector – Australia and South Australia", April 2007 (included as Appendix D).

ElectraNet has applied the average of the commercial and rural annual escalation factors in Table 5.6 to the land and easement acquisition cost components of its capital expenditure forecast.

5.7.10 Non-labour construction cost escalation

ElectraNet engaged Evans & Peck to investigate and research escalation trends from past infrastructure projects as a basis for predicting future rates of escalation for project construction costs.

CPI has sometimes been used as the basis for determining escalation. However, while CPI may be appropriate for measuring the change in household spending, it does not reflect the change in the cost of delivering infrastructure projects.

Evans and Peck investigated alternative and more appropriate ABS indices which more accurately reflect the cost of delivering infrastructure projects.

In developing a model to predict the future rates of escalation for ElectraNet capital projects, Evans & Peck examined the relative contribution of each of the discrete elements that form the basis of the project estimates (plant, materials, design etc.).

To provide rigour and transparency in establishing appropriate levels of escalation the historical trend information from the previous nine years has been utilised to predict the most likely values for each year through to 2012-13. This information has been modelled using Monte Carlo simulation to develop a predicted escalation profile for the regulatory period.

ElectraNet has used labour escalation rates forecast by BIS Shrapnel and projections of the ABS 6427 Producer Price Index (PPI) as recommended by Evans & Peck for escalating non-labour construction costs. The escalation factors applied to the various project cost components in ElectraNet's capital expenditure forecast are summarised in Tables 5.7 and 5.8.

Table 5.7: Non-labour construction cost escalation factors.

Cost Component	Evans & Peck Recommended Index
Aluminium	ABS 6427 - Producer Price Index
Copper	ABS 6427 Producer Price Index - Table 47. Copper Materials Used in the Manufacture of Electrical Equipment (Power Transformers)
Steel	ABS 6427 Producer Price Index - Table 30. Iron & Steel Used in the Fabricated Metal Products Industry
Materials – Other	ABS 6427 - Producer Price Index
Plant & Equipment	ABS 6427 - Producer Price Index
Other, buildings, clearing access and environmental, concrete poles, establishment and foundations	ABS 6427 - Producer Price Index

Table 5.8: Non-labour construction cost escalation factors (%).

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Aluminium	4.2	4.2	4.3	4.5	4.6	4.7
Copper	6.2	6.2	6.2	6.2	6.2	6.2
Steel	7.0	7.0	7.0	6.0	6.0	6.0
Plant and equipment	4.2	4.2	4.3	4.5	4.6	4.7
Other	4.2	4.2	4.3	4.5	4.6	4.7

5.7.11 Cost estimation risk analysis

As discussed in section 5.6, cost estimation risk analysis is based on a statistical approach to understanding the uncertainties and probabilities associated with project cost estimates. Cost estimation risk analysis recognises the inherent uncertainties in the cost estimating process and that there is generally a higher probability that costs will increase rather than decrease[49].

ElectraNet engaged Evans & Peck to conduct a cost estimation risk analysis on its portfolio of forecast capital projects[50].

The analysis determines a risk factor that is applied to the estimated cost of the portfolio of projects to ensure that the overall capital expenditure forecast is unbiased (i.e. to ensure that the probability of actual cost outcomes exceeding the forecast is no higher than the probability of a cost underrun).

Traditionally project and portfolio managers have made best estimates of future project costs, and then applied a contingency to each project to allow for unforeseen cost increases. Applying a set contingency for each project invariably gives rise to an excessive contingency amount at an aggregated portfolio level.

While contingency allowances and cost estimation risk analysis have the same end goal – to provide an accurate allowance for costs likely to be incurred – risk analysis is a more sophisticated and accurate tool which recognises both risks and opportunities[49].

In particular, the assessment of specific risks and opportunities, combined with the application of Monte Carlo simulation, provides an accurate and robust methodology for assessing the likely cost outcome of a portfolio of projects.

In summary, the approach adopted by Evans & Peck involves:

- including the range of potential cost outcomes for each item of known scope ('inherent risk'), based around the project cost estimates;
- including the probability of occurrence of each identified risk event outside of the known scope of work and the probable range of costs ('contingent risks'); and

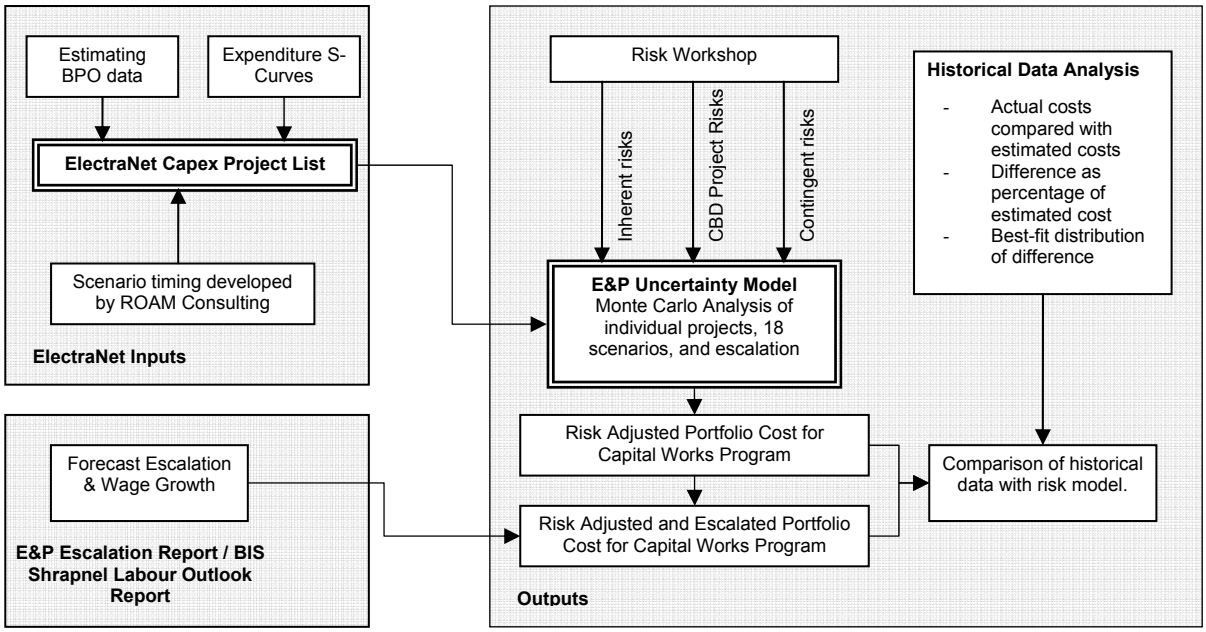
[49] Peter Trueman (Evans & Peck) "Capital Works Decision Making Using Risk Management Techniques", Risk Engineering Conference 2004.

[50] Evans & Peck "Risk Review of Capital Works Program", May 2007 (included as Appendix F).

- Simulating potential combinations of the costs of all of these risks to develop a likely range of costs for the overall project portfolio.

The overall approach to cost estimation risk analysis is illustrated in Figure 5.4.

Figure 5.4: Portfolio cost estimation risk model.



While the above diagram also includes the application of labour and non-labour input cost escalation as discussed in sections 5.7.8, 5.7.9 and 5.7.10, it is important to understand that cost estimation risk and cost escalation are considered and modelled as separate and distinct cost drivers.

The results of Evans & Peck's cost estimation risk analysis is that the risk-adjusted cost of ElectraNet's forecast capital works portfolio in 2007-08 dollars, has a 50 per cent probability of not exceeding the sum total of the base cost estimates by 5.1 per cent.

This is in contrast to a comparison of the out-turn and budget costs of 29 ElectraNet historical projects, which shows a mean difference of 22 per cent - that is, ElectraNet has historically underestimated project costs by 22 per cent. While this comparison does not exclude the impact of above CPI input cost escalation, adjusting for this factor would still result in the historical underestimation of project costs exceeding by a very large margin the 5.1 per cent risk factor calculated for the 1 July 2008 to 30 June 2013 regulatory period.

ElectraNet has improved, and will continue to improve its outturn cost to forecast cost ratio. However, forecasting future costs will always include an element of risk. Even with best practice estimating and project management, a cost estimation risk premium is still applicable to ensure that the overall capital expenditure forecast is unbiased (i.e. to ensure that the probability of actual cost outcomes exceeding the forecast is no higher than the probability of a cost underrun).

ElectraNet has applied the cost estimation risk factor of 5.1 per cent recommended by Evans & Peck to its network capital expenditure forecast in order to achieve this outcome.

5.8 Forecast Capital Expenditure

This section presents ElectraNet's forecast capital expenditure for the forthcoming regulatory period. The forecast is the result of applying ElectraNet's forecasting methodology described in section 5.6, and the key inputs and assumptions described in section 5.7.

5.8.1 Summary of forecast capital expenditure

A summary of the capital expenditure forecast by category is shown in Table 5.9[51].

Table 5.9: Capital expenditure forecast by category ($m 2007-08).

Category	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Augmentation	57.9	73.9	52.4	32.4	11.4	228.0
Connection	56.1	47.4	37.9	13.3	3.1	157.8
Replacement	46.9	66.7	36.8	59.6	30.4	240.3
Strategic land/ easements	6.5	4.4	7.7	2.6	2.7	23.9
Security/ compliance	9.8	16.6	20.3	13.1	10.6	70.4
Inventory/ spares	6.3	2.4	2.4	2.4	2.4	15.7
Total Network	**183.3**	**211.2**	**157.7**	**123.5**	**60.7**	**736.1**
Business IT	7.3	6.2	6.8	5.2	3.2	28.8
Buildings/ facilities	9.5	0.6	0.4	1.0	1.7	13.3
Total Non-Network	**16.9**	**6.8**	**7.2**	**6.2**	**4.9**	**42.0**
Total Capex	**200.2**	**218.2**	**164.6**	**129.5**	**65.6**	**778.1**

Augmentation, connection and replacement projects make up the large majority of ElectraNet's capital expenditure forecast (over 80 per cent). These projects generally involve existing substation sites and a small number of new sites requiring minimal transmission line works and some others involving the installation of reactive support and, therefore, are inherently lower cost than alternative network options requiring both new sites and line works. Replacement projects have been limited to high priority substations which service significant loads and are generally limited in scope.

Connection projects are required to increase the capacity of existing distribution connections and to establish three new distribution connection points requested by ETSA Utilities. The three new distribution connection points are at Penola West, Clare North and Coonalpyn West. ETSA Utilities has completed regulatory approvals for the Penola West project, which has commenced in the current regulatory period. ETSA Utilities has completed the initial stage of public consultation on the remaining two projects, which have been assessed as providing the most efficient solutions to meeting the distribution network limitations identified by ETSA Utilities.

The profile of the capital expenditure forecast is largely driven by the ETC mandated timing requirements for reliability augmentations and connection projects.

Table 5.10 summarises the material assets (projects) included in the capital expenditure forecast, their estimated cost and location in accordance with Clause S6A.1.1(1) of the Rules. For this purpose, material assets (projects) have been taken to mean capital projects with an estimated cost greater than $15 million. The

[51] The capital expenditure categories are explained in section 5.5 of this Revenue Proposal.

categories of prescribed transmission services to which the material assets (projects) relate are shown in Table 5.1 by project category.

For the purposes of clause 6A.6.7(b)(4) of the Rules all augmentation projects included in the capital expenditure forecast are reliability augmentations. The Regulatory Test has not been completed for these projects at the time of this proposal.

Table 5.10: Forecast capital projects greater than $15 million ($ 2007-08).

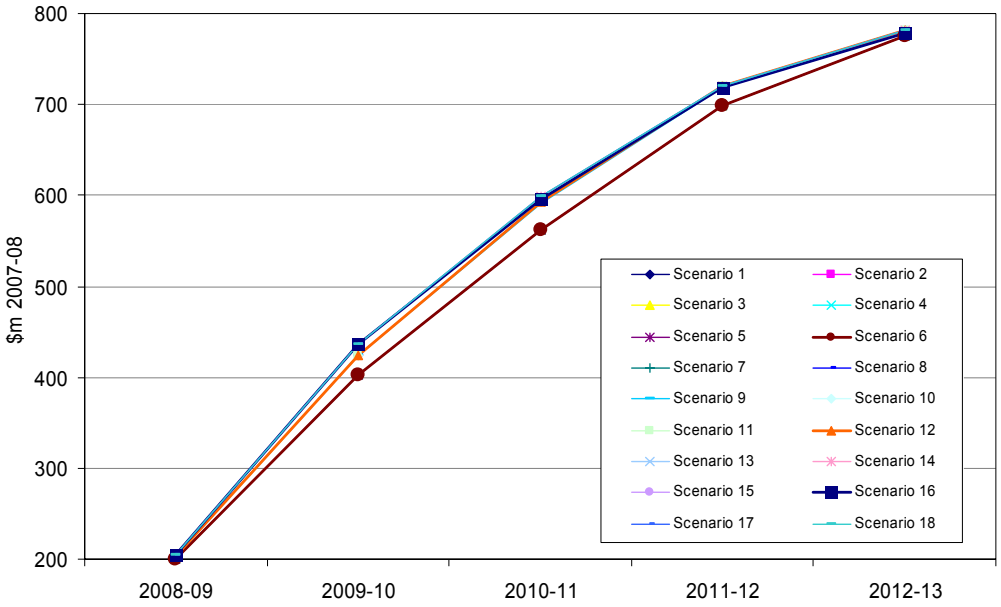
Project Name	Category	Estimated Cost $m	Description
Adelaide CBD	Connection, Augmentation	138	Establishment of new substation supplying CBD as required by ETC
Playford relocation	Replacement	50	Replacement of existing substation timed with transformer capacity upgrade
Whyalla Terminal	Connection, Augmentation, Replacement	49	Replacement of existing substation timed with transformer capacity upgrade
Cultana	Augmentation	36	Upgrade of existing 275/132kV transformer injection capacity
Torrens Island	Replacement	37	Replacement of secondary systems (providing TUOS services) at a metropolitan substation with significant load
Mount Barker	Connection, Augmentation	28	Establishment of new 275/66kV transformer injection
Templers	Augmentation	28	Establishment of new 275/132kV transformer injection
Para	Replacement	25	Replacement of secondary systems at a metropolitan substation with significant load
Waterloo	Connection, Replacement	24	Replacement of existing substation timed with transformer capacity upgrade
Coonalpyn West	Connection	20	New distribution connection point requested by ETSA Utilities
Clare North	Connection	18	New distribution connection point requested by ETSA Utilities
Kadina East	Connection	18	Provision of transformer redundancy as required by ETC
Ardrossan West	Connection, Replacement,	17	Part replacement timed with transformer capacity upgrade
Southern Suburbs	Connection	15	275/66kV transformer capacity increase utilising new CBD substation

Full details of the projects included in the capital expenditure forecast, including those summarised in Table 5.10, are contained in the templates accompanying this Revenue Proposal. Project summaries for augmentation, connection and replacement projects greater than $1 million are included in Appendix G, which identify the project need and solution options considered, and provide reasoning for the project selected for inclusion in the capital expenditure forecast.

Section 5.7.2 described the eighteen plausible market development scenarios with varying external generation development and demand forecast assumptions, which ElectraNet has used to model the transmission network and identify the need for load driven reliability augmentations and distribution connection works.

A key feature of ElectraNet's capital expenditure forecast is that the augmentation and distribution connection point projects identified are largely independent of the varying generation development and demand forecast assumptions considered in the eighteen scenarios modelled – this is illustrated in Figure 5.5.

Figure 5.5: Cumulative capital expenditure forecast over 18 plausible market development scenarios.



The large majority of network projects included in the capital expenditure forecast (90 per cent) are required to be completed within the forthcoming regulatory period irrespective of whether demand growth follows the high, medium or low demand forecast and irrespective of where new generation sources locate to meet the growth in demand. The variation in the five-year capital expenditure forecast over the eighteen plausible market development scenarios is less than $4 million.

As noted in section 2.5, the ESIPC provides independent oversight of transmission planning in South Australia. Therefore, ElectraNet has developed its capital expenditure plans in consultation with the ESIPC and has taken proper account of the feedback received as part of that consultation.

5.8.2 Comparison of forecast and historical capital expenditure

Overall ElectraNet is forecasting a significantly higher capital investment requirement than was allowed in the current regulatory period. This has resulted from the combined effect of the "volume of work" and "price of work" cost drivers described in sections 3.6 and 5.1.

In accordance with clause S6A1.1 (7) of the Rules, this section presents:

- a comparison of the capital expenditure forecast with historical capital expenditure in the current regulatory period by category; and
- an explanation of significant variations in the forecast capital expenditure from historical capital expenditure.

The comparison is shown in Table 5.11.

Table 5.11: Comparison of forecast and annual historical capital expenditure ($2007-08).

Category	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13
Augmentation	7.5	10.2	32.5	38.0	35.0	57.9	73.9	52.4	32.4	11.4
Connection	26.7	10.0	16.4	6.2	12.0	56.1	47.4	37.9	13.3	3.1
Replacement	20.9	27.1	64.3	46.3	25.5	46.9	66.7	36.8	59.6	30.4
Strategic land/ easements	0.6	0.4	0.9	4.8	1.0	6.5	4.4	7.7	2.6	2.7
Security/ compliance	0.0	0.0	0.1	1.5	0.3	9.8	16.6	20.3	13.1	10.6
Inventory/ spares	0.4	7.0	3.3	2.4	2.5	6.3	2.4	2.4	2.4	2.4
Total Network	**56.1**	**54.7**	**117.4**	**99.3**	**76.3**	**183.3**	**212.2**	**157.7**	**123.5**	**60.7**
Business IT	19.5	4.3	4.5	3.4	3.4	7.3	6.2	6.8	5.2	3.2
Buildings/ facilities	0.1	0.9	1.6	0.6	0.6	9.5	0.6	0.4	1.0	1.7
Total Non-Network	19.6	5.2	6.1	4.0	4.0	**16.9**	**6.8**	**7.2**	**6.2**	**4.9**
Total Capex	**75.6**	**59.9**	**123.6**	**103.3**	**80.3**	**200.2**	**218.2**	**164.6**	**129.5**	**65.6**

Note: this table differs from table 4.3 which shows capitalisations in $nominal.

Figure 5.6 also compares the annual capital expenditure forecast with annual historical capital expenditure in the current regulatory period. As noted previously, the mandated reinforcement of the Adelaide CBD is the most significant single reason for the higher capital expenditure requirement in the forecast period.

Figure 5.6: Capital expenditure 2003-04 to 2012-13 ($ 2007-08).

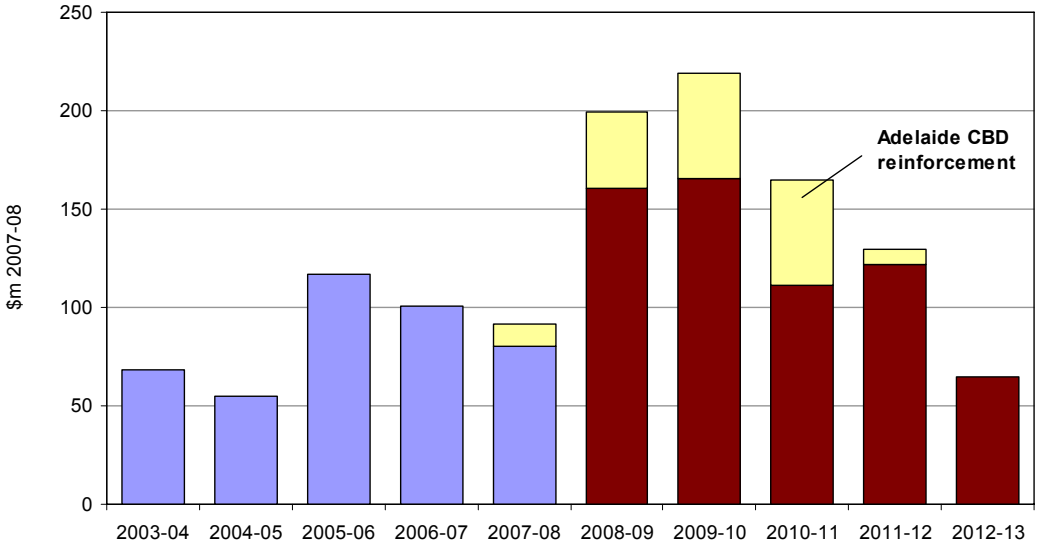


Table 5.12 compares the total forecast and historical capital expenditure by category including explanations of significant variations.

Table 5.12: Comparison of forecast and historical capital expenditure ($m 2007-08).

Capex Type	Historic Spend	Forecast	Explanation of significant variations
Augmentation	126.8	228.0	Increased expenditure largely driven by the mandated Adelaide CBD reinforcement
Connection	42.9	157.8	Increased expenditure largely driven by the connection component of the mandated Adelaide CBD reinforcement and other projects driven by the new ETC standards
Replacement	174.6	240.3	Increased expenditure on asset replacement is required to address the increasing number of assets nearing the end of their useful lives. As noted in section 5.8.1, replacement projects have been limited to high priority substations which service significant loads and are generally limited in scope.
Strategic land/ Easements	6.6	23.9	Increased expenditure required to meet future development requirements
Security/ compliance	1.9	70.4	Increased expenditure required to address concerns about the physical security of critical infrastructure
Inventory/ spares	14.4	15.7	No significant variation
Total Network	**367.1**	**736.1**	
Business IT	33.3	28.8	Historic expenditure included major business systems changeover
Building/ facilities	3.8	13.3	Forecast expenditure includes construction of an extension to ElectraNet's head office building to accommodate the increase in staff required to deliver a larger capital program
Total Non-Network	**37.1**	**42.0**	
Total Capex	**404.5**	**778.1**	

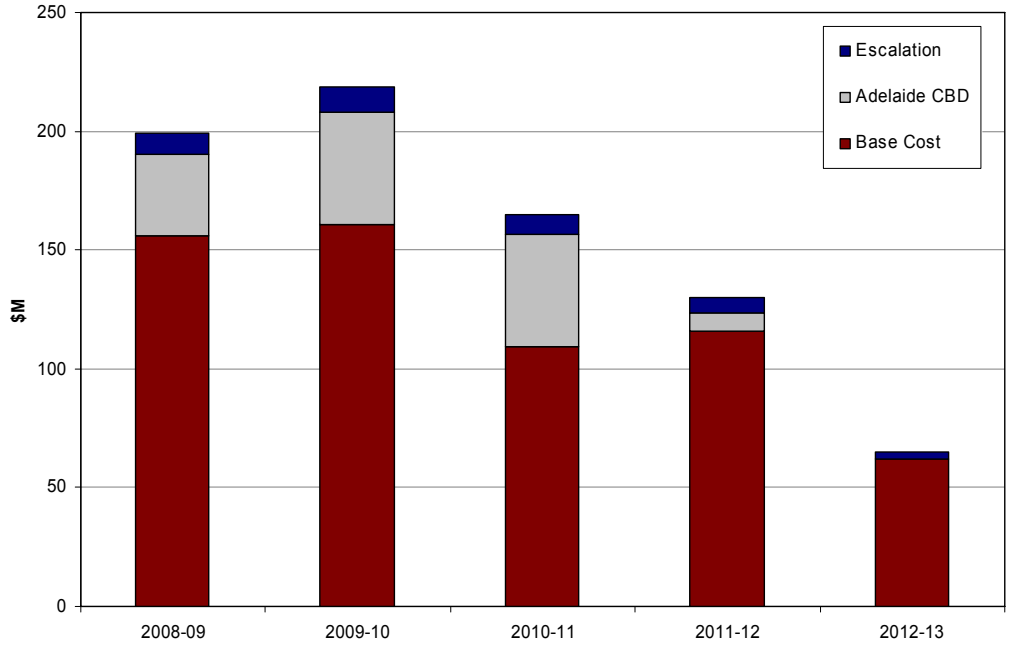
It is important to note that the cost drivers contributing to higher levels of forecast capital expenditure are both "volume of work" related and "price of work" related.

The cost drivers contributing to "volume of work" related increases are summarised in Table 5.12 above. As noted in section 3.3.2, the mandated Adelaide CBD reinforcement is the most significant single reason for the higher capital expenditure requirement in the forecast period (there has been no project of this magnitude in the current regulatory period). New ETC standards also require connection point upgrades at Ardrossan West, Kadina East, Mount Barker, Whyalla and Wudinna.

The cost drivers contributing to "price of work" related increases were described in section 5.7 and include wages growth, land value escalation and non-labour construction cost increases.

Figure 5.7 shows the impact of the mandated Adelaide CBD reinforcement and the "price of work" cost drivers on the capital expenditure forecast.

Figure 5.7: Impact of key cost drivers on capital expenditure forecast ($m 2007-08).



ElectraNet is confident that its capital expenditure forecast is both efficient and prudent and that it meets the capital expenditure objectives set out in the Rules.

5.8.3 Deliverability of increased capital expenditure

ElectraNet recognises that the capital expenditure forecast ($778 million) is a significant increase compared to the capital expenditure allowance in the current regulatory period ($386million). While deliverability is not one of the factors that the Rules explicitly require the AER to have regard to in assessing whether ElectraNet's capital expenditure forecast reasonably reflects to capital expenditure criteria[52], ElectraNet understands that the AER and stakeholders may be concerned about the deliverability of the forecast capital program.

To put the increase into perspective, it should be recognised that whilst the program is approximately 100 per cent larger in dollar terms, a significant proportion of this is attributable to higher input costs and significant plant and equipment capital expenditure. The capital program, which includes a large 275kV cable project and a number of large substation replacement projects, is equipment intensive. Therefore the work increase in actual physical (i.e. labour) terms is much less.

ElectraNet has demonstrated in the current regulatory period its ability to ramp up capital expenditure with expenditure increasing from $35 million per annum at the beginning of the regulatory period to over $100 million in 2005-06 and 2006-07.

ElectraNet is confident that it can deliver the higher capital program in the forecast period.

ElectraNet has implemented or commenced implementation of a range of initiatives to ensure that the increased capital program can be delivered.

[52] In accordance with clause 6A.6.6 of the Rules.

Design standardisation

Designs for new transmission lines and substations now adopt a very high degree of standardisation. This delivers benefits in terms of design resources (including the ability to outsource nearly all of the engineering design and support work), and project commissioning resources. Standardisation also provides a significant benefit to procurement, enabling standard equipment modules to be bulk purchased.

Program management

Past practice has been to engage construction contractors on a project-by-project basis. The new approach is to create much larger programs, comprising many projects over a 3 – 5 year period, and award these programs to a smaller number of major contractors. This enables the contractors to plan with certainty, and to invest in the people, training and equipment required to undertake the work. This approach also enables ElectraNet to optimise the deployment of its project management resources.

Supply chain management

The combination of design standardisation and the program management approach enables ElectraNet to procure materials and equipment via long term, high volume contracts. This allows long lead-time materials and equipment to be ordered well in advance, and delivered in a timely manner.

Increased outsourcing

Historically, ElectraNet has undertaken some engineering design and project support work internally. The design standardisation initiative has enabled practically all of the design work to be outsourced to engineering consultants and with turn key projects much of the support work will be outsourced. ElectraNet has also established standard designs for new substations. These allow consultants / contractors a degree of certainty in the design process and require less support and training.

Increased internal staffing

ElectraNet continues to increase its internal resources to enable delivery of the increased capital program. ElectraNet typically achieves a strong response to its recruitment activities, and is confident that it can continue to increase its internal resources as required.

Strengthened project governance

ElectraNet has over the current period made significant improvements to its project management processes, including project governance.

The new processes have significantly enhanced the organisational focus on project delivery.

5.8.4 Directors' Responsibility Statement

In accordance with clause S6A.1.2(6) of the Rules, this Revenue Proposal must contain a certification of the reasonableness of the key assumptions that underlie the capital expenditure forecast by the directors of ElectraNet.

The Director's responsibility statement is included in Appendix B.

5.9 Proposed Contingent Capital Expenditure Projects

This section presents ElectraNet's proposed contingent capital expenditure in accordance with clause 6A.8 of the Rules.

Pursuant to clause 6A.8.1(b) of the Rules, contingent projects may be proposed where:

- They are reasonably required to be undertaken in order to achieve the capital expenditure objectives specified in clause 6A.6.7(a) of the Rules;
- They are not otherwise provided for (either in part or in whole) in the total of the forecast capital expenditure;
- They reasonably reflect the capital expenditure criteria specified in clause 6A.6.7(c) of the Rules, representing efficient costs of a prudent operator; and
- They exceed the threshold of either $10 million or 5 per cent of the value of the maximum allowed revenue for the first year of the regulatory period, whichever is the larger amount.

ElectraNet's maximum allowed revenue for the first year of the regulatory period is $209 million (see Table 12.7). Five percent of the maximum allowed revenue is $10.4 million, which makes this amount the threshold for contingent projects for the purpose of this Revenue Proposal.

ElectraNet has identified proposed contingent projects that:

- Support future generation and interconnection requirements, where the project is dependent on demonstrating a net market benefit;
- Based on current demand forecasts are required in future regulatory periods, but would need to be advanced if a step increase in demand of sufficient magnitude occurs; and
- Are required in the forecast regulatory period, but the scope of the project and therefore cost is uncertain.

ElectraNet's proposed contingent projects are summarised in Table 5.13 below and are described in more detail in Appendix H, including an explanation of how each project satisfies the requirements of clause 6A.8.1 of the Rules.

ElectraNet has identified specific trigger events that are capable of objective verification as required by the Rules.

ElectraNet notes that by definition it is generally not possible to accurately define the scope of proposed contingent projects at this early stage. Therefore, the proposed contingent projects are described in general terms and the estimated cost of the projects is indicative only. A detailed project scope and cost estimate will be required before any amendment to the revenue determination is considered by the AER should the specified trigger event for a proposed contingent project occur during the regulatory period.

Table 5.13: Proposed contingent projects.

Project Name	Trigger	Indicative Cost $m
Eyre Peninsula Reinforcement	An increase in demand in the lower Eyre Peninsula region exceeding the published 2013-14 aggregated demand forecast for the region by 15 MW[53]	150
Riverland Reinforcement	An increase in demand in the Riverland region exceeding the published 2013-14 aggregated demand forecast for the region by 30 MW[53] or publication by VENCorp of available Murraylink dispatch into South Australia that is insufficient to provide the necessary network support to meet ETC reliability standards in the Riverland region	130
Yorke Peninsula Reinforcement	An increase in demand in the Yorke Peninsula region exceeding the published 2013-14 aggregated demand forecast for the region by 25 MW[53]	41
South East Reinforcement	An increase in demand in the South East region exceeding the published 2013-14 aggregated demand forecast for the region by 15 MW[53]	33
Bungama Reinforcement	An increase in demand in the Port Pirie area exceeding the published 2013-14 aggregated demand forecast for the area by 20 MW[53]	12
Southern Suburbs Reinforcement	An increase in demand in the Southern Suburbs of Adelaide exceeding the published 2013-14 demand forecast for the Southern Suburbs by 35MW[53]	16
Playford (Davenport) to Leigh Creek 132kV Transmission Line	An increase in demand on the Playford (Davenport) to Leigh Creek 132 kV transmission line more than 25 km from the Playford (Davenport) end exceeding the published 2013-14 aggregated demand forecasts for the existing loads connected to this line by 10 MW[53]	11
Fleurieu Peninsula Reinforcement[54]	DNSP application to connect in accordance with Chapter 5 of the Rules and successful completion of the Regulatory Test by the DNSP	65
Murray Mallee Reinforcement[54]	DNSP application to connect in accordance with Chapter 5 of the Rules and following successful completion of the Regulatory Test by the DNSP	34
Munno Para Reinforcement[54]	DNSP application to connect in accordance with Chapter 5 of the Rules and successful completion of the Regulatory Test by the DNSP	26
Lucindale West Reinforcement[54]	DNSP application to connect in accordance with Chapter 5 of the Rules and successful completion of the Regulatory Test by the DNSP	17
Western Suburbs Reinforcement	DNSP application to connect in accordance with Chapter 5 of the Rules and successful completion of the Regulatory Test by the DNSP	15
Tailem Bend to Tungkillo Reinforcement	Application of the Regulatory Test demonstrating that the project would deliver net market benefits	41

[53] Aggregate of connection point demand forecasts for the region published by the ESIPC in its 2007 Annual Planning Report.

[54] ETSA Utilities has formally requested ElectraNet include these projects as proposed contingent projects.

Table 5.13: Proposed contingent projects (continued).

Project Name	Trigger	Indicative Cost $m
Parafield Gardens West	Application of the Regulatory Test demonstrating that the project would deliver net market benefits	14
Para-Brinkworth-Davenport 275kV transmission lines	Application of the Regulatory Test demonstrating that the project would deliver net market benefits	12
Heywood Interconnection capacity upgrade	Application of the Regulatory Test demonstrating that an upgrade would deliver net market benefits	80
Northern Transmission Reinforcement	Customer application to connect in accordance with Chapter 5 of the Rules and a regulatory ruling that required network assets should be treated as providing prescribed transmission services	250

5.10 Concluding Comments

This Chapter has presented ElectraNet's capital expenditure forecast for the 1 July 2008 to 30 June 2013 regulatory period. The capital expenditure forecast is significantly higher than capital expenditure in the current regulatory period.

The key cost drivers contributing to higher levels of forecast capital expenditure are both "volume of work" and "price of work" related:

- Growth in demand and the new ETC standards are driving the need for significant transmission investment to meet mandated reliability standards. For example, the required reinforcement of the Adelaide CBD is expected to cost approximately $138 million in the forecast period;
- An ageing asset base, which requires increased levels of asset replacement expenditure;
- Additional investment required to address concerns about the physical security of critical infrastructure;
- Real wages growth caused by a marked strengthening in employment in the mining, construction and manufacturing sectors in South Australia; and
- The price of transmission equipment currently rising well above inflation due to strong global demand.

The combined effect of these cost drivers is an increased capital expenditure requirement in the forecast period.

Despite increasing cost pressures, ElectraNet has sought to manage the increase in required capital expenditure by carefully balancing the cost of increased network investment against the increased risk of reliability failures resulting from inadequate investment.

ElectraNet has developed its capital expenditure forecast to:

- meet the expected demand for prescribed transmission services set out in section 5.7.1 – demand forecasts that have been independently provided by

ETSA Utilities and ElectraNet's direct-connect customers in accordance with clause 5.6.1 and Schedule 5.7 of the Rules;

- comply with all applicable regulatory obligations associated with the provision of prescribed transmission services – the applicable regulatory obligations are set out in section 5.3;

- maintain the quality, reliability and security of supply of prescribed transmission services and the reliability, safety and security of the transmission system – the applicable quality, reliability, safety and security of supply standards are set out in section 5.3.

ElectraNet has developed the requirements for network capital expenditure in consultation with ETSA Utilities and the ESIPC. The ESIPC has confirmed, on the basis of its own analysis, that the capital "*projects proposed by ElectraNet broadly match the emerging limitations identified by the Planning Council*"[55].

ElectraNet is confident, therefore, that its capital expenditure forecast is both efficient and prudent and that it meets the required expenditure objectives set out in the Rules.

[55] Letter from ESIPC "Review of Capital Projects for the 2008-2013 Regulatory Period", 30 May 2007 (included as Appendix I).

6. Forecast Operating Expenditure

6.1 Summary

This Chapter presents ElectraNet's operating expenditure forecast for the forthcoming regulatory control period.

ElectraNet's operating expenditure performance in the current regulatory period was discussed in Section 4.4. ElectraNet has responded positively to regulatory incentives and achieved significant and sustainable efficiencies in the current regulatory period. However, savings from these efficiencies have recently been, and continue to be, overtaken by other cost increases resulting from the need to address an ageing asset base and the higher input costs that have emerged in recent years. These underlying drivers of higher input costs and ageing assets are expected to continue well into the future and impact on costs in the forecast period.

The key cost drivers contributing to higher levels of forecast operating expenditure include:

- Asset growth: Growth in demand and the new ETC standards are driving the need for significant transmission investment to meet mandated reliability standards resulting in higher levels of required operating expenditure;

- An ageing asset base: A new maintenance regime has been introduced to address the particular risks associated with a growing number of assets nearing the end of their useful lives;

- Labour skills shortages and real wages growth caused by a marked strengthening in employment in the mining, construction and manufacturing sectors in South Australia; and

- A number of cost scope changes including a land tax imposed by the South Australian Government and new obligations to develop a generator testing and model validation program.

The combined effect of these cost drivers is an increasing operating expenditure requirement in the forecast period.

ElectraNet is confident, however, that its operating expenditure forecast is both efficient and prudent and that it meets the required expenditure objectives set out in the Rules.

The remainder of this Chapter is structured as follows:

- Section 6.2 summarises the Rules requirements in relation to operating expenditure;

- Section 6.3 describes ElectraNet's compliance obligations related to the Rules operating expenditure objectives;

- Section 6.4 describes ElectraNet's operating cost categories;

- Section 6.5 explains the operating expenditure forecasting methodology;

- Section 6.6 describes the key inputs and assumptions underlying the operating expenditure forecast and provides substantiation for these inputs and assumptions;

- Section 6.7 presents and explains ElectraNet's operating expenditure forecast;

- Section 6.8 demonstrates that ElectraNet has complied with the requirements of the Rules in relation to its operating expenditure forecast; and

- Section 6.9 provides concluding comments.

6.2 Rules Requirements

ElectraNet's operating expenditure forecast must be for operating expenditure which ElectraNet considers is required in order to achieve each of the following operating expenditure objectives[56]:

- meet the expected demand for prescribed transmission services over the period;

- comply with all applicable regulatory obligations associated with the provision of prescribed transmission services;

- maintain the quality, reliability and security of supply of prescribed transmission services; and

- maintain the reliability, safety and security of the transmission system through the supply of prescribed transmission services.

In addition the forecast of required operating expenditure must:

- comply with the requirements of the AER's submission guidelines;

- be for expenditure that is properly allocated to prescribed transmission services in accordance with the principles and policies set out in the Cost Allocation Methodology for the Transmission Network Service Provider; and

- include both: the total of the forecast operating expenditure for the relevant regulatory control period; and the forecast of the operating expenditure for each regulatory year of the relevant regulatory control period.

The AER must accept the forecast of required operating expenditure that is included in a Revenue Proposal if the AER is satisfied that the total of the forecast operating expenditure for the regulatory control period reasonably reflects the following operating expenditure criteria:

- the efficient costs of achieving the operating expenditure objectives;

- the costs that a prudent operator in the circumstances of the relevant TNSP would require to achieve the operating expenditure objectives; and

- a realistic expectation of the demand forecast and cost inputs required to achieve the operating expenditure objectives.

[56] Clause 6A.6.6 of the Rules.

Schedule 6A.1.2 specifies other minimum information that must be provided to explain and substantiate the forecast of required operating expenditure including amongst other things an appropriate categorisation of the opex forecast, the methodology used for developing the forecast, key input variables and assumptions that underlie the forecast and a certification of the reasonableness of the key assumptions by the directors of ElectraNet.

6.3 Compliance Obligations

This section describes ElectraNet's compliance obligations, which relate to the operating expenditure objectives set out in the Rules.

These compliance obligations include those described in Section 5.3 of this Revenue Proposal, which relate to the capital expenditure objectives.

In addition, ElectraNet is subject to a wide range of both general legislation and regulations and electricity industry specific instruments that impact on operating expenditure requirements. These include broad obligations such as Corporations Law, and other corporate governance obligations including the Occupational, Health and Safety Act and Workcover obligations.

Specific obligations under the Electricity Act and regulations include a range of technical requirements from general safety related provisions to more specific requirements including managing public access to sites, entry to private property, working in the vicinity of transmission lines and prescriptive vegetation clearance obligations. The Electricity Act and regulations make specific reference to accepted industry practice and standards.

As a condition of its Transmission Licence, ElectraNet maintains a Safety, Reliability, Maintenance and Technical Management Plan, which is reviewed on an annual basis and submitted to ESCOSA for approval on the recommendation of the Technical Regulator. ElectraNet must comply with the Plan and its performance against the Plan is subject to annual audit. The following matters must be dealt with by the Plan:

- the safe design, installation, commissioning, operation, maintenance and decommissioning of electricity infrastructure;
- the maintenance of a supply of electricity of the quality required to be maintained by or under the Electricity Act and regulations and the Transmission Licence;
- the implementation and conduct of safety measures and training programs for the purpose of reducing the risk of death or injury, or damage to property, arising out of the operation of electricity infrastructure and ensuring that employees performing work in respect of electricity infrastructure are competent and properly trained, perform their work safely and are provided with a safe system of work;
- ensuring that contractors performing work in respect of electricity infrastructure have processes and procedures for ensuring that the persons personally performing the work are competent and properly trained, perform their work safely and are provided with a safe system of work;
- the manner in which accidents and unsafe situations are to be dealt with, reported and investigated;

- monitoring compliance with safety and technical requirements imposed by or under the Electricity Act and regulations and the Transmission Licence;
- monitoring electricity infrastructure for the purposes of identifying infrastructure that is unsafe or at risk of failing or malfunctioning;
- monitoring compliance with requirements for vegetation clearance;
- communication of information to the public for the purpose of reducing the risk of death or injury, or damage to property, arising out of the operation of electricity infrastructure; and
- the communication of information to existing and potential customers about the facilities that customers must provide for connection to the network and procedures that customers must follow in order to prevent damage to or interference with the network.

ElectraNet is confident that by developing its operating expenditure forecast to meet the above compliance obligations it has developed a forecast that meets the Rules operating expenditure objectives.

6.4 Operating Cost Categories

As noted in Section 6.2, ElectraNet's operating expenditure forecast must be presented by reference to well accepted categories. This section describes the operating cost categories used to present ElectraNet's operating expenditure forecast and also identifies the transmission services to which these forecast expenditure categories relate.

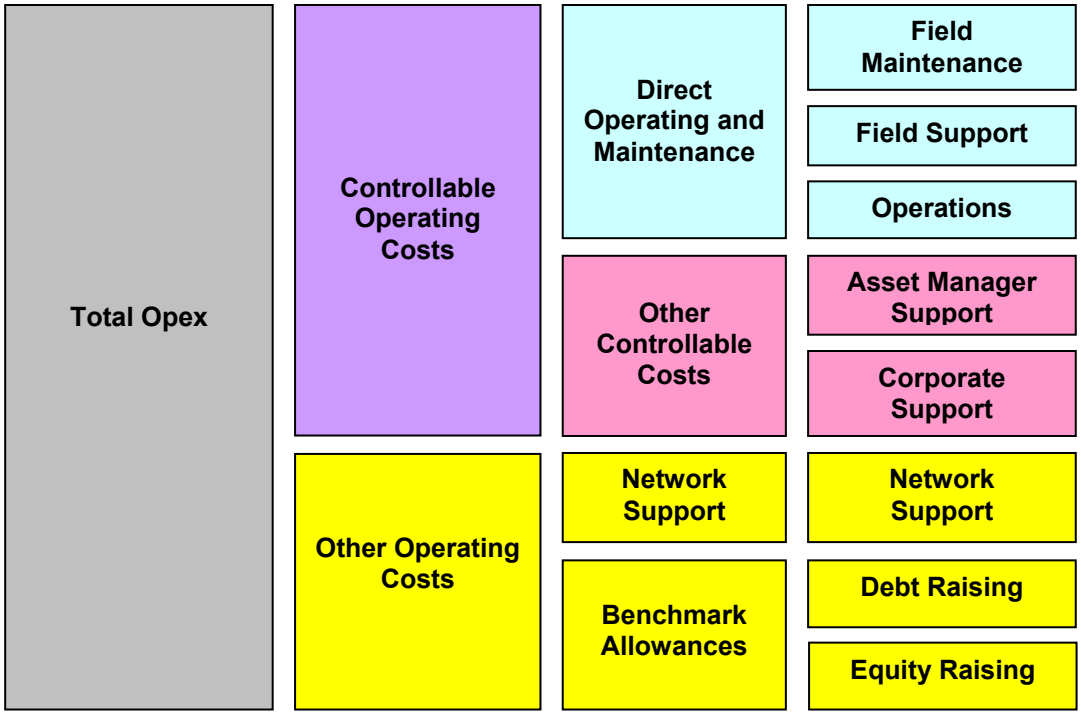
ElectraNet's operating expenditure is grouped into three major categories:

- direct operating and maintenance – costs directly attributable to maintaining and operating the transmission system;
- other controllable costs – costs that include planning, engineering and asset manager support, and corporate costs (including insurance); and
- other operating costs – network support costs associated with payment for non-network alternatives to network augmentations and benchmark debt and equity raising cost allowances.

The composition of these major cost categories is illustrated in Figure 6.1.

The controllable cost categories are described in further detail in the remainder of this section. The other cost categories, network support and benchmark debt and equity raising cost allowances, are described in section 6.6.

Figure 6.1: ElectraNet's operating cost categories.



6.4.1 Direct operating and maintenance costs

This first and largest operating expenditure category has three key components.

Field Maintenance

Field Maintenance costs include all field-based costs for preventative maintenance (routine and condition-based activities), corrective maintenance (emergency and deferred), and maintenance projects (projects that combine elements of other maintenance but are developed with a broader view of asset condition and long term needs).

Costs include all labour and maintenance materials required to perform the required tasks. As these activities are predominantly labour-based, labour cost increases have a significant impact on this cost component.

All field maintenance activities are competitively outsourced. Contracts are performance based with financial incentives linked to the achievement of specified targets. Maintenance on the transmission network has been outsourced since 1995 and over time the performance-based provisions of service contracts have improved to maximise efficiency.

Cost drivers for maintenance projects are the age profile of assets, and design parameters of the plant and its sub-components. As these works are labour and materials intensive, both labour and non labour costs are significant cost drivers.

Field Support

This category includes the internal labour costs of managing maintenance contracts, and developing work packages. It also includes the costs of running business processes and systems that directly support the field maintenance activities, such as

land information systems. The cost of field maintenance services and ElectraNet's costs to directly manage and support these external service contracts is included in field maintenance as are direct charges such as council rates, water rates and land taxes.

Operations

The costs included in this category relate to:

- Real-time control room function – this is a 24-hour continuous requirement. Network operators provide the functions of network operation, coordination and switching sheet preparation for all plant outages;

- Off-line system security support – this function involves network security analysis, including an ongoing need to perform contingency planning;

- Technical support for the Energy Management System (EMS) and SCADA systems – support functions such as EMS configuration, upgrade, hardware installation, software upgrade and maintenance; and

- Asset Monitoring – monitoring asset performance and condition, which includes auditing network configurations and performing fault diagnosis and response management.

As the network increases in size and complexity, the required amount of switching, analysis, support and monitoring increases driving the need for higher levels of resource and capability in the network operations area. These activities are predominantly labour-based, therefore labour cost increases have a significant impact upon them.

Another key cost driver in this category is the growing need to implement asset monitoring functions in relation to aged assets. This includes installation of equipment and systems that provide early warning of changes in the condition of assets with particular emphasis on indicators linked to catastrophic failure modes.

6.4.2 Other controllable costs

Other controllable costs encompass activities and services not directly related to maintaining or operating the network, but which provide necessary support functions. These support functions are divided into two key components.

Asset Manager Support

Asset manager support includes the costs of operational activities that support the strategic development and ongoing management of the network, including network planning, network support, customer and regulatory support and IT support.

Corporate Support

Corporate support includes the costs of activities required to ensure adequate and effective corporate governance and business administration, including finance, accounting, administration, employee relations, OHS and internal audit..

Insurance costs are also included. ElectraNet purchases insurance for its assets where insurance is available and appropriate. However, insurance cover is not available, or not cost effective for some risk events, notably transmission lines.

Insurance costs, therefore, include both insurance premiums and an allowance for self-insurance, which are explained further in sections 6.6.7 and 6.6.8

6.4.3 Categories of prescribed transmission service

Table 6.1 identifies the prescribed transmission services to which the forecast expenditure categories relate as required by clause S6A.1.2 of the Rules.

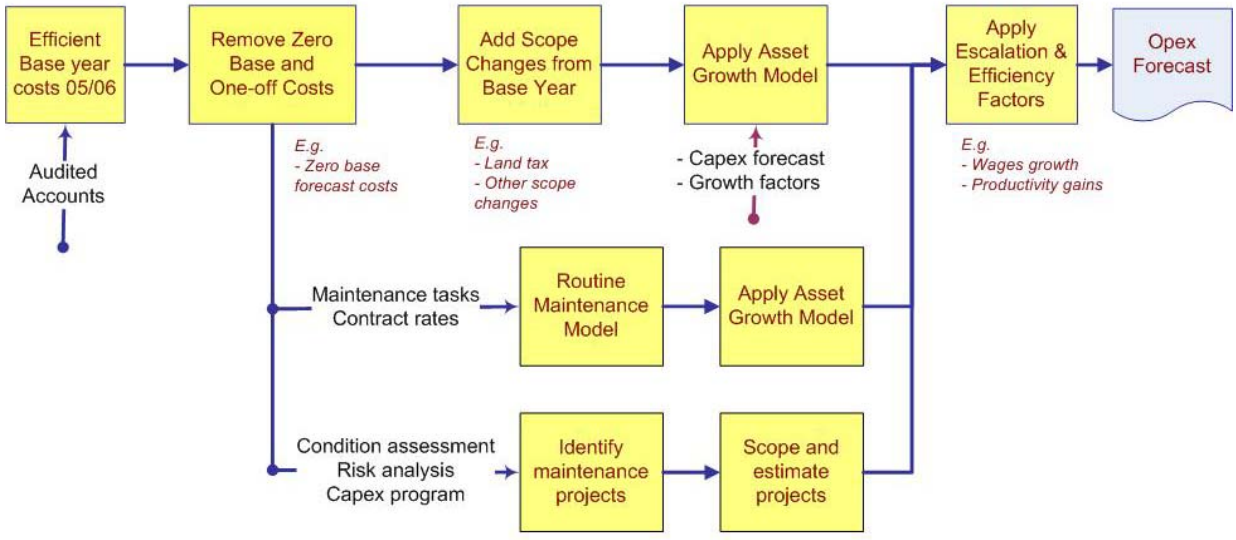
Table 6.1: Categories of prescribed transmission services.

Opex category	Service categories
Field maintenance	Prescribed exit services, prescribed entry services, TUOS, common services
Field Support	Prescribed exit services, prescribed entry services, TUOS, common services
Operations	Prescribed exit services, prescribed entry services, TUOS, common services
Asset Manager Support	Prescribed exit services, prescribed entry services, TUOS, common services
Corporate support	Prescribed exit services, prescribed entry services, TUOS, common services
Network support	TUOS

6.5 Forecasting Methodology

This section describes ElectraNet's operating expenditure forecasting methodology as required by clause S6A.1.2 of the Rules. The methodology is shown diagrammatically in figure 6.2.

Figure 6.2: Operating Expenditure Forecasting Methodology.



ElectraNet has developed its operating expenditure forecast by determining an efficient base year level of opex, then modelling the impact of future cost drivers and efficiency factors on each of the components of its base year expenditure. 2005-06, the most recent year for which audited financial accounts are available, has been used as the base year.

ElectraNet believes that its 2005-06 opex outcomes provide an efficient base level from which to forecast future expenditure requirements (see Section 6.6.1), with the exception of the cost components identified below.

The base year forecasting methodology involves:

- removing one-off costs from the base year (base year costs are summarised in Table 6.2);
- adding the cost of scope changes in future years that are not represented in the base year (discussed in section 6.6.2);
- escalating costs for asset growth and wages growth (discussed in sections 6.6.3 and 6.6.4); and
- applying efficiency factors (discussed in section 6.7.2).

ElectraNet has identified three cost components for which 2005-06 does not provide an efficient base level from which to forecast future expenditure requirements. These categories of cost have also been removed from the base year and a zero based forecast developed:

- Routine maintenance – as explained in more detail in section 6.6.5, ElectraNet has changed its maintenance regime with an increased preventative maintenance focus to address the ageing asset base. A forecast has been developed from a detailed model of maintenance tasks, outsourced contract rates and equipment head counts;
- Maintenance projects – maintenance project expenditure is generally needed to mitigate risks identified through asset condition assessment. It may also include some specific operating expenditure obligations. As such the expenditure profile will vary and consequently ElectraNet has estimated the maintenance project expenditure based on a specific list of projects and risks that are apparent now; and
- Insurance – Insurance premiums are not well aligned to the escalators that ElectraNet applies to other operating cost components. ElectraNet has received broker advice regarding the predicted costs of insurance over the regulatory control period.

Other cost components that are forecast separately to the base year approach include an allowance for self-insurance based on actuarial advice, benchmark debt and equity raising costs and network support.

6.6 Key Inputs and Assumptions

This section describes the key inputs and assumptions underlying the operating expenditure forecast and provides substantiation for these inputs and assumptions.

6.6.1 Efficient base year

As noted above, 2005-06 has been selected as the base year for forecasting future costs as it is the most recent for which audited financial accounts are available. A breakdown of the base year controllable costs is shown in Table 6.2 by cost category.

Table 6.2: ElectraNet actual controllable opex for 2005-06 ($m 2007-08).

Opex Category	Opex Base
Field maintenance	18.0
Field support	6.5
Operations	1.8
Asset manager support	5.4
Corporate support	15.0
Total controllable opex	**46.6**

Table 6.3 compares ElectraNet's 2005-06 actual controllable opex with the ACCC's revenue cap allowance and shows that ElectraNet's actual base year operating expenditure was approximately 4 percent ($1.8 million) less than the efficient level of expenditure included in the ACCC's revenue cap decision.

Table 6.3: Actual and allowed controllable opex for 2005-06 ($m 2007-08).

Opex Category	Opex Base
ACCC revenue cap decision ($2002-03)	42.7
ACCC revenue cap decision (CPI adjusted)	48.4
ElectraNet's actual opex	46.6
Difference	**1.8**

ElectraNet believes that its 2005-06 opex outcomes provide an efficient base level from which to forecast future expenditure requirements.

As explained in section 6.5, one-off costs have been removed from the base year costs in Table 6.2 as part of the forecasting methodology. Routine maintenance costs, maintenance projects and insurance costs for which a zero based forecasting methodology has been applied have also been removed from the base year costs.

6.6.2 Scope changes

This section describes scope changes, which are adding costs to the operating expenditure forecast over and above those represented in the base year. In some cases the scope changes relate to a new obligation for which no costs where incurred in the base year and in other cases they relate to cost items for which costs in the base year are not representative of costs over the five year forecast period.

Land tax

The South Australian Government has imposed a new land tax on ElectraNet from 2006-07[57]. Land tax is calculated using a fixed formula linked to unimproved land values as defined by the Valuer General. The formula for Land Tax is a sliding scale

[57] Letter from Kevin Foley, South Australian Treasurer, to Ian Stirling dated 17 September 2006 (included as Appendix O).

up to $11,420 for the first $1 million of a land holding portfolio, and 3.7 per cent over $1 million[58].

Land tax has been estimated by applying this fixed formula to the portfolio of land held by ElectraNet as assessed by the Valuer General and the estimated value of land to be acquired during the regulatory period Land values have been escalated based on average land value growth factors (residential, commercial and rural) that have been derived from ABS data for different categories of land use. The factors applied were presented earlier in Table 5.6.

The estimated cost of the land tax during the regulatory period is calculated in ElectraNet's operating expenditure forecast model as shown in Table 6.4.

Table 6.4: Land tax forecast ($m 2007-08).

	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
ElectraNet property valuation estimate	18.5	20.9	32.3	38.0	42.5	51.0	57.0
Land tax obligation	0.0	0.7	1.1	1.4	1.5	1.8	2.1

* Note calculation accounts for some properties being exempt from land tax

Skills shortages

BIS Shrapnel note that skills shortages have been evident in the electricity, gas and water sector for the past three years, which is demonstrated in the sharp increase in job vacancies during this period[59].

> *The latest 'skills in demand' lists released by the Department of Employment and Workplace Relations show that all states are experiencing skills shortages in the engineering trades, while shortages in the electrical trades are also widespread.*

Given this environment, ElectraNet has recognised the need to put in place initiatives to develop and retain the skilled resources the business needs now and in the future. ElectraNet has developed a training and development strategy that includes university cadetships, and graduate development programs. The incremental costs of this scheme have been estimated based on business resource plans.

Generator Testing

Changes to the Rules[60] that came into effect on 15 March, 2007 introduce a clear obligation on TNSPs to program generator tests, analyse the results of the tests, develop or validate models to support power system security and the planning and operational activities of the TNSP and NEMMCO.

ElectraNet considers it prudent to develop a systematic and ongoing generator testing and model development program in order to comply with the Rules obligation.

58 http://www.revenuesa.sa.gov.au/ Land Tax Calculator.

59 BIS Shrapnel, "Outlook for Labour Markets and Costs to 2016-17: Electricity, Gas and Water Sector – Australia and South Australia", April 2007 (included as Appendix D).

60 National Electricity Rules clauses 5.7.6 (a) to (g).

ElectraNet engaged John Thompson Inclusive Pty Ltd to provide advice on the content and size of the program that needs to be established to manage the Rules obligation, and an estimated cost of performing the tests and model developments[61].

ElectraNet has prepared an estimate for a minimum level of testing during the forecast regulatory period as well as a program of work to develop alternative methods for model validation using power system monitoring equipment. The forecast costs are shown in Table 6.5.

Table 6.5: Forecast generator testing costs ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Generator testing	0.7	0.7	0.7	0.7	0.7	3.3

Revenue reset costs

The costs incurred in preparing for ElectraNet's Revenue Proposal have been removed from the base year costs as they are not an ongoing expenditure during the period. ElectraNet has estimated revenue reset costs for the forthcoming regulatory period based on the budget costs of its current revenue reset process.

6.6.3 Asset growth

Asset growth is a key cost driver for ElectraNet's operating expenditure forecast. Asset dependent cost drivers include the number of assets and equipment to be maintained, their age and condition, their technology and geographical location.

ElectraNet has escalated its 2005-06 base year operating expenditure to account for asset growth over the next regulatory period. ElectraNet forecasts that its replacement asset value will increase by approximately 15 per cent over this period.

Asset growth does not result in a one-for-one increase in operating expenditure requirement for all operating cost categories. This is due to economies of scale, which allow ElectraNet to obtain efficiencies resulting from a larger network. ElectraNet has applied a forecasting methodology that utilises the approach recently accepted by the AER in its draft revenue cap decision for Powerlink and applied the economy of scale factors (scale factors) in Table 6.6 to determine the increased operating expenditure requirement resulting from underlying growth in asset replacement value. The scale factors are based on ElectraNet's experience and judgement.

[61] John Thompson Inclusive "Future Generator Testing and Modelling Requirements", May 2007 (included as Appendix X).

Table 6.6: Economy of scale factors for asset growth (%).

Activity	Scale factor	Rationale
Field maintenance	95	There is almost a one-for-one increase in maintenance effort but some efficiencies should be achievable.
Field support	25	Significant economies of scale are possible through efficient management of this activity.
Direct charges	100	Direct charges will be directly proportional to asset growth to cover costs such as land rates where there are no opportunities for efficiencies.
Operations	25	Significant economies of scale are possible through efficient management of this activity.
Grid planning	25	Support to operations from grid planners is more directly related to asset size and maintenance planning, so fewer economies are available.
Asset management support	10	Substantial economies of scale are available and recognised.
Corporate support	10	Substantial economies of scale are available and recognised.
Insurance	-	Not applicable as costs are based on a broker estimate.
Grid Support	-	Not applicable as costs are based on a separate zero base forecast.

ElectraNet has applied asset growth factors in its forecast of operating expenditure as follows:

- Base year cost categories – the asset growth factor applied to these cost categories is derived by dividing the load driven capital expenditure during the period by total asset replacement cost and multiplying by the relevant scale factor in Table 6.6. Load driven capital expenditure excludes asset replacement to ensure that only additional assets are accounted for when applying asset growth factors; and

- Routine maintenance – ElectraNet recognises that the routine maintenance requirements of new equipment will generally be less than those of older equipment. Consequently ElectraNet's routine maintenance model specifically accounts for asset growth at a detailed level recognising the changing equipment headcounts and equipment types resulting from forecast capital additions during the regulatory period.

The application of asset growth factors in the routine maintenance model considers the forecast commissioning dates of augmentation and connection projects. Each asset type is escalated based on the growth of similar assets; for example, ElectraNet's capital expenditure forecast does not include significant investment in new transmission lines during the period and so the relevant line maintenance costs are not escalated by large amounts. The converse is true for communications assets.

6.6.4 Wages growth

As discussed in section 5.7.8, labour cost increases are a key driver of ElectraNet's capital and operating expenditure forecast. Wages growth has been strong in the current regulatory period and this is expected to continue into the future.

ElectraNet engaged BIS Shrapnel to provide an expert opinion on the outlook for labour costs and labour market issues relevant to the electricity sector. For the purposes of estimating wage cost changes in ElectraNet's operating expenses, BIS Shrapnel recommends that movements in average weekly ordinary time earnings (AWOTE) for the electricity, gas and water sector should be used.

BIS Shrapnel forecast wages growth (AWOTE) in the South Australian utilities sector to average 5.9 per cent over the next regulatory period[62]. This represents slightly faster growth in AWOTE in South Australia (compared to the national average), because of a marked strengthening in employment in the mining, construction and manufacturing sectors in the state. Employment growth in these key competing sectors in South Australia is collectively expected to outpace the Australian average, particularly over 2009-10 to 2011-12, with surging mining investment and defence-related work key factors in the strengthening over this period.

Table 6.7 shows the wages growth escalation factors that have been applied to labour components of the operating expenditure forecast.

Table 6.7: Wages forecast growth for SA utilities sector (%).

Application	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
General	6.2	5.6	5.6	6.0	6.3	5.9	5.6
Maintenance (routine and corrective)	6.7	6.7	4.5	4.5	4.5	4.5	4.5
Vegetation management	5.1	4.5	4.5	4.9	5.2	4.8	4.5

The BIS Shrapnel forecasts have been applied to most labour cost components (General). However, the labour escalators applied to the maintenance and vegetation management cost components have been offset by productivity improvements built into service provider maintenance contracts. These contracts do not extend for the full period of the regulatory period. However, despite increasing shortages of service providers in the market place, ElectraNet has assumed current contract rates and productivity factors will continue at existing levels to the end of the forecast regulatory period.

6.6.5 Routine maintenance costs

As described in section 6.5, ElectraNet has not forecast routine maintenance costs using the base year approach, but has instead used a detailed routine maintenance model.

As noted in sections 3.6 and 6.5, the increasing number of assets nearing the end of their useful lives has important implications for the reliability of transmission services in the forthcoming and subsequent regulatory periods. Approximately 35 per cent of ElectraNet's transmission assets are in the 40-60 year age group, reflecting major transmission development in the 1950s and 1960s.

[62] BIS Shrapnel, "Outlook for Labour Markets and Costs to 2016-17: Electricity, Gas and Water Sector – Australia and South Australia", April 2007 (included as Appendix D).

As assets approach the end of their useful lives they incur higher maintenance costs and the risk of failure increases. Unpredictable failures become more common (ElectraNet has experienced a number of asset failures during the current regulatory period; e.g. catastrophic failures of current transformers posing safety risks and operational restrictions).

Since 2005-06, ElectraNet has transitioned towards a new maintenance regime that is better suited to managing the increased risks associated with an increasing number of assets nearing the end of their useful lives, including the increasing risk of interruptions to supply. The new maintenance regime places greater emphasis on building asset condition assessment into normal maintenance practices, thereby enabling ElectraNet to better forecast and mitigate the risk of deteriorating assets.

This shift in focus increases routine maintenance costs, but will avoid a more significant increase in emergency corrective maintenance that can be anticipated if large populations of assets reach a condition where they cannot be relied on.

ElectraNet has developed a detailed routine maintenance model which recognises individual equipment to which ElectraNet's routine maintenance standards are applied. This model is linked directly to ElectraNet's capital expenditure plans for augmentation and connection works, to provide an accurate forecast of the required routine maintenance expenditure for existing and new equipment.

The routine maintenance model is supported by ElectraNet's Asset Management Plan. Key inputs to the model are the maintenance tasks defined in ElectraNet's maintenance standards, standard pricing for specific maintenance tasks from ElectraNet's outsourced maintenance agreements, equipment head counts from ElectraNet's asset register, and escalation and productivity factors based on existing contractual agreements.

ElectraNet believes that its new maintenance regime reflects best practice and will enable it to better manage risk and the costs of its ageing asset base in the forthcoming and subsequent regulatory periods.

6.6.6 Maintenance projects

As described in section 6.5, ElectraNet has not forecast maintenance projects costs using the base year approach.

ElectraNet has instead used detailed asset condition information sourced from independent asset condition assessment reports to develop specific plans for operational maintenance projects for different asset categories such as lines, and transformers, and key risk areas such as security and environmental risks. Efficiencies are achieved by planning and bundling similar types of work at a common location.

The need for the maintenance projects included in the operating expenditure forecast is assessed in the Asset Management Plan, which also includes details of the development of these projects.

6.6.7 Insurance

Variations in insurance premiums do not necessarily follow similar escalation profiles to other costs and are influenced by factors beyond the control of ElectraNet. For this reason, ElectraNet has not projected forward base year costs but has sourced an

estimate of the forecast premiums from a qualified insurance broker, taking into account ElectraNet's claim history, risk profile, and business growth (see Table 6.8)[63].

Table 6.8: Forecast insurance premiums ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Insurance	2.4	2.6	2.8	3.0	3.3	14.0

6.6.8 Self insurance allowance

The AER's Submission Guidelines require the following information to be provided in relation to proposed self insurance costs for the regulatory control period[64].

- details of all amounts, values and other inputs used by the *TNSP* to calculate its proposed self insurance costs;
- an explanation of the *TNSP's* calculation of these amounts, values and inputs;
- a board resolution to self-insure (i.e. a copy of the signed minutes recording resolution made by the board);
- confirmation that the TNSP is in a position to undertake credibly self-insurance for those events;
- self-insurance details setting out the specific risks which the TNSP has resolved to self-insure;
- a report from an appropriately qualified actuary or risk specialist verifying the calculation of risks and corresponding insurance premiums;
- the annual regulatory accounts must record the cost of self insurance as an operating expense, and establish a self insurance reserve; and
- when a claim against self insurance is made, an appropriate deduction to the self insurance reserve must be recorded.

The ElectraNet Board has resolved to self-insure against the following specific risks[65]:

- Network related events greater than $20,000 as defined below:
  - Losses for which insurance is commercially unavailable or excluded under a policy of insurance (e.g. transmission lines);
  - Loss events for insured risks below the existing property insurance policy deductible;
  - Costs incurred through emergency actions to mitigate losses;

63 Marsh advice, "Five Year Insurance Premium Trends – Indicative Forecast", 3 May 2007 (included as Appendix J).

64 AER, "First Proposed Electricity Transmission Network Service Provider Submission Guidelines", January 2007, p21.

65 See Board resolution to undertake self-insurance (included as Appendix M).

- Non-network property risks such as vandalism, theft and damage (loss events for insured risks below existing insurance policy deductibles); and

- Workers compensation costs (ElectraNet is a Workcover exempt employer).

ElectraNet engaged Aon Risk Services Limited to undertake an actuarial assessment to calculate the above risks, (except workers compensation), and the corresponding self-insurance premium. Brett and Watson: Consulting actuaries were engaged to assess the risks for workers compensation losses.

The total self-insurance premium is shown in Table 6.9. The AON[66] and Brett and Watson[67] reports include full details of the amounts, values and other inputs used to calculate this proposed premium and an explanation of the calculations involved.

Table 6.9: Self insurance allowance ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Self-insurance	1.7	1.7	1.7	1.8	1.9	8.7

6.6.9 Network support

Network support is an alternative to transmission network augmentation. The Rules require the pass through of network support costs subject to the relevant factors set out in clause 6A.7.2.

ElectraNet's network support forecast for the regulatory period is based on an estimate of the cost of network support services required to be provided at Port Lincoln on the Eyre Peninsula. The estimate, shown in Table 6.10, includes both fixed and variable costs based on an existing service provider agreement.

ElectraNet's has not at this stage identified any other network support services that could defer capital investment during the regulatory period. However, ElectraNet is required through the Regulatory Test process under the Rules and the ETC to consider non-network options before committing to any capital investment in the network. Should a viable and cost effective non-network alternative to a capital project included in the capital expenditure forecast be identified during the regulatory period then ElectraNet will be required to:

- enter into a network support agreement for the provision of the relevant network support services; and

- fund the cost of these network support services from the revenue cap provided by the AER – ElectraNet will not be able to seek a pass through of these costs.

Therefore, no 'double dipping' has occurred between the capital expenditure forecast and network support forecast or will occur between capital expenditure and operating expenditure.

66 AON report "Self Insurance Risk Quantification", February 2007 (included as Appendix K).

67 Brett and Watson report " Workers Compensation- Outstanding Claims Investigation and Amount Required for a Guarantee as at 30 June 2006", September 2006 (included as Appendix L).

Table 6.10: Forecast network support costs ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Network support	4.7	4.9	5.1	5.6	7.0	27.3

6.6.10 Debt raising costs

To raise debt, a company has to pay debt financing costs or transaction costs over and above the debt margin allowed in the cost of capital. Such costs tend to vary between each debt issue and are dependant on market conditions.

The AER allows benchmark debt raising costs based on a methodology developed by The Allen Consulting Group[68]. This calculation of this allowance is included in the AER's Post Tax Revenue Model.

On this basis, ElectraNet has determined an average debt raising cost allowance of $730,000 per annum.

Table 6.11: Debt Raising Allowance ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Debt Raising Allowance	0.6	0.7	0.8	0.8	0.8	3.7

6.6.11 Equity raising costs

Equity raising costs relate to the raising of new equity capital and include preparing and distributing information and undertaking presentations to potential investors.

The ACCC included a benchmark allowance for equity raising costs in its 2002 revenue cap determination for ElectraNet.

The AER used the 'pecking order theory' in its December 2006 Powerlink Draft Decision to justify a decision to disallow equity raising costs. The pecking order theory dictates that the cheapest forms of finance would be exhausted first, which means that internal equity funds (i.e. retained earnings) would be used in preference to raising equity funds from outside sources.

The Rules require a benchmark approach to determining the cost of capital. Using a TNSP's actual debt structure to determine equity raising costs would be inconsistent with this benchmark approach. The benchmark gearing approach adopted by the AER in accordance with clause 6A.6.2(b) of the Rules is 60 per cent.

ElectraNet engaged The Allen Consulting Group (ACG) to estimate:

- the quantum of equity funds that a transmission business in the position of ElectraNet, but with benchmark financing arrangements would need to raise to finance its capital expenditure program in the next regulatory period; and

[68] AER Draft Decision, "Powerlink Queensland transmission revenue cap 2007-08 to 2011-12", 8 December 2006, p104-105.

- the transaction costs that would be incurred to raise those funds[69].

ACG's modelling indicates that a firm with benchmark financing arrangements and with ElectraNet's capital expenditure program would exhaust internal equity funds over the next regulatory period and would need to raise an annual amount that ranges from $35 million to $72 million from external sources.

The ACG analysis concludes that using benchmark assumptions equity raising transaction costs of $6.5 million would be incurred over the regulatory period to raise the required equity funds. ElectraNet has converted this transaction cost into an annuity-equivalent stream and included the benchmark equity raising costs shown in Table 6.12 in its operating expenditure forecast.

Table 6.12: Equity raising allowance ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Equity Raising Allowance	0.2	0.2	0.2	0.2	0.2	**0.8**

6.7 Forecast Operating Expenditure

This section presents ElectraNet's operating expenditure forecast for the forthcoming regulatory period. The forecast is the result of applying ElectraNet's forecasting methodology described in section 6.5, and the key inputs and assumptions described in section 6.6.

6.7.1 Summary of forecast operating expenditure

ElectraNet's operating expenditure forecast is shown by category in Table 6.13.

Table 6.13: ElectraNet's operating expenditure forecast ($m 2007-08).

Category	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Field Maintenance	23.6	24.2	25.3	26.4	26.4	125.9
Field Support	8.1	8.6	8.9	9.5	10.0	45.1
Operations	2.0	2.0	2.1	2.2	2.3	10.6
Asset Manager Support	6.4	6.5	6.6	6.8	6.9	33.1
Corporate Support	14.1	14.5	15.4	16.4	16.9	77.3
Total Controllable	**54.2**	**55.8**	**58.4**	**61.3**	**62.5**	**292.1**
Network support	4.7	4.9	5.1	5.6	7.0	27.3
Debt raising costs	0.6	0.7	0.8	0.8	0.8	3.7
Equity raising costs	0.2	0.2	0.2	0.2	0.2	0.8
TOTAL	**59.6**	**61.5**	**64.4**	**67.8**	**70.5**	**323.8**

[69] The Allen Consulting Group, "Estimation of ElectraNet's equity raising transaction cost allowance", 29 May 2007 (included as Appendix N).

6.7.2 *Efficiency factors*

ElectraNet's operating expenditure forecast includes economies of scale efficiencies resulting from a larger network (discussed in section 6.6.3) and future efficiency gains negotiated with maintenance service providers (discussed in section 6.6.4). The cost savings from these efficiencies are illustrated in Figure 6.3.

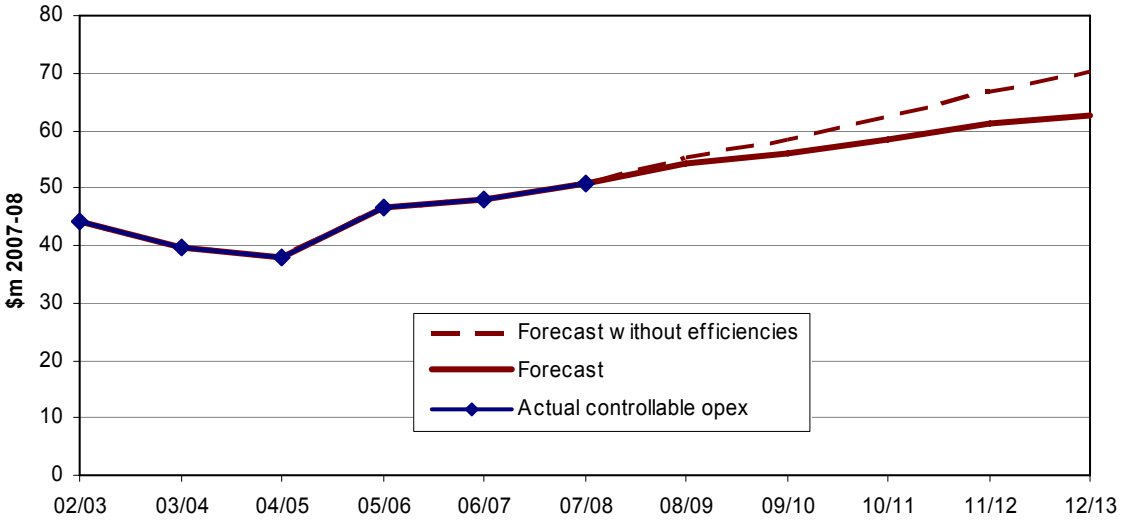


Figure 6.3: Effect of efficiencies on controllable opex ($m 2007-08).

6.7.3 *Comparison of forecast and historical operating expenditure*

Overall ElectraNet is forecasting a higher operating expenditure requirement than was allowed in the current regulatory period. This has resulted from the combined effect of the "volume of work" and "price of work" cost drivers described in sections 3.6 and 5.1.

In accordance with clause S6A1.2 (8) of the Rules, this section presents:

- a comparison of the operating expenditure forecast with historical operating expenditure in the current regulatory period by category; and
- an explanation of significant variations in the forecast operating expenditure from historical operating expenditure.

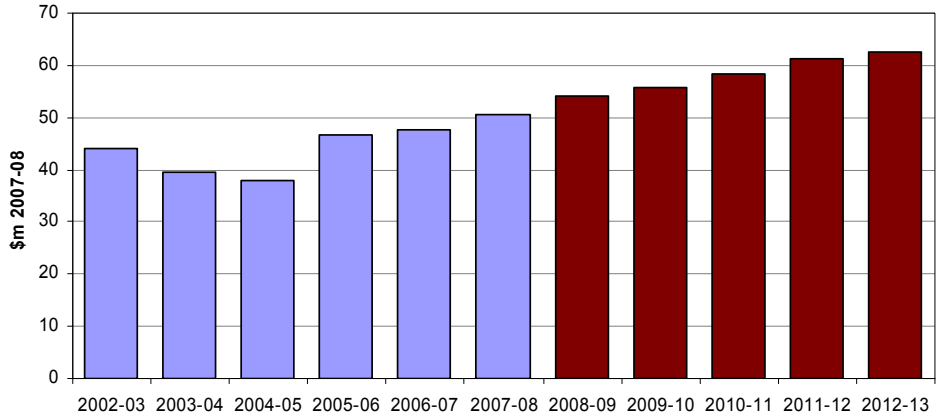
The comparison is shown in Table 6.14.

Table 6.14: Comparison of forecast and historical operating expenditure ($m 2007-08).

Category	03-04	04-05	05-06	06-07	07-08	08-09	09-10	10-11	11-12	12-13
Field maintenance	11.2	10.2	18.0	21.0	21.4	23.6	24.2	25.3	26.4	26.4
Field support	4.8	6.5	6.5	6.6	6.8	8.1	8.6	8.9	9.5	10.0
Operations	2.4	1.7	1.8	1.8	2.0	2.0	2.0	2.1	2.2	2.3
Asset manager support	5.8	5.9	5.4	5.4	5.5	6.4	6.5	6.6	6.8	6.9
Corporate support	15.5	13.5	15.0	13.2	15.0	14.1	14.5	15.4	16.4	16.9
Total controllable	**39.6**	**37.8**	**46.6**	**48.0**	**50.8**	**54.2**	**55.8**	**58.4**	**61.3**	**62.5**
Other opex	4.2	5.1	4.5	5.1	4.9	4.7	4.9	5.1	5.6	7.0
Debt raising costs	0.0	0.0	0.0	0.0	0.0	0.6	0.7	0.8	0.8	0.8
Equity raising costs	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2
Total	**43.8**	**42.9**	**51.1**	**53.1**	**55.7**	**59.6**	**61.5**	**64.4**	**67.8**	**70.5**

Figure 6.4 compares the annual controllable operating expenditure forecast with annual historical operating expenditure in the current regulatory period.

Figure 6.4: Controllable operating expenditure 2002-03 to 2012-13 ($ 2007-08).



A comparison of forecast and historical controllable operating expenditure is shown in Table 6.15 by operating expenditure category. Explanations of significant variations are also included in the table.

Table 6.15: Comparison of forecast and historical controllable operating expenditure ($m 2007-08).

Category	Forecast	Historic Spend*	Explanation of significant variations
Field Maintenance	126	85	Change in asset maintenance regime
Field Support	45	31	Additional land tax obligation
Operations	11	10	No significant change
Asset Manager Support	33	28	Additional generator testing obligation
Corporate Support	77	72	Skills development program (offset by efficiencies achieved in current regulatory period)
Total Controllable	**292**	**223**	

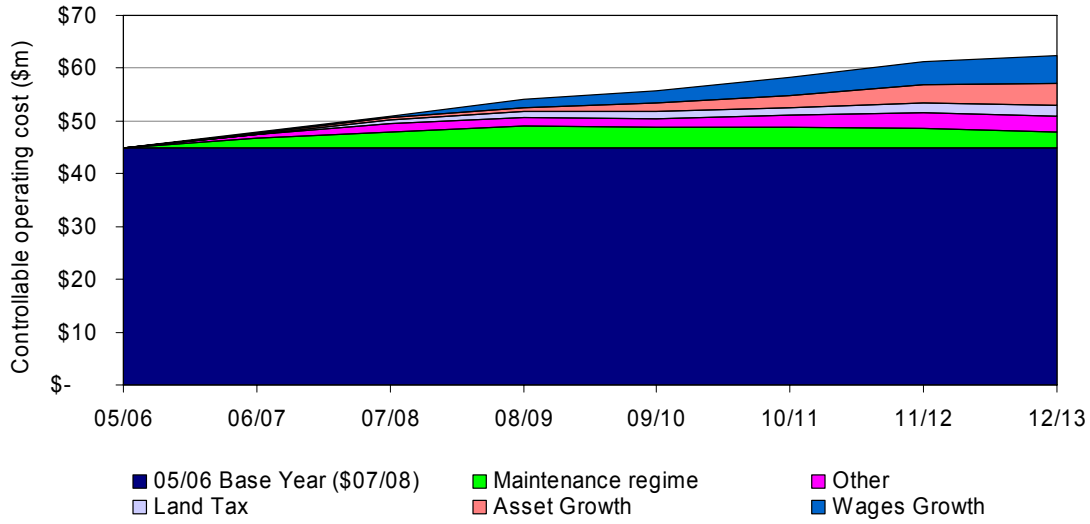
* Note historic spend is over last 5 years of 5.5 year regulatory period for comparison purposes

During the current regulatory period, ElectraNet identified that its maintenance regime was no longer suitable or sustainable for managing an ageing network in which a significant numbers of assets are nearing the end of their useful life.

ElectraNet has introduced a new best practice maintenance regime, which has increased maintenance expenditure in the later part of the current regulatory period. ElectraNet is forecasting to spend 20 per cent more in the current period than was provided for maintenance activities in the ACCC's operating expenditure allowance. This increase represents part of the transition to the new maintenance regime, which is reflected fully in the maintenance component of the operating expenditure forecast. A more detailed rationale for the introduction of the new maintenance regime is included in ElectraNet's Asset Management Plan.

Figure 6.5 shows the impact of the major drivers for operating expenditure on the operating expenditure forecast. Operating expenditure is increasing due to labour growth, asset growth, implementation of a new maintenance regime for ageing assets, land tax and other scope changes.

Figure 6.5: Impact of controllable opex cost drivers ($2007-08).



The combined effect of these cost drivers is an increased operating expenditure requirement in the forecast period.

ElectraNet is confident, however, that its operating expenditure forecast is both efficient and prudent and that it meets the required expenditure objectives set out in the Rules.

6.7.4 Interaction between operating and capital expenditure

Operating and capital expenditure, and system performance are intrinsically linked, which is why these factors are considered together in ElectraNet's approach to asset management (as discussed in section 3.5). Some of the more specific linkages between these factors is outlined below:

- ElectraNet uses the maintenance project program where practical to manage immediate asset risks while deferring asset replacement projects to align with augmentation projects (e.g. transformer refurbishment and removal of high risk

instrument transformers at sites where larger scale replacement can be aligned with later augmentation needs);

- Delivery of the capital program is critical to maintaining control of operating expenditure because replacement of older, outdated equipment manages the risk of increasing corrective maintenance costs associated with the deteriorating reliability of assets nearing the end of their useful lives. Older equipment can also be costly to maintain because of lack of readily available parts, expertise or support from manufacturers (e.g. the direct routine maintenance cost comparison for an old 275kV substation layout with older equipment compared to a new layout with new equipment shows the new substation costs are approximately 40 per cent lower than those for the old substation. This impact has been directly modelled in ElectraNet's routine maintenance forecast discussed in section 6.6.5);

- The capital program delivers new technology (e.g. communications capability, remote access relays, and power system monitoring) which inturn drives improvements in real time operations capability and capacity. Improved network designs (e.g. use off greater maintenance clearances, and mesh bus and breaker-and-a-half schemes) provide flexibility in accessing the asset for maintenance resulting in reduced impact of outages (potentially deferring additional augmentation capex);

- As the network grows through capital investment, the costs of operating and maintaining the network also grows (this is directly modelled in the routine maintenance model as explained above and indirectly through the asset growth and scale factors discussed in section 6.6.3); and

- Additional operating costs are incurred during a period of significant capital development. Many parts of ElectraNet's network are close to capacity, and there is additional effort and cost in managing access to the network for capital and maintenance works without adversely affecting availability or imposing constraints which impact market price (ElectraNet has not made specific allowance for these additional costs in its expenditure forecasts as they are difficult to quantify).

6.7.5 Directors' Responsibility Statement

In accordance with clause S6A.1.2(6) of the Rules, this Revenue Proposal must contain a certification of the reasonableness of the key assumptions that underlie the operating expenditure forecast by the directors of ElectraNet.

The Director's responsibility statement is included in Appendix B.

6.8 Concluding Comments

This Chapter has presented ElectraNet's operating expenditure forecast for the 1 July 2008 to 30 June 2013 regulatory period.

The key cost drivers contributing to higher levels of forecast operating expenditure include:

- Asset growth: Growth in demand and the new ETC standards are driving the need for significant transmission investment to meet mandated reliability standards resulting in higher levels of required operating expenditure;

- An ageing asset base: A new maintenance regime has been introduced to address the particular risks associated with a growing number of assets reaching the end of their useful lives;

- Labour skills shortages and real wages growth caused by a marked strengthening in employment in the mining, construction and manufacturing sectors in South Australia; and

- A number of cost scope changes including a land tax imposed by the South Australian Government.

The combined effect of these cost drivers is an increased operating expenditure requirement in the forecast period.

ElectraNet has developed its operating expenditure forecast to:

- meet the expected demand for prescribed transmission services set out in section 5.7.1 – demand forecasts that have been independently provided by ETSA Utilities and ElectraNet's direct-connect customers in accordance with clause 5.6.1 and Schedule 5.7 of the Rules;

- comply with all applicable regulatory obligations associated with the provision of prescribed transmission services – the applicable regulatory obligations are set out in section 6.3;

- maintain the quality, reliability and security of supply of prescribed transmission services and the reliability, safety and security of the transmission system – the applicable quality, reliability, safety and security of supply standards are set out in section 6.3.

ElectraNet is confident that its operating expenditure forecast is both efficient and prudent and that it meets the required expenditure objectives set out in the Rules.

7. Regulatory Asset Base

7.1 Introduction

This Chapter presents information relating to ElectraNet's regulatory asset base (RAB) in accordance with the Rules and AER guidelines. The Chapter is structured as follows:

- Section 7.2 describes the establishment of the opening RAB value as at 1 January 2003.
- Section 7.3 describes the roll forward methodology used to establish the opening asset base as at 1 July 2008.
- Section 7.4 explains the change in regulatory accounting methodology implemented by the AER.
- Section 7.5 provides information relating to the readmission of previously optimised assets into the RAB from 1 July 2008.
- Section 7.6 provides information relating to the revaluation of easements.
- Section 7.7 concludes the chapter by providing a summary of the derivation of the regulatory asset base as at 1 July 2008.

7.2 Establishment of Regulatory Asset Base Value as at 1 January 2003

ElectraNet's RAB as at 1 January 2003 is prescribed in clause S6A.2.1(c)(1) of the Rules, being $823.75 million. Clause S6A.2.1(c)(2) requires this value to be adjusted for the difference between:

- any estimated capital expenditure that is included in those values for any part of a previous regulatory control period; and
- the actual capital expenditure for that part of the previous regulatory control period.

This adjustment must also remove any benefit or penalty associated with any difference between the estimated and actual capital expenditure.

In accordance with these provisions, the AER's Asset Base Roll Forward Model adjusts ElectraNet's RAB value for differences between estimated commissioned assets and actual commissioned assets.

ElectraNet's has adjusted the 1 January 2003 opening RAB for actual commissioned assets in the July to December 2002 period. Commissioned assets were $5.1 million higher than forecast. The resulting return on the difference between actual and forecast commissioned assets equates to an additional $3.1 million over the regulatory period which will be rolled into the opening RAB as at 1 July 2008.

During the regulatory control period, ElectraNet has changed its accounting system and as a consequence different asset classes have been adopted for the purpose of representing assets at an aggregated level in the AER's Asset Base Roll Forward Model and PTRM. Where assets have been aggregated, weighted average standard

and remaining lives have been calculated for the asset category. ElectraNet has mapped the 2002 revenue cap decision capex and economic depreciation to the new asset classes. This mapping exercise was performed at an asset class level as the 2002 decision does not model individual assets. The asset base roll forward has been conducted with the new asset classes. Details of the asset class mapping are supporting information that is available to the AER upon request.

7.3 Roll Forward Methodology

ElectraNet has used the AER's Asset Base Roll Forward Model to roll forward its asset base and establish the opening RAB as at 1 July 2008. The AER's model was developed in accordance with the capital expenditure incentive framework, which applies in the current regulatory period.

In accordance with the AER's Asset Base Roll Forward Model, the closing RAB (nominal) for each year of the regulatory period is calculated by:

- adjusting the opening RAB for the difference between actual CPI and forecast inflation;
- adjusting the forecast capex (allowed in the 2002 decision) for the difference between actual CPI and forecast inflation; and
- adjusting the forecast economic depreciation (allowed in the 2002 decision) for the difference between actual CPI and forecast inflation.

At the end of the current regulatory control period an adjustment is made to the closing RAB to reflect a higher than forecast capital expenditure by adding prudent additional expenditure.

The final steps in establishing the opening RAB are to recognise adjustments for the following as at 1 July 2008:

- prudent assets under construction at 30 June 2008;
- readmission of previously optimised assets on the basis that demand growth and generation developments mean that these assets are required in the forecast period to provide prescribed transmission services; and
- an easement revaluation adjustment consistent with undertakings given to ElectraNet by the ACCC in a letter dated 3 August 2004.

These adjustments are explained in the following sections.

7.4 Change in Regulatory Accounting Methodology

A number of different approaches have been proposed for recognising capital expenditure in the RAB. The approach which has applied in the current regulatory control period is to recognise capital expenditure on an as-commissioned basis; i.e. when assets are placed in service. The AER has previously indicated a preference for recognising capital expenditure on an as-incurred basis, which requires modelling the return on and return of capital when that expenditure is incurred.

However, in its first proposed PTRM and Asset Base Roll Forward Model the AER has adopted a hybrid approach in which:

- the return on capital is calculated on an as-incurred basis; and
- the return of capital or depreciation is calculated on an as-commissioned or in-service basis.

The transition to modelling the return on capital on an as-incurred basis requires an amount for prudent expenditure on assets under construction at the end of the current regulatory period to be rolled into ElectraNet's RAB.

ElectraNet's forecast of prudent expenditure on assets under construction to be rolled into the RAB as of 1 July 2008 is $44.4m.

7.5 Readmission of Optimised Assets

7.5.1 Background

The AEMC recognised in its November 2006 Rule determination that a TNSP should be allowed to reinstate assets that were optimised out of the initial RAB where these assets are subsequently used to provide prescribed services and that this was consistent with current regulatory practice[70].

The Rules permit a TNSP's regulatory asset value to be adjusted to include the value of 'past capital expenditure that has not been included in that value[71], but only to the extent that such past capital expenditure' is needed to provide prescribed transmission services and has not otherwise been recovered[72].

7.5.2 Review of optimised assets

ElectraNet has a number of assets that were 'optimised out' of its regulatory asset value when this was first determined in 1998. The ACCC allowed the readmission of a number of optimised assets in its 2002 revenue cap decision.

In the context of this Revenue Proposal, ElectraNet commissioned GHD to review the current optimisations reflected in ElectraNet's RAB and recommend those optimised assets that should be readmitted to the RAB on the basis of load growth and well accepted optimisation principles.

GHD has recommended that the following assets be readmitted to ElectraNet's RAB for the next regulatory period[73]:

- Tailem Bend to Keith 132 kV transmission line – the double circuit line optimisation is to be reversed and the two Tailem Bend to Keith 132 kV transmission lines readmitted as single circuit lines and valued accordingly;

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70 AEMC, "National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 Number 18: Rule Determination", 16 November 2006.

71 The roll forward method refers to updating the regulatory asset value by adding in new capital expenditure, deducting depreciation and disposals, adjusting for inflation, but not making any other adjustments (either positive or negative).

72 National Electricity Rules, schedule 6A.2.1(f)(8)(ii).

73 GHD Report, "Asset Optimisation Review", May 2007 (included as Appendix P).

- Para (Tungkillo) to Tailem Bend 275 kV transmission line – the previous optimisation of the double circuit to single circuit be reversed so that the line is valued as constructed;

- Davenport to Cultana 275 kV transmission line – the previous optimisation of the transmission line from double circuit to single circuit to be reversed and the line valued as a 275kV double circuit line; and

- Robertstown (Tungkillo) to Cherry Gardens 275 kV transmission line – the previous optimisation of the twin conductor to single circuit per phase to be reversed and valued as twin conductor per phase from Tungkillo to Cherry Gardens.

7.5.3 Value of optimised assets for regulatory purposes

ElectraNet engaged The Allen Consulting Group (ACG) to provide economic advice on how those assets recommended by GHD for readmission to the RAB should be valued for regulatory purposes[74].

Under an ODRC framework in which the future service potential of optimised assets (spare capacity) has not been valued then a value for surplus assets must be recognised if and when they are required. The ACG report concludes that the minimum value at which such assets should be readmitted into the RAB is the difference between the current replacement cost of the non-optimised asset (i.e. the actual asset in service) and the optimised asset (the one that is reflected in the regulatory asset value at present) adjusted for depreciation (i.e. taking into account the age of the readmitted assets).

Adopting this minimum approach, the assets recommended by GHD for readmission to the RAB have been valued by GHD at a total current replacement cost of $155.4 million for the non-optimised assets and $108.7m for the optimised assets[75].

Applying straight-line depreciation to the incremental value of $46.7m results in a depreciated value of $21.0 million to be added to ElectraNet's opening asset base as of 1 July 2008.

7.6 Easement Valuation Adjustment

7.6.1 Introduction

Clause 11.6.13 of the Rules provides that in establishing ElectraNet's RAB at the 2008 revenue reset, the AER may make an adjustment for the value of easements:

> *"Without limiting the operation of the new Chapter 6A, in establishing the opening regulatory asset base for ElectraNet for the regulatory control period subsequent to ElectraNet's current regulatory control period, the AER may also consider adjustments to the regulatory asset base for ElectraNet that relate to easements, as agreed by letter dated 3 August 2004, between the ACCC and ElectraNet."*

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74 The Allen Consulting Group, "Treatment of Previously 'Optimised' Transmission Assets – Appropriate recognition in the Regulated Asset Value", May 2007 (included as Appendix R).

75 GHD Report, "Transmission Line Replacement Cost", May 2007 (included as Appendix Q).

This clause confers on the AER the power to consider an adjustment to ElectraNet's easement value as the ACCC agreed to do by its letter dated 3 August 2004. The ACCC letter clearly states that if ElectraNet establishes that its investors had a reasonable expectation that its easements would be revalued, the ACCC would consider a revaluation of those easements:

> *"The ACCC's preference to roll forward a TNSP's asset base reflects its views as to the best approach, under the Code, to asset valuation into the future. However, the decision on ElectraNet's asset base will be made at the re-set of its revenue cap in accordance with the requirements of the Code.*
>
> *As previously noted by ACCC staff, the ACCC would consider revaluation of ElectraNet's asset base if ElectraNet was able to establish that such a step accords with the reasonable expectations of ElectraNet's investors."*

ElectraNet's Easement Value Adjustment Submission (included as Appendix S) establishes that ElectraNet's investors did in fact have a reasonable expectation that the easements would be revalued. This submission also outlines the proposed methodology for determining an easement value adjustment in relation to both landowner compensation costs and easement acquisition or transaction costs and the corresponding easement values.

The remainder of this section summarises the proposed methodology for determining an easement value adjustment and the calculation of the adjustment value.

7.6.2 Landowner compensation costs

A benchmark methodology is proposed to estimate a proxy historical cost of easement compensation from Victorian historical cost records.

The proposed methodology developed by market valuation company, Capital Value Pty Ltd, is based on the use of independent and reliable data including:

- Data from the Victorian TNSP, SP AusNet (formerly SPI PowerNet). This data formed the basis of the historical cost estimates used by the ACCC in SPI PowerNet's 2002 revenue cap determination;
- The Australian Bureau of Agricultural and Resource Economics (ABARE), identifies a range of statistical information including the value of land and improvements by geographic location; and
- The Australian Bureau of Statistics provides information on the (nominal) value of residential, rural commercial and other land by state/territory.

Capital Value has implemented the proposed methodology and estimates landowner compensation costs in the range of $25.9 million to $30.7 million[76]. Adopting the midpoint of Capital Value's estimated range and subtracting the $3.5 million easement value included in ElectraNet's asset base at 1 July 2002[77] results in a proxy historical cost of $24.8 million.

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[76] Capital Value, "Establishing a proxy historical cost valuation of easement compensation", 17 May 2007 (included as Appendix T).

[77] ElectraNet SA revenue cap proforma provided to the ACCC on 15 November 2002.

For the purposes of this Revenue Proposal indexation by CPI results in an easement value adjustment of $29.1 million to be added to the RAB as at 1 July 2008.

7.6.3 Easement acquisition or transaction costs

The South Australian Government 1998 jurisdictional asset valuation included no recognition of easement acquisition or transaction costs. This fact is established in statements provided by Sinclair Knight Merz (SKM) who carried out the jurisdictional asset valuation[78]. This means that ElectraNet's current RAB includes no recognition of these costs.

The ACCC's consultants Meritec recommended in 2002 that $36 million be introduced to the RAB to recognise easement acquisition costs based on a valuation by Maloney Field Services in 2000[79]. A more comprehensive valuation by SKM in 2002 suggested a higher value of $54 million (figure included in Meritec report to the ACCC)[79].

Adopting the midpoint of the range established by the Maloney Field Services and SKM valuations results in a proxy historical cost of $45.0 million.

For the purposes of this Revenue Proposal indexation by CPI results in an easement value adjustment of $52.8 million to be added to the RAB as at 1 July 2008.

7.6.4 Total easement value adjustment

In summary, ElectraNet is seeking an easement value adjustment of $81.9 million to be added to its RAB as at 1 July 2008. The calculation of this figure is shown in Table 7.1.

Table 7.1: Easement value adjustment as at 1 July 2008 ($ nominal).

Component	Proxy Historical Cost ($m 2001-02)	Valuation Adjustment ($ 2007-08)
Easement compensation costs	24.8	29.1
Easement acquisition or transaction costs	45.0	52.8
Total	69.8	81.9

ElectraNet notes that this is a conservative value which is significantly lower than:

- the independent easement valuations that were made available to investors by the South Australian Government at the time of their investment decision; and
- the investor prepayment for network land lease (including easements) of $156.1 million.

78 ElectraNet, "Easement Value Adjustment Submission to the AER", May 2007, p21.

79 Meritec report to ACCC, "ElectraNet SA Asset Base Review", July 2002, p32.

7.7 Regulatory asset base as at 1 July 2008

In summary, ElectraNet's opening RAB as at 1 July 2008 is derived by:

- using the RAB value as at 1 January 2003 prescribed in the Rules, and adjusted for differences between forecast and actual capital expenditure in accordance with the Rules;
- rolling forward the 1 January 2003 value for actual additions, disposals, revaluation and subtraction of depreciation allowances contained in the ACCC's 2002 revenue cap decision for ElectraNet using the Asset Base Roll Forward Model provided by the AER;
- adding prudent assets under construction as at 30 June 2008;
- readmitting previously optimised assets on the basis that load growth and generation developments mean that these assets are now required to provide prescribed transmission services; and
- including an easement value adjustment that is consistent with undertakings given by the ACCC in its letter dated 3 August 2004.

Table 7.2 below shows the derivation of the regulatory asset base value as at 1 July 2008.

Table 7.2: Derivation of Opening RAB as at 1 July 2008 ($m nominal).

	2003	2003-04	2004-05	2005-06	2006-07	2007-08
Opening RAB	823.8	829.1	880.1	954.5	1,025.6	1,084.9
2002 decision capex (adjusted for actual CPI)	10.1	73.4	96.4	88.3	79.3	54.2
2002 decision economic depreciation	(4.9)	(22.3)	(22.0)	(17.2)	(20.0)	(22.0)
Closing RAB	829.1	880.1	954.5	1,025.6	1,084.9	1,117.1
Adjust for difference in actual capex (and disposals)[80]						12.2
Add prudent assets under construction at 30 June 2008						44.4
Add readmitted optimised assets						21.0
Add easement value adjustment						81.9
Opening RAB at 1 July 2008						**1,276.5**

[80] Value is derived from adjusting the forecast opening RAB as at 1 January 2003 including the return on additional asset as calculated in the PTRM, plus variance between actual and forecast commissioned assets during the current regulatory period.

8. Depreciation

8.1 Introduction

This Chapter presents ElectraNet's assessment of the allowable depreciation on regulated assets during the regulatory period.

Clause 6A.6.3 of the Rules requires that the nominated depreciation schedules must use a profile that reflects the nature of the category of assets (which must be classified into well accepted categories) over the economic life of that category of assets. ElectraNet has depreciated each asset category in the RAB on a straight-line basis over its economic life. In accordance with the requirements of Clause 6A.6.3, ElectraNet has followed standard practice by assigning a regulatory life to each category of assets that equates to its expected economic or technical life.

The remainder of this section is structured as follows:

- Section 8.2 describes ElectraNet's depreciation methodology;
- Section 8.3 sets out ElectraNet's standard asset lives;
- Section 8.4 presents ElectraNet's nominated depreciation schedules for the forthcoming regulatory period; and
- Section 8.5 provides some concluding comments.

8.2 Depreciation Methodology

The Accounting Standard AASB 116 Property, Plant and Equipment, defines depreciation as the systematic allocation of the depreciable amount of an asset over its useful life. The accounting standard requires depreciation to be charged on a systematic basis over the life of the asset. In addition, asset lives are required to be reviewed at least once each annual reporting period.

ElectraNet has used the remaining asset lives recorded in its fixed asset register and rolled forward the remaining asset life to the end of the regulatory period. Assets capitalised in each asset class have been included taking into account the actual year of capitalisation and the value of the assets. Where asset classes have been aggregated for efficiency, a weighted average life approach has been used to determine the remaining life of each asset class.

Where assets are forecast to be decommissioned, asset lives have been adjusted to depreciate over the remaining economic life of the asset. Other assets depreciate from their commissioning date using ElectraNet's standard asset life.

ElectraNet has changed its accounting system during the current regulatory period. As a consequence, different asset categories have been adopted for the purpose of representing assets at an aggregated level. Where changes have been necessary a weighted average approach was used to establish the life of new or amended asset category aggregations.

ElectraNet has used the AER's PTRM to calculate depreciation. Opening assets have been calculated in accordance with the AER's asset base roll forward model.

The depreciation profile chosen is a straight-line depreciation profile from asset commissioning date.

8.3 Standard Asset Lives

Accounting standards recognise that a characteristic common to all physical assets held on a long-term basis, with the exception generally of land and easements, is that their useful lives are limited because their service potential declines over time to a point where it is either consumed or lost.

This decline can occur due to factors such as wear and tear, technical obsolescence and commercial obsolescence. The possibility of obsolescence, both technical and commercial, is a factor which exists regardless of the physical use of an asset.

The useful life of an asset is "*the period over which an asset is expected to be available for use by an entity*" usually assessed and expressed on a time basis defined in terms of the asset's expected utility to the entity. In determining the useful life, the following factors need to be considered:

- the expected usage of the asset assessed by reference to the asset's expected capacity or physical output;
- expected physical wear and tear, which depends on operational factors such as the environmental conditions in which the asset is to be used and the repair and maintenance program;
- the anticipated technical life of the asset, that is, the period of time over which the asset can be expected to remain efficient having regard to technical obsolescence;
- the expected commercial life of the asset, corresponding to the commercial life of its product or output; and
- in the case of certain rights and entitlements, the legal life of the asset, that is, the period of time during which the right or entitlement exists.

ElectraNet engaged Maunsell Australia Pty Ltd to carry out a review of its transmission equipment standard asset lives. The scope of work required that ElectraNet's standard asset lives be assessed against asset lives used by other Australian transmission utilities as well as other international standards.

Maunsell has made a number of recommendations for shorter standard asset lives taking into account technology factors, substation design standards and industry practice[81].

Based on Maunsell's recommendations ElectraNet has adopted new standard asset lives for substation secondary systems (electronic), substation demountable buildings and substation fences.

In addition to Maunsell's recommendations, ElectraNet has adopted new standard lives for Computers, Software and office Machines and Network Switching Centres based on an assessment of revised technological life.

[81] Maunsell report, "Assessment of Asset Lives", May 2007 (included as Appendix U).

These new standard asset lives are reflected in ElectraNet's Depreciation Policy and will be effective from the commencement of the forthcoming regulatory period on 1 July 2008.

Substation secondary systems (electronic)

Modern digital electronic protection and control devices that are the standard in the current period have a shorter economic life than their electromechanical predecessors. Manufacturer's support for integrated circuit components generally does not exceed 10 years. ElectraNet has, therefore, separated its substation secondary systems asset category to recognise both older electromechanical equipment and modern digital electronic equipment with asset lives of 27 and 15 years respectively.

Substation demountable buildings

ElectraNet's current substation build standard utilises where possible demountable buildings (particularly for containment of protection and control schemes) where they can be outfitted and commissioned off site. As digital protection and control schemes have to be replaced it is a simple matter of replacing one building module with another. This means that demountable buildings are replaced at the same time as digital electronic devices (i.e. every 15 years). ElectraNet has, therefore, separated demountable buildings from its substation buildings and establishment asset category as follows:

- Substation Establishment: this asset category will include the main infrastructure of masonry buildings, earth grid, services etc. with an asset life of 55 years (as presently used); and

- Substation Demountable Buildings: this new asset category will include buildings that are used as integral components of protection and control schemes that will be replaced with those schemes. These buildings will have an asset life of 15 years.

Substation fences

Substation fences are currently assigned a 55 year asset life as part of the substation establishment asset category. Based on Maunsell's recommendations ElectraNet will separate fences out from this asset category and recognise them in a new asset category called Substation Fences with a 35 year asset life.

Computers, Software, and Office Machines

Computer related assets are currently assigned a 5 year asset life. Computer related assets have a higher turnover due to technical obsolescence. In this regard, ElectraNet has adjusted the asset life on these assets to 3 years.

Network Switching Centre

Network switching centres have historically had specialised computer equipment with longer than usual asset life compared to modern day computers. Now with the transition to modern day computer technologies, these assets are required to be updated in line with other computer related equipment. ElectraNet has reduced the asset life from 10 years to 3 years in line with other computer related equipment.

Summary

Although Maunsell's report recommends other reductions in asset life for circuit breakers and instrument transformers ElectraNet considers that a change in treatment for these assets is not warranted at this time.

ElectraNet's asset categories and standard asset lives are shown in Table 8.1 below. These asset categories have been used to forecast ElectraNet's revenue requirement in the AER's PTRM.

Table 8.1: Asset Categories and Standard Lives.

Asset Category	Asset Life
Substation Primary	45
Substation Establishment	55
Substation Demountable Buildings	15
Substation Fences	35
Substation Secondary Systems – Electromechanical	27
Substation Secondary Systems – Electronic	15
Transmission Lines - Overhead	55
Transmission Lines – Underground	40
Network Switching Centres (e.g. SCADA)	3
Communication – Civil	55
Communication – Other	15
Commercial Buildings	30
Computers, Software and Office Machines	3
Office Furniture, Movable Plant and Miscellaneous	10
Easements	n/a
Land	n/a

8.4 Depreciation Forecast

ElectraNet has forecast its depreciation schedules for the regulatory period based on the AER's roll forward of the opening asset base and forecast asset additions and disposals.

Asset class lives included in the opening asset base (as at 1 July 2008) have been calculated using a weighted average life. The PTRM has been used to calculate the depreciation forecast on a straight-line-basis.

Clause 6A.6.3(b)(1) of the Rules requires ElectraNet to use a profile that reflects the nature of the assets or category of assets over the economic life of that asset or category of assets. Straight-line depreciation is well established method used to reflect the economic life of an asset.

Clause S6A.1.3(7) of the Rules requires ElectraNet to provide depreciation schedules, which categorise the relevant assets by reference to well accepted categories. ElectraNet has provided depreciation schedules by asset class (e.g. transmission lines, substation primary plant etc.) in the Submission Guideline

Templates – other information. The sum total of the required regulatory accounting depreciation allowance is shown in Table 8.2 below.

Clause S6A.1.3(7) also requires ElectraNet to provide the depreciation schedules by location. ElectraNet understands this requirement relates to clause 6A.6.3, which requires special treatment of assets dedicated to one user or a small group of users (not being a DNSP) with value exceeding $20 million. ElectraNet does not have any assets that fall within this category.

Table 8.2: Forecast regulatory depreciation schedule ($m nominal).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Regulatory Depreciation	58.4	61.3	63.0	66.1	78.5	327.3

For the purpose of estimating the cost of corporate income tax pursuant to Clause 6A.6.4 of the Rules, ElectraNet has calculated tax depreciation in accordance with tax law on a straight-line basis. Different asset lives apply for taxation purposes.

Table 8.3 shows the forecast tax depreciation schedule for the forthcoming regulatory period, which has been used to calculate ElectraNet's allowance for corporate income tax, further details of which are provided in section 9.3.

Table 8.3: Forecast tax depreciation schedule ($m nominal).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Straight-line tax depreciation	28.0	29.3	38.0	44.0	54.4	193.7

8.5 Conclusion

ElectraNet has modelled and forecast its depreciation allowance at an asset category level using straight-line depreciation with all assets within a class assigned weighted average standard and remaining lives. Where assets are to be decommissioned during the regulatory control period, those assets are written-off over the regulatory period on a straight-line depreciation basis.

The AER's PTRM has been used to calculate both the regulatory and tax depreciation allowances. This approach is consistent with the requirements set out in Clause 6A.6.3 and S6A.1.3 of the Rules.

9. Cost of Capital and Taxation

9.1 Introduction

The return on capital is a significant component of ElectraNet's total revenue requirement and relatively small reductions in the rate of return can have a material and adverse impact on the business and its financial viability.

The assessment of an adequate rate of return is of critical importance to ElectraNet. Failure to provide an adequate return, from an investor's viewpoint, will deny customers the economic benefits of additional prudent investment, as discretionary investments are unlikely to be commercially justifiable.

The importance of providing a stable return on investment has been recognised in formulating the cost of capital and taxation aspects of the Rules. In particular, the Rules provide greater certainty regarding the methodology and parameters that should be applied. The remainder of this Chapter is structured as follows:

- Section 9.2 presents ElectraNet's estimate of the WACC in accordance with the requirements of clause 6A.6.2 of the Rules. This WACC is used to determine the return on capital component of the Revenue Proposal.

- Section 9.3 provides details of the net tax allowance calculated for inclusion in the Revenue Proposal, in accordance with the WACC methodology and parameter values specified in clause 6A.6.2 and the requirements of the AER's PTRM.

9.2 Estimation of WACC

As noted above, clause 6A.6.2 sets out that the post-tax nominal vanilla Weighted Average Cost of Capital (WACC) is to be estimated in accordance with the following formula:

$$WACC = k_E \frac{E}{V} + k_D \frac{D}{V}$$

where:

- k_E is the nominal return on equity (determined using the Capital Asset Pricing Model) and is calculated as:

  $k_E = r_f + \beta_e \times MRP$ where:

  - r_f is the nominal risk free rate for the regulatory control period;

  - β_e is the equity beta; and

  - MRP is the market risk premium;

- k_D is the nominal return on debt and is calculated as:

  $k_D = r_f + DRP$ where:

  - DRP is the debt risk premium for the regulatory control period.

- E/V is the equity share in total value (equal to 1 - D/V); and
- D/V is the debt share in total value.

Clause 6A.6.2 also specifies that the following parameter values must be applied:

- benchmark gearing (D/V) is set at 60 percent;
- the market risk premium (MRP) is 6 percent;
- the equity beta (β_e) is 1.0; and
- the benchmark credit rating used to estimate the debt risk premium is BBB+.

To calculate the WACC, ElectraNet is required to estimate the remaining WACC parameters:

- the nominal risk free rate;
- the debt margin; and
- forecast inflation.

Each of these parameters is addressed in turn in the remainder of this section.

9.2.1 Nominal Risk free rate

The risk free rate represents the rate of return on an asset with zero default risk. In estimating the WACC, it is a component of both the cost of equity and cost of debt.

In accordance with clause 6A.6.2 (c) of the Rules, the nominal risk free rate is the rate determined by the AER on a moving average basis from the annualised yield on Commonwealth Government bonds with a maturity of 10 years using the indicative mid rates published by the Reserve Bank of Australia.

ElectraNet proposes that the risk free rate be calculated by averaging over a 10 day trading period. ElectraNet will nominate the start date and the end date of the proposed averaging period to the AER on a confidential basis, as provided for in the Rules.

For the purposes of this proposal, ElectraNet has calculated a nominal risk free rate of 5.71 per cent using a 10 day averaging period ending on 30 March 2007. ElectraNet recognises that the AER will determine the nominal risk free rate to be used in its revenue cap determination.

9.2.2 Debt margin

The cost of debt is determined by adding a debt risk premium (DRP) to the risk free rate of return. Clause 6A.6.2(e) of the Rules states:

> *"The debt risk premium is the margin between the 10 year Commonwealth annualised bond rate and the observed annualised Australian benchmark corporate bond rate for corporate bonds which have a BBB+ credit rating from Standard and Poors and a maturity of 10 years."*

Based on Bloomberg data, the debt risk premium proposed by ElectraNet is 1.14.

ElectraNet recognises that the AER will determine the actual debt risk premium from market data at the date of its determination.

9.2.3 Forecast inflation

The expected inflation rate is an inherent aspect of the nominal risk free rate and is also implicit in the nominal cost of debt.

The AER proposes in its Regulatory Principles to derive the expected inflation rate from the difference between nominal and indexed bond rates and has adopted this approach in its regulatory decisions.

Since late 2004, the Reserve Bank of Australia (RBA) has noticed a decline in the indexed Commonwealth Government Security (CGS) yields in long term maturity bonds. This downward trend has been identified by the RBA in its statements of monetary policy. The February 2006 statement of monetary policy stated:

> *"One development of particular note over the past year or so has been the fall in yields on inflation-indexed bonds. Yields on 10-year indexed bonds fell by 85 basis points from the beginning of 2005 to mid January 2006. This took them below 2 per cent, by far the lowest level since their introduction in the mid 80s and, as a result, the spread between 10-year nominal and real yields widened to 3.2 per cent, compared with around 2.7 per cent in the first half of 2005. While this spread is usually seen as a measure of expected inflation, its recent increase is at odds with other measures of inflation expectations and reflected special factors, unrelated to inflationary pressures. As noted in the earlier chapter on international markets, regulatory changes abroad have encouraged life insurers and superannuation funds to acquire long-dated bonds as an asset class that better matches their liabilities. Other investors, such as hedge funds, are said to have recognised that this process is likely to continue for some time and have added to demand. These developments, against a background of a small, tightly-held domestic supply of indexed bonds, have seen their prices rise (yields fall) significantly. As a consequence, and despite having fallen a little in February, the current spread between yields on nominal and indexed government bonds overstates the market's expectations of inflation."*

NERA has researched this decrease in yields and published a report examining the extent to which Commonwealth Government Securities yields are biased downwards when used in the Capital Asset Pricing Model[82].

NERA's report cites several economic forecasts, such as forecasts by Westpac, ANZ Bank and Commonwealth Bank, that are lower than the forecast determined using the AER's inflation methodology.

The research undertaken by NERA shows indexed bonds to be biased downward in the order of 20 basis points. Adjusting the indexed bond yield upward impacts on the implied inflation rate as the difference between the nominal bonds and indexed bonds is reduced.

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[82] NERA report, "Bias in Indexed CGS Yields as a Proxy for the CAPM Risk Free Rate", March 2007 (included as Appendix V).

ElectraNet has used the AER's approach to determining the expected inflation rate with the 20 basis point adjustment applied to the real risk free rate to determine an assumed inflation rate of 2.97 per cent.

9.2.4 Summary

ElectraNet has calculated a post tax nominal vanilla WACC of 8.79 percent in accordance with the requirements of the Rules.

The key parameters and variables underlying the cost of capital calculation are summarised in Table 9.1 below.

Table 9.1: WACC parameters used for the purpose of this Revenue Proposal.

Parameter	ElectraNet Proposal
Nominal Risk Free Rate	5.71%
Inflation rate	2.97%
Cost of Debt margin over *rf*	1.14%
Market Risk Premium	6.00%
Corporate Tax rate	30.00%
Proportion of Equity Funding	40.00%
Proportion of Debt Funding	60.00%
Value of Imputation Credits	0.5
Equity Beta (uses Te)	1.0
Normal Vanilla WACC	8.79%

9.3 Taxation Allowance

As part of the post-tax nominal approach, a separate allowance must be made in the revenue cap for corporate income tax, net of the value ascribed to dividend imputation credits. Clause 6A.6.4 of the Rules sets out the methodology for calculating the allowance for corporate income tax in accordance with the following formula:

$$\mathbf{ETC_t} = (\mathbf{ETI_t} \times \mathbf{r_t})\,(1 - \boldsymbol{\gamma})$$

where:

- ETI_t is an estimate of the taxable income for that regulatory year that would be earned by a benchmark efficient entity as a result of the provision of prescribed transmission services if such an entity, rather than the Transmission Network Service Provider, operated the business of the Transmission Network Service Provider, such estimate being determined in accordance with the post-tax revenue model;

- r_t is the expected statutory income tax rate for that regulatory year as determined by the AER; and

- γ is the assumed utilisation of imputation credits, which is deemed to be 0.5.

Based on current forecasts of bond rates and inflation, and the tax depreciation schedule shown in section 8.4, ElectraNet's proposed net tax allowance for the regulatory period is as set out in Table 9.2 below.

Table 9.2: Tax Allowance ($m nominal).

Tax Allowance	2008-09	2009-10	2010-11	2011-12	2012-13
Tax payable	18.4	20.2	19.0	19.0	20.6
Less value of imputation credits	(9.2)	(10.1)	(9.5)	(9.5)	(10.3)
Net tax allowance	**9.2**	**10.1**	**9.5**	**9.5**	**10.3**

This tax allowance has been calculated using the AER's PTRM and the tax depreciation allowance summarised in section 8.4.

10. Service Target Performance Incentive Scheme

10.1 Summary

This chapter presents ElectraNet's service target performance incentive scheme and the values proposed to be attributed to the scheme parameters in accordance with clause S6A.1.3(2) of the Rules.

ElectraNet's service performance in the current regulatory period was discussed in section 4.4 of this Revenue Proposal and has demonstrated an overall trend of improved performance.

ElectraNet has been the subject of performance incentives since 1 April 2000 and is operating at or near 'best practice' levels for a network with its characteristics with limited opportunities to make further improvements. Accordingly it is appropriate to set targets with asymmetric caps and collars to recognise the inherent difficultly faced by ElectraNet in improving service performance from an already high base.

ElectraNet's proposed incentive scheme involves:

- taking into account the major risk of extended outages associated with the regulatory obligation to operate long radial lines in rural and remote South Australia as provided for under clause 6A.7.4 (b)(4) of theRules;

- setting parameter values for customer outage related parameters based on historical data over the longest available representative period to ensure that the impact of long return period events is included in the target value as provided for under clause 2.5(h) 2.5(j)(1) of the scheme; and

- adjusting the event frequency parameter values for significant forecast step changes in load and other characteristics that have a material impact on performance such as the impact of load increases on the radial Playford - Pimba 132 kV line and the new Kanmantoo and Middleback connection points.

The remainder of this Chapter is structured as follows:

- Section 10.2 describes the requirements of the Rules in relation to the service target performance incentive scheme;

- Section 10.3 sets out ElectraNet's service target performance incentive scheme parameters (or performance measures) and the proposed values to be applied to these parameters; and

- Section 10.4 provides concluding comments.

10.2 Rules Requirements

Clause 6A.7.4 of the Rules requires the AER to develop and publish an incentive scheme by 28 September 2007 that provides incentives for each Transmission Network Service Provider to:

- provide greater reliability of the transmission system that is owned, controlled or operated by it at all times when Transmission Network Users place greatest value on the reliability of the transmission system; and

- improve and maintain the reliability of those elements of the transmission system that are most important to determining spot prices;

while taking into account:

- the regulatory obligations with which TNSPs must comply;
- other incentives provided for in the Rules that TNSP's have to minimise capital or operating expenditure; and
- the age and ratings of the assets comprising the relevant transmission system.

ElectraNet is subject to interim arrangements in accordance with Clause 11.6.18(b) of the Rules which provide that:

> *"For the purposes of making a 2008 determination for the regulatory control period to be covered by a 2008 determination, anything that must be done in accordance with a guideline must instead be done in accordance with the corresponding proposed guideline."*

The values, weightings and other elements proposed in this Revenue Proposal are compliant with the principles of the First Proposed Service Target Performance Incentive Scheme[83] and the parameter definitions contained in Appendix B, Part 2 of that Scheme.

10.3 ElectraNet's Proposed Values, Weightings and Other Elements

In accordance with the requirements of the First Proposed Service Target Performance Incentive Scheme, ElectraNet's performance incentive scheme includes the following parameters (or performance measures):

- Transmission circuit availability;
- Loss of supply event frequency; and
- Average outage duration.

ElectraNet's proposed values, weightings and other elements that are to be attributed to the performance incentive scheme parameters are specified in the following subsections.

10.3.1 Principles for setting service target values

Service targets should reflect the inherent underlying performance of the transmission network, which is consistent with the historical development of the network. In other words, service targets should represent the performance that the TNSP would be expected to achieve, on average, over a long period consistent with good asset management practices in the context of the underlying network infrastructure and operating environment.

[83] AER, "First Proposed Service Target Performance Incentive Scheme, Explanatory Statement and Issues Paper", January 2007.

Setting meaningful service targets requires the availability of long-term performance data. It is also important that parameters and targets can be influenced by TNSP behaviour and that they are not diminished in value by including the strong influence that random events can have on performance (this is often characterised in terms of requiring a high signal to noise ratio).

Network performance standards must be consistent with the standards set for planning and developing the network. This should include consideration of the impact of long radial transmission lines; for example in remote, difficult to patrol, areas in the North and West of South Australia.

Network performance standards must be consistent with the standards and criteria set for operation of the network. It is important to recognise that NEMMCO is responsible for power system security and that the decisions and actions of NEMMCO have an impact on the operation of the network. TNSPs cannot be held accountable for achieving a standard that exceeds the criteria used by NEMMCO to operate the power system.

Where the historic performance of the network is not representative of forecast performance due to causes outside of the TNSP's control, this should be taken into account in setting targets. Relevant considerations to ElectraNet's proposed service target performance incentive scheme include:

- The impact of forecast changes in customer load and other characteristics at connection points to the network such as the impact of load increases on the Playford - Pimba 132 kV line and the new Kanmantoo and Middleback connection points; and

- The absence of long return period events during the default 5-year period for target setting associated with the regulatory obligation to operate long radial lines in rural and remote South Australia.

ElectraNet proposes to take these considerations into account by setting target values for the forthcoming regulatory period based on the average performance of the network over the preceding 11 years[84] for the loss of supply event frequency parameters and the preceding 9 years for the average outage duration parameter, with adjustments to the loss event frequency targets for the impact of material connection point changes

Caps and Collars

In the service standards guideline published on 12 November 2003, section 4.5.2 addresses the matters of asymmetric rewards and penalties, and states:

> *"the ACCC recognises that TNSPs may already be operating at a high-level of performance. For example, most TNSPs in Australia have a circuit availability rate of more than 99 per cent. At this level, for a particular TNSP, improvements of a certain magnitude could be harder than a similar deterioration. Therefore the gradient of the reward would be greater than that of the penalty, although at the extreme the maximum reward is 1 per cent of the revenue-cap and so is the penalty."*

[84] This is allowable under guideline 2.5(h) which says "The AER may approve a performance target based on a different period if it is satisfied that the use of a different period is consistent with the objectives in clause 1.4 of this scheme."

ElectraNet is operating at or near 'best practice' levels for a network of its type. There are very limited opportunities for further improvement. Accordingly, ElectraNet believes that it is appropriate for the design of the incentive scheme to reflect the asymmetry between the higher potential for service performance to deteriorate and the lesser potential for further service improvements. This would ensure that the scheme provide incentives for ElectraNet to seek further service improvements, even though the opportunity for such improvement is limited.

ElectraNet engaged statistical consultants, SAHA International[85], to develop and apply a sound methodology for calculating the averages, caps and collars for the parameters, which results in the probability of being rewarded being equal to the probability of being penalised. A detailed description of the methodology used for the parameter values is included in the SAHA International report included as Appendix W.

10.3.2 Transmission circuit availability

Transmission circuit availability is comprised of the following sub-parameters which seek to capture the overall level of transmission line availability together with the availability of those lines that are most important in determining spot prices:

- Transmission circuit availability applies to all regulated transmission lines and is predominantly a measure of planned maintenance and construction outages on the network; and

- Critical circuit availability peak and non peak applies to the 275 kV transmission lines making up the Heywood interconnector between South Australia and Victoria. These transmission lines are the most critical transmission lines in determining spot prices. Peak hours has been defined as 8:00 am to 8:00 pm weekdays.

ElectraNet has used the previous 5 years from 2002 to 2006 for the purpose of setting the proposed performance values for this parameter, as the parameter is not unduly influenced by long return period events (statistical outliers).

A weighting of zero is proposed for the critical circuit availability non peak sub-parameter as the historical data does not include a significant amount of interconnector related work programmed during the off-peak hours. Performance against the sub parameter will, however, be reported.

10.3.3 Loss of supply event frequency

The loss of supply event frequency is a threshold-based, unserved energy measure which captures both the magnitude and duration of unplanned interruptions to customer supply.

As the parameter is normalised to maximum system demand, uniform increases in connection point demands do not of themselves impact the use of historical data as a predictor of future average performance. However, significant step changes in load at new or existing connection points do have the potential to significantly overstate future average performance compared to historic performance unless appropriate adjustments are made.

[85] SAHA International "Service Target Incentive Scheme Review", May 2007 (included as Appendix W).

Significant demand increase are anticipated on the Playford - Pimba 132 kV line and at the new Kanmantoo and Middleback connection points during the regulatory period. ElectraNet proposes to take the impact of these demand increases into account by adjusting the historic performance data for three representative connection points by the ratio of the new to old load at the above connection points.

No adjustment has been proposed for the prospective major expansion of the Olympic Dam mine in the State's North, which would materially change the risk profile for this parameter. Instead, ElectraNet proposes an exclusion during the regulatory period for that portion of any outage associated with increased demand at Olympic Dam from the calculation of system minutes.

As noted in section 10.1, performance against this parameter is subject to the major risk of long return period extended outages associated with the regulatory obligation to maintain long radial lines in rural and remote South Australia, which contributes to a set of five historical data points not being statistically significant. For this reason, SAHA International has increased the sample size to the maximum available reliable historical data and has set the proposed performance target equal to the average performance over the previous 11 years, being 1996-2006.

ElectraNet proposes to maintain x and y values at the existing 0.2 and 1.0 system minute levels.

10.3.4 Average outage duration

Average outage duration is a simple measure of the average time without transmission supply for those connection points that experience unplanned transmission outages during the reporting period.

As noted in section 10.1, performance against this parameter is subject to the major risk of long return period extended outages associated with the regulatory obligations to maintain long radial lines in rural and remote South Australia, which contributes to a set of five historical data points not being statistically significant. For this reason, SAHA International has increased the sample size to the maximum available reliable historical data and has set the performance target equal to the average performance over the previous 9 years, being 1998-2006.

Consistent with the current scheme this parameter varies from the standard definition by applying only to those unplanned plant outages which result in loss of customer supply. ElectraNet believes that this approach provides a strong incentive for the company to improve reliability when Transmission Network Users place greatest value on the reliability of the transmission system.

10.3.5 Summary of service target parameters

Table 10.1 specifies the proposed values, weightings and other elements related to ElectraNet's service target performance incentive scheme parameters.

Table 10.1: Proposed values, weightings and other scheme elements.

Parameter	Transmission Circuit Availability			Loss of Supply Event Frequency		Average Outage
Sub Parameter	Transmission Circuit Availability (%)	Critical Circuit Availability Peak (%)	Critical Circuit Availability Non Peak (%)	Events > x System Minutes	Events > y System Minutes	Duration (minutes)
Performance target	99.47	99.75	99.94	5	1	84
Cap (upper limit)	99.75	99.80	99.97	3	0	39
Collar (lower limit)	98.56	99.53	99.90	6	2	147
Weighting	0.3	0.2	0	0.1	0.2	0.2

Notes: x = 0.2 and y = 1.0

Critical circuits are the Para to Tailem Bend, Tailem Bend to South East and South East to Heywood 275 kV double circuit transmission lines

Peak is defined as 8am to 8pm Monday to Friday

Non Peak is defined as all other times

These parameters are illustrated in and Figures 10.1 to 10.5.

Figure 10.1: Transmission Circuit Availability parameter.

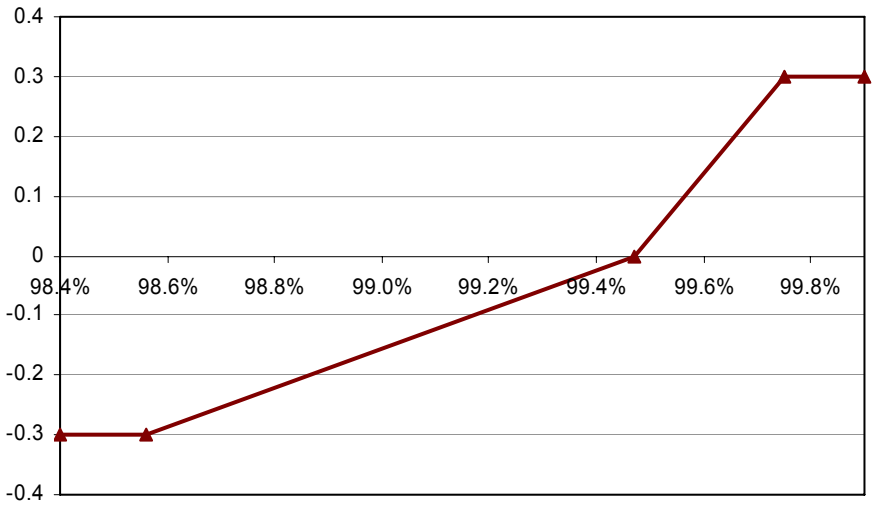


Figure 10.2: Critical Circuit Availability Peak parameter.

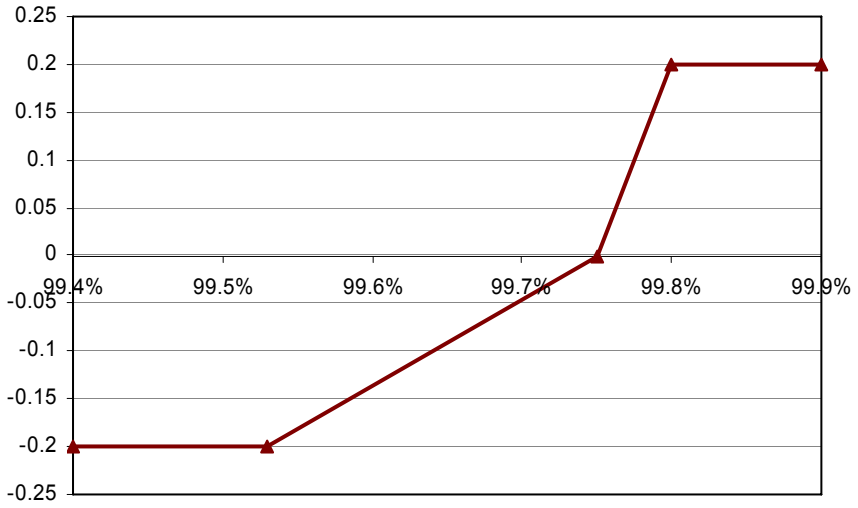


Figure 10.3: Loss of Supply Event Frequency > 0.2 System Minutes parameter.

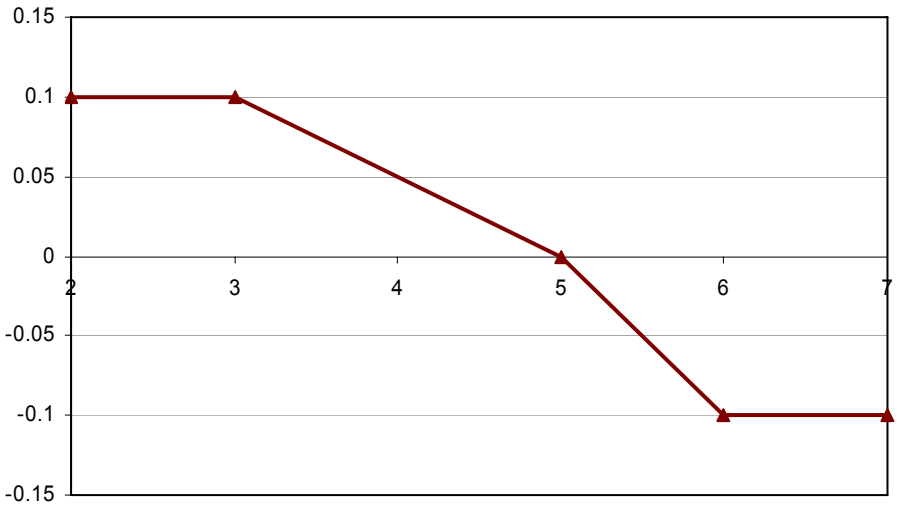


Figure 10.4: Loss of Supply Event Frequency > 1.0 System Minutes parameter

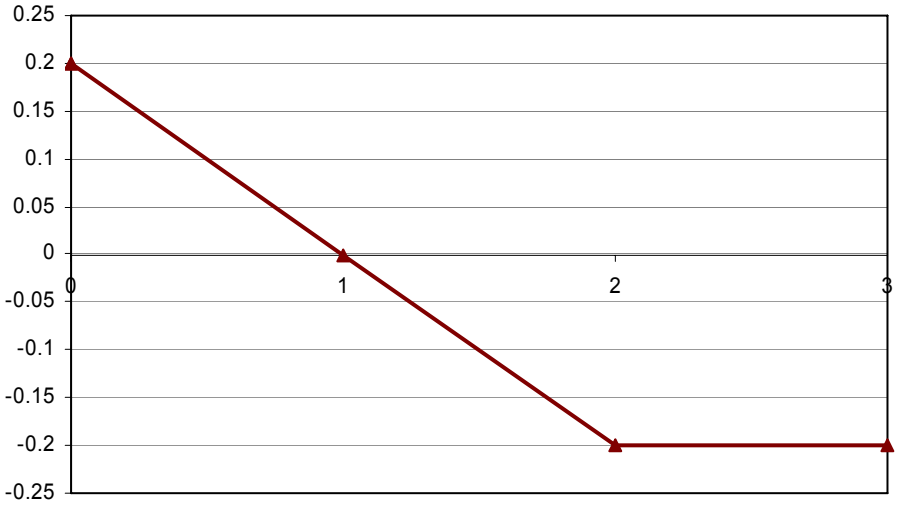
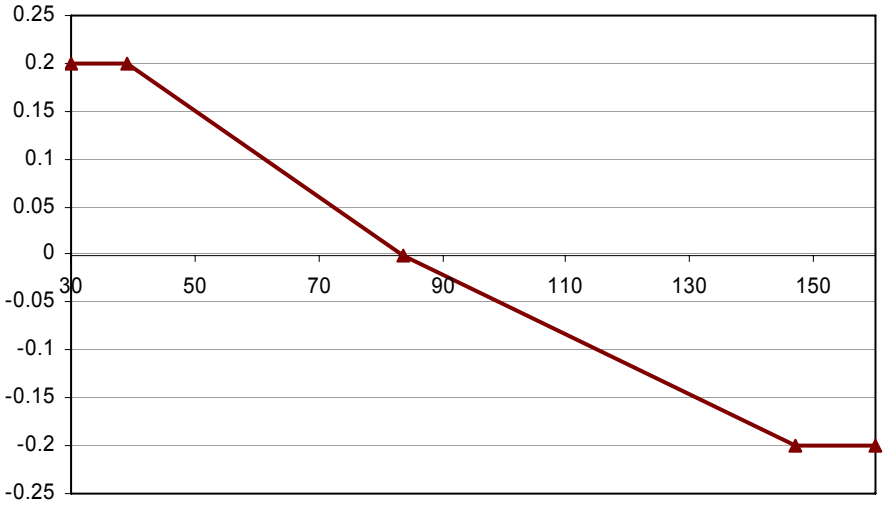


Figure 10.5: Average Outage Duration parameter (minutes).



10.4 Conclusion

ElectraNet has been the subject of service standard performance incentive schemes since 1 April 2000 and is operating at or near 'best practice' levels for a network with its characteristics and has limited opportunities to make further improvements.

Accordingly it is appropriate to set asymmetric caps and collars to recognise the inherent difficultly faced by ElectraNet in improving from an already extremely high base. The proposed asymmetric caps and collars are calculated by reference to the proposed performance targets using a sound methodology which ensures that the probability of exceeding the performance target equals the probability of failing to reach the target.

11. Efficiency Benefit Sharing Schemes

11.1 Introduction

Chapter 4 of this Revenue Proposal explained that ElectraNet has achieved cost and service performance improvements during the current regulatory period. As a privatised company, ElectraNet has responded positively to the incentive properties of the regulatory framework.

In designing CPI-X regulatory frameworks, the efficiency benefit sharing scheme (or "carry-over mechanism") plays an important role in encouraging efficiency improvements. Broadly speaking, such schemes allow the regulated company to retain in the next regulatory period a proportion of any cost efficiencies achieved in the current regulatory period.

The structure and purpose of this Chapter is as follows:

- Section 11.2 explains the carry-over mechanism that applies in respect of the current regulatory period, and ElectraNet's resulting carry-over amount for the forthcoming regulatory period. This scheme reflects the approach agreed between ElectraNet and the ACCC.

- Section 11.3 describes ElectraNet's proposed efficiency benefit sharing scheme, which will apply during the forthcoming regulatory period. This scheme must comply with the requirements of the Rules in Chapter 6A. Any revenue impact from the application of this scheme will apply from 1 July 2013.

- Section 11.4 provides concluding comments.

11.2 Operation of the existing carry-over mechanism

Clause 11.6.10 of the Rules states that:

> *"The maximum allowed revenue that a Transmission Network Service Provider may earn in any regulatory year of the first regulatory control period may be adjusted for any carry-over mechanisms provided for in the relevant existing revenue determination and in any other arrangements agreed between the AER and the Transmission Network Service Provider for the purposes of, and in accordance with, the existing revenue determination."*

ElectraNet's view is that the above clause is relevant to this Revenue Proposal. In particular, ElectraNet entered into correspondence with the ACCC in 2004 regarding the operation of the efficiency carry-over mechanism during the current regulatory period. In response to ElectraNet's letter to the ACCC in June 2004[86], the ACCC explained the operation of the efficiency carry-over scheme in respect of operating expenditure as follows[87]:

- Calculate the total operating expenditure savings during the current regulatory period by comparing the actual operating expenditure with the ACCC's forecast operating expenditure;

[86] Letter from Rainer Korte, ElectraNet, to Sebastian Roberts, ACCC, dated 16 June 2004.

[87] Letter from Sebastian Roberts, ACCC, to Rainer Korte, ElectraNet, dated 4 August 2004.

- Divide the total operating expenditure savings by the number of years in the current regulatory period to calculate the annualised saving; and

- The annualised saving is glide-pathed over the subsequent regulatory period, the first year (year 6) getting 100 per cent, reducing 20 per cent each year (year 7, 80 per cent; year 8, 60 per cent; year 9, 40 per cent and so on).

In accordance with Clause 11.6.10 of the Rules, together with the ACCC's stated approach in its letter dated 4 August 2004, ElectraNet has calculated its glide-path amount (relating to operating expenditure savings) as detailed below.

Table 11.1: Calculation of annual efficiency savings ($m 2007-08).

	2003	2003-04	2004-05	2005-06	2006-07	2007-08	TOTAL
Opex allowance	26.7	53.4	53.3	53.9	54.4	54.8	296.5
Less network support	(2.3)	(4.5)	(4.5)	(4.5)	(4.5)	(4.5)	(25.0)
Less equity/debt raising costs	(0.3)	(0.8)	(0.8)	(0.9)	(0.9)	(0.9)	(4.7)
Adjusted allowance	**24.0**	**48.1**	**48.0**	**48.4**	**49.0**	**49.3**	**266.9**
Controllable Opex	26.7	39.6	37.8	46.6	48.0	50.8	249.5
Total efficiency	**(2.6)**	**8.5**	**10.1**	**1.8**	**1.0**	**(1.5)**	**17.4**
Average opex efficiency savings							3.2

Table 11.2: Glide path of Controllable opex efficiencies ($m 2007-08).

	2008-09	2009-10	2010-11	2011-12	2012-13	TOTAL
Opex Efficiency Glide Path	100%	80%	60%	40%	20%	
Opex Efficiency payment	3.2	2.5	1.9	1.3	0.6	9.5

11.3 ElectraNet's proposed benefit sharing scheme

Clause 6A.6.5 of the Rules requires the AER to publish the Efficiency Benefit Sharing Scheme (the scheme) by 28 September 2007. The scheme must comply with the principles prescribed in the Rules at clause 6A.6.5.

Under Clause 11.6.17 the AER must also publish a proposed scheme on or before 31 January 2007, which will apply for the purposes of ElectraNet's Revenue Proposal. In accordance with clause 11.6.17, the AER published its First Proposed Efficiency Benefit Sharing Scheme in January 2007. This scheme explains that the AER will calculate efficiency gains or losses using the relevant efficiency benefit sharing parameters, and the method by which gains or losses are shared between TNSPs and transmission network users.

The AER will calculate an efficiency gain or loss in the first year (E1) as follows:

$E_1 = F_1 – A_1$, where

- A_1 is the actual operating expenditure incurred by the TNSP for year 1 of the regulatory control period; and

- F_1 is the forecast operating expenditure for that year as accepted by the AER in the relevant revenue determination.

Gains or losses that arise in the second and subsequent years of the regulatory control period will be calculated as:

$E_t = (F_t - A_t) - (F_{t-1} - A_{t-1})$, where

- E_t is the efficiency benefit/loss in year t;
- A_t, A_{t-1} are the actual operating expenditure incurred in years t and t-1 respectively; and
- F_t, F_{t-1} are the forecast operating expenditure for the years t and t-1 respectively.

The sample calculations contained in Attachment A of the scheme illustrate the calculation and adjustment process that underpins the Scheme. The efficiency benefit/loss for each year will be retained by the TNSP for five years following the year in which is it incurred, after which the total value of the gain or loss is removed from the TNSP's expenditure forecast and notionally 'shared' with transmission network users. The sharing of efficiency gains or losses will not occur until the regulatory control period immediately following the implementation of the Scheme.

For the purposes of this Revenue Proposal, ElectraNet will adopt the efficiency benefit sharing scheme as set out in the AER's First Proposed Efficiency Benefit Sharing Scheme.

11.4 Conclusion

This Chapter has explained the application of the operating expenditure carry-over mechanism for the current regulatory period. It shows that ElectraNet is entitled to an efficiency bonus of $9.5 million ($2007-08) in the forthcoming regulatory period, which reflects a sharing of the operating expenditure efficiency gains achieved during the current period.

In terms of the forthcoming regulatory period, ElectraNet proposes to adopt the efficiency benefit sharing scheme outlined in the AER's First Proposed Efficiency Benefit Sharing Scheme, dated January 2007. ElectraNet's proposal efficiency benefit sharing scheme therefore complies with the requirements of the Rules.

12. Maximum Allowed Revenue

12.1 Introduction

ElectraNet's Revenue Proposal is based on the post tax building block approach outlined in Chapter 6 of the Rules and the AER Guidelines and PTRM. The revenue building block components have been described in the preceding chapters.

The building block formula to be applied in each year of the revenue control period is:

MAR = return on capital + return of capital + Opex + Tax

= (WACC x RAB) + D + Opex + Tax

where:

MAR = Maximum allowable revenue

WACC = post tax nominal weighted average cost of capital

RAB = Regulatory Asset Base

D = economic depreciation (nominal depreciation – indexation of the RAB)

Opex = operating and maintenance expenditure + efficiency glide path payments

Tax = regulated business corporate tax allowance

This revenue is then smoothed with an X factor in accordance with the requirements of Clause 6A.6.8 of the Rules.

A brief summary of each of the building blocks, the unsmoothed revenue and smoothed revenue is outlined in this Chapter.

12.2 Regulatory asset base

The movements in the regulatory asset base over the 2008-09 to 2012-13 regulatory period are set out in Table 12.1. These reflect the capital expenditure forecast set out in Chapter 5 and the expected depreciation over the period as set out in Chapter 8.

Table 12.1: Asset Base Roll-Forward from 1 July 2008 to 30 June 2013 ($m nominal).

Regulatory Asset Base	2008-09	2009-10	2010-11	2011-12	2012-13
Opening RAB	1,276.5	1,468.0	1,687.9	1,859.7	1,998.6
Net capex	211.9	237.7	184.7	149.7	78.1
Economic depreciation	(20.4)	(17.7)	(12.9)	(10.8)	(19.1)
Closing RAB	**1,468.0**	**1,687.9**	**1,859.7**	**1,998.6**	**2,057.5**

12.3 Return on Capital

The WACC calculation is detailed in Chapter 9 of this Revenue Proposal. The return on capital has been calculated by applying the post tax nominal vanilla WACC to the opening regulatory asset base consistent with the AER post tax revenue model. This calculation is shown in Table 12.2 below.

Table 12.2: Return on Capital from 1 July 2008 to 30 June 2013 ($m nominal).

Return on Capital	2008-09	2009-10	2010-11	2011-12	2012-13
Asset value	1,276.5	1,468.0	1,687.9	1,859.7	1,998.6
Return on capital	112.3	129.1	148.4	163.5	175.8

12.4 Depreciation

The calculation of depreciation is detailed in Chapter 8 of this Revenue Proposal. The AER's post tax revenue model calculates economic depreciation by subtracting the indexation of the opening asset base from the depreciation for each regulatory year. A summary of this calculation is shown in Table 12.3 below.

Table 12.3: Depreciation from 1 July 2008 to 30 June 2013 ($m nominal).

Depreciation	2008-09	2009-10	2010-11	2011-12	2012-13
Straight-line depreciation	58.4	61.3	63.0	66.1	78.5

Depreciation	2008-09	2009-10	2010-11	2011-12	2012-13
Tax Depreciation	28.0	29.3	38.0	44.0	54.4

12.5 Operating expenditure

The calculation of operating and maintenance costs (opex) is detailed in Chapter 6 of this Revenue Proposal. The total opex including efficiency glide path payments, is shown in Table 12.4.

Table 12.4: Operating expenditure from 1 July 2008 to 30 June 2013 ($m 2007-08).

Operating Expenditure	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Controllable opex	54.2	55.9	58.5	61.4	62.6	292.5
Other opex	5.4	5.7	6.0	6.5	8.0	31.7
Total opex	**59.6**	**61.6**	**64.5**	**67.9**	**70.6**	**324.2**
Opex efficiency payment	3.2	2.5	1.9	1.3	0.6	9.5

12.6 Tax allowance

The calculation of the corporate tax allowance is detailed in Chapter 9 of this Revenue Proposal. The corporate tax allowance is shown in Table 12.5 below.

Table 12.5: Tax allowance from 1 July 2008 to 30 June 2013 ($m nominal).

Tax Allowance	2008-09	2009-10	2010-11	2011-12	2012-13
Tax payable	18.4	20.2	19.0	19.0	20.6
Less value of imputation credits	(9.2)	(10.1)	(9.5)	(9.5)	(10.3)
Net tax allowance	**9.2**	**10.1**	**9.5**	**9.5**	**10.3**

12.7 Maximum Allowed Revenue

The unsmoothed revenue requirement for each year of the period is calculated as the sum of return on capital, return of capital, operating and maintenance expenditure, efficiency carry-over and corporate tax allowance. The outcomes are presented in Table 12.6 below.

Table 12.6: Unsmoothed revenue requirement July 2008 to 30 June 2013 ($m nominal).

Unsmoothed Revenue	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Return on capital	112.3	129.1	148.4	163.5	175.8	729.1
Return of capital	20.4	17.7	12.9	10.8	19.1	80.9
Operating expenses	61.4	65.2	70.3	76.2	81.6	354.7
Opex efficiency payment	3.2	2.7	2.1	1.4	0.7	10.1
Tax allowance	9.2	10.1	9.5	9.5	10.3	48.6
Unsmoothed revenue requirement	**206.5**	**224.8**	**243.2**	**261.5**	**287.5**	**1,223.5**

12.8 X Factors

The X factor smoothing profile proposed by ElectraNet meets the requirements set out in clause 6A.6.8 of the Rules, which requires the maximum allowed revenue requirement to be equal to the NPV of the annual building block revenue requirement, while ensuring the expected maximum allowed revenue for the last regulatory year is as close as reasonably possible to the annual building block revenue requirement.

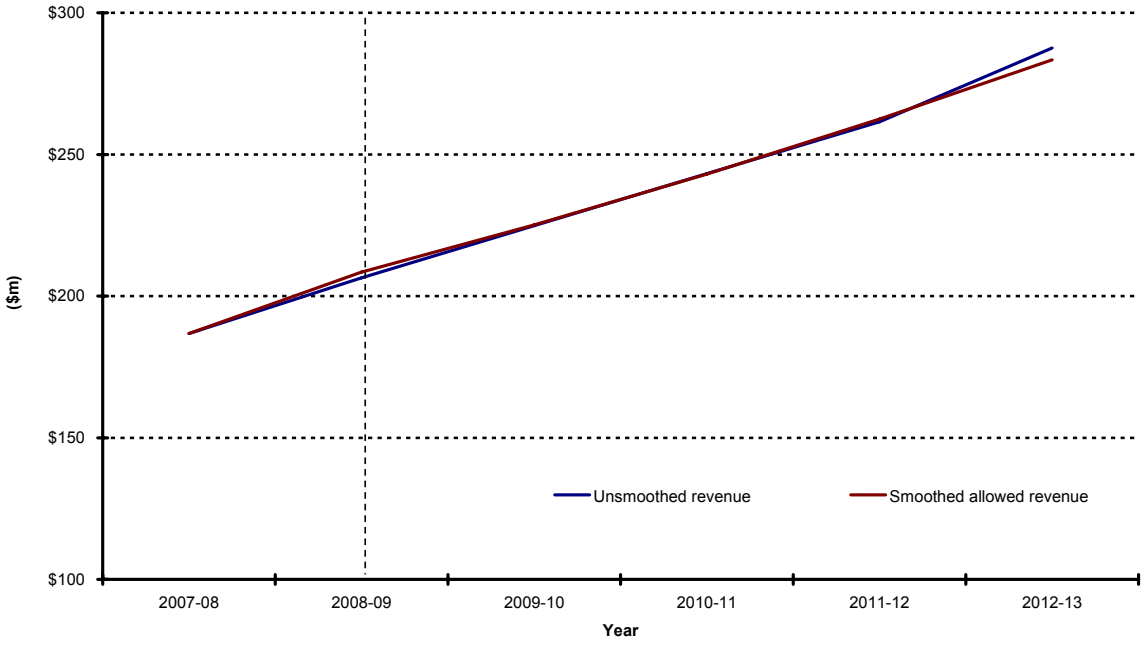
The proposed X factors are presented in Table 12.7 below.

Table 12.7: Smoothed revenue requirement, 1 July 2008 to 30 June 2013 ($m nominal).

	2008-09	2009-10	2010-11	2011-12	2012-13	Total
Unsmoothed revenue requirement	206.5	224.8	243.2	261.5	287.5	1,223.5
Smoothed revenue requirement	208.5	225.1	243.1	262.5	283.4	1,222.6
X factor	(8.4%)	(4.9%)	(4.9%)	(4.9%)	(4.9%)	

ElectraNet has determined the proposed X factors to achieve a smooth average price transition between the current and forthcoming regulatory periods. The same X factor has been applied in each year following the first year of the regulatory period. The proposed X factors deliver an expected maximum allowed revenue for the last regulatory year that is very close to the annual building block revenue requirement. The AER's PTRM has been used to calculate the X factors to ensure that the smoothed and unsmoothed revenue requirements are equal in NPV terms.

Figure 12.1: Revenue path ($m nominal).



12.9 Average Price Path

ElectraNet determines its transmission charges based on the AER's approved revenues and the pricing principles contained in the Rules. The effect of ElectraNet's Revenue Proposal on average transmission charges can be estimated by taking the maximum allowed revenues and dividing them by forecast energy delivered in South Australia. Based on this approach, ElectraNet estimates that its Revenue Proposal will result in an increase of about 6.8 per cent per annum (nominal) in average transmission charges during the regulatory period[88].

Table 12.8 and Figure 12.2 show the average price path resulting from this revenue proposal during the next regulatory period compared with the average price for the final year of the current regulatory period (2007–08). Average transmission charges are estimated to increase from around $13.3 per MWh in 2007–08 to $18.5 per MWh in 2012–13.

The increase in average transmission prices is directly related to the significantly higher levels of capital expenditure required and the higher input cost drivers discussed previously. A part of the increase is also attributable to the AER's change in regulatory accounting methodology for capital expenditure (discussed in section 7.4).

88 Forecast energy figures are medium growth figures taken from NEMMCO's 2006 Statement of Opportunities with addition of the new committed Prominent Hill load.

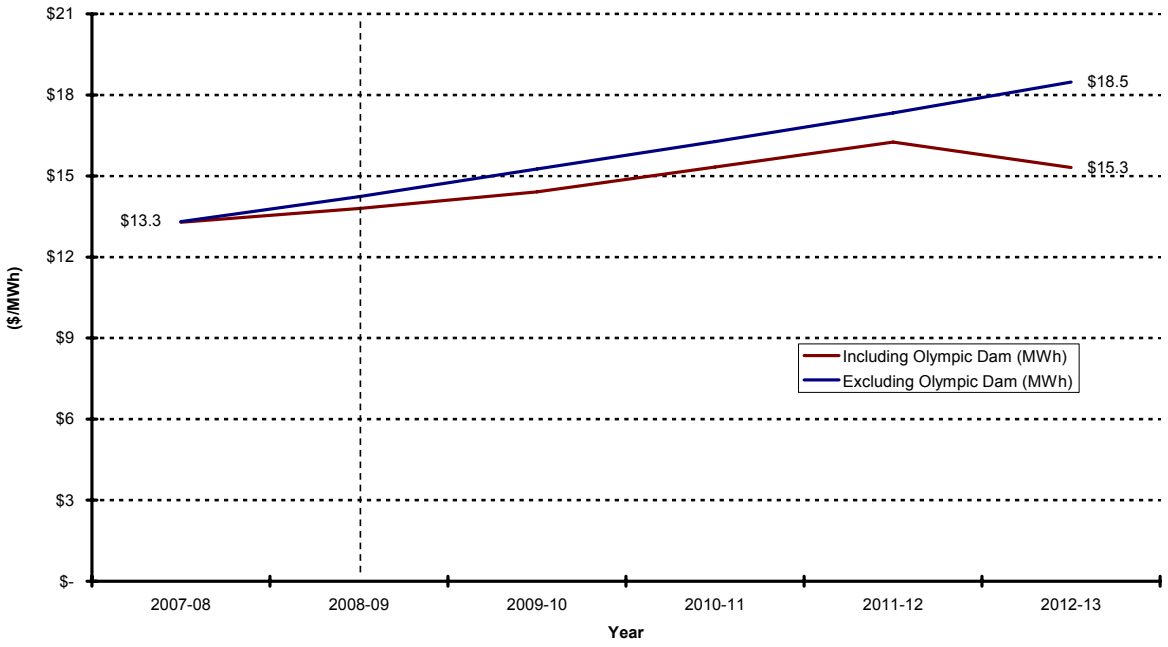
ElectraNet estimates that the 6.8 per cent per annum (nominal) average increase in transmission charges will add approximately $7.50 to the average residential customer's annual bill of $1,058 (0.7 per cent)[89].

The average increase in transmission prices in South Australia reduces to 3.0 per cent per annum (nominal) when taking into account the latest forecasts of higher demand that would result from the proposed large scale expansion of mining operations at Olympic Dam (see Figure 1.6)[90].

Table 12.8: Average price path ($m nominal).

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Smoothed revenue requirement	186.8	208.5	225.1	243.1	262.5	283.4
Energy (GWh)	14.6	14.8	14.9	15.1	15.3	14.6
Average transmission price ($/MWh)	13.3	14.2	15.3	16.3	17.3	18.5

Figure 12.2: Average price path ($/MWh nominal).



89 Customer billing data from ESCOSA, "2005-06 Annual Performance Report - SA Energy Retail Market", November 2006, p71-73.

90 Note that this comparison does not include any prescribed capital expenditure that may be required to facilitate the Olympic Dam expansion.

12.10 Revenue Cap Adjustments

In accordance with the Rules, the revenue cap determined by the AER will be subject to adjustment during the regulatory control period as follows:

- The revenue cap will be calculated each year following the CPI-X methodology using actual CPI;

- Network support costs are treated as a pass through cost. As required by clause 6A.7.2 of the Rules, changes in network support costs will be subject to a pass through application. The application will seek to change the annual maximum allowed revenue allowance in each year based on the difference between forecast and actual network support expenditure;

- Clause 6A.7.3 of the National Electricity Rules allows the pass through of other approved costs related to an insurance event, a regulatory change event, a service standard event, a tax change event or a terrorism event as defined in the Rules; and

- Contingent projects have been included in section 5.9 of this proposal. If a trigger event for a contingent project occurs then ElectraNet will assess the projects using the Regulatory Test, where applicable, and lodge an application to the AER requesting a revised maximum allowed revenue stream in accordance with clause 6A.8.2 of the National Electricity Rules.

13. Glossary

AASB	Australian Accounting Standards Board
ABARE	Australian Bureau of Agriculture and Resource Economics
ABS	Australian Bureau of Statistics
ACCC	Australian Consumer Competition Commission
ACG	The Allen Consulting Group
AEMC	Australian Energy market Commission
AER	Australian Energy Regulator
AMD	Agreed Maximum Demand
APR	Annual Planning Report (published by ESIPC)
AWOTE	Average Weekly Ordinary Time Earning
BPO	Base Planning Objects
CAPM	Capital Asset Pricing Model
CBD	Central Business District
CPI	Consumer Price Index
DNSP	Distribution Network Service Provider
DRP	Debt Risk Premium
ECCSA	Energy Consumers Coalition of South Australia
EMC	Electromagnetic compatibility
EMS	Energy Management System
ESAA	Energy Supply Association of Australia
ESCOSA	Essential Service Commission of South Australia
ESIPC	Electricity Supply Industry Planning Council
ETC	Electricity Transmission Code
ETI	Estimated Taxable Income
EUAA	Energy Users Association of Australia

IRPC	Inter-Regional Planning Committee
MAR	Maximum Allowable Revenue
MRP	Market Risk Premium
NEL	National Electricity Law
NERA	NERA Economic Consulting
NPV	Net Present Value
ODRC	Optimised Depreciated Replacement Cost
PPI	Producer Price Index
PTRM	Post Tax Revenue Model
RAB	Regulatory Asset base
RBA	Reserve Bank of Australia
Rules	National Electricity Rules
SCADA	Supervisory Communications and Data Acquisition
SKM	Sinclair Knight Merz
SNI	South Australian – New South Wales Interconnector
SOO	Statement of Opportunities
TNSP	Transmission Network Service Provider
TUOS	Transmission use of system
WACC	Weighted Average Cost of Capital

14. Appendices

Appendix A	Submission Guidelines Compliance Table
Appendix B	Directors' Responsibility Statement
Appendix C	ROAM Consulting report, "2007 South Australian Generation and Load Scenario Analysis", 28 May 2007
Appendix D	BIS Shrapnel report, "Outlook for Labour Markets and Costs to 2016-17: Electricity, Gas and Water Sectors, Australia and South Australia", April 2007
Appendix E	Evans & Peck report, "Escalation and ElectraNet Infrastructure Projects", May 2007
Appendix F	Evans & Peck report, "Risk Review of Capital Works Program", May 2007
Appendix G	Forecast Network Capital Projects
Appendix H	Proposed Contingent Projects
Appendix I	Electricity Supply Industry Planning Council Letter "Review of Capital Projects for the 2008-13 Regulatory Period", 30 May 2007
Appendix J	Marsh advice, "Five Year Insurance Premium Trends – Indicative Forecast", May 2007
Appendix K	AON report, "Self Insurance Risk Quantification", February 2007
Appendix L	Brett & Watson Workers Compensation Self Insurance Risk Quantification, June 2006
Appendix M	Board resolution to undertake self-insurance
Appendix N	The Allen Consulting Group, "Estimation of ElectraNet's equity raising transaction cost allowance", 29 May 2007
Appendix O	Land tax letter from South Australian Treasurer Kevin Foley, dated 17 September 2006
Appendix P	GHD report, "Asset Optimisation Review", May 2007
Appendix Q	GHD report, "Transmission Line Replacement Cost", May 2007
Appendix R	The Allen Consulting Group, "Treatment of previously optimised transmission assets", May 2007

Appendix S	ElectraNet Easement Value Adjustment Submission
Appendix T	Capital Value report, “Establishing a proxy historical cost valuation of easement compensation”, May 2007
Appendix U	Maunsell/ AECOM report, “Assessment of Asset Lives”, May 2007
Appendix V	NERA Economic Consulting report, “Bias in Indexed CGS Yields as a Proxy for the CAPM Risk Free Rate”, March 2007
Appendix W	SAHA International report, “Service Target Performance incentive Scheme report”, May 2007
Appendix X	John Thompson Inclusive report, “Future generator testing and modelling requirements”, May 2007