POWERLINK QUEENSLAND

QUEENSLAND TRANSMISSION NETWORK REVENUE PROPOSAL

for the period 1 July 2007 to 30 June 2012

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Executive Summary

This Proposal covers Powerlink Queensland's regulated electricity transmission network for the 5-year period from 1 July 2007 through 30 June 2012. This will be the first revenue determination for a major electricity network to be undertaken by the Australian Energy Regulator (AER).

The Australian Energy Market Commission (AEMC) is required to make Rules in relation to the economic regulation of transmission systems on or before 1 July 2006. The AEMC is part way through the Rule change consultation process associated with establishing those Rules. As the timetable for establishment of new Rules overlaps the timetable for Powerlink's regulatory revenue determination, transitional provisions are needed in the Rules to cover this revenue determination. Powerlink has prepared this Revenue Proposal based on the AER's Statement of Regulatory Principles and the transitional provisions expected to be included in the Rules.

High reliability at a reasonable price

Powerlink is, and plans to remain, the most cost effective electricity transmission entity in the National Electricity Market (NEM), whilst delivering the high level of reliability expected by electricity consumers in Queensland. This Proposal identifies how Powerlink will continue to deliver a high level of reliability at a reasonable price.

The primacy of reliability is clear from the Queensland Competition Authority's (QCA) observations in its recent revenue determination for Queensland distribution networks[1]:

> *"It is clear that the community is not prepared to risk falling service quality and potential system failure in return for lower prices. On the contrary, there is an apparent expectation that service quality should increase and that system security be paramount."*

In other words, customers want high reliability at a reasonable price. A revenue cap based on the program of work in this Proposal will only increase the total delivered electricity price to an average end consumer by about $3 per annum (on an average annual electricity bill of $737).

[1] QCA Final Determination Regulation of Electricity Distribution April 2005.

A very challenging environment

The business environment in which Powerlink operates is characterised by many elements unique to Queensland, such as geography/decentralisation, high demand growth, mandated reliability of supply obligations, significant interest in generation development, and key legislation (such as the Vegetation Management Act).

Powerlink's two "headline" challenges are high load growth and rising input costs, both of which are currently being experienced.

Load growth in Queensland is much higher than in the rest of the NEM and this is driving Powerlink's high level of capital investment, as observed by AER Chairman, Steve Edwell[2]:

> *"In Queensland, demand growth in electricity is running at twice the levels forecast four years ago. Significant infrastructure investment is therefore needed."*

All infrastructure providers are experiencing sustained levels of high input costs – including substantial increases in the cost of materials such as steel and aluminium, costs for increasingly scarce skilled labour and healthy contractor margins driven by competition for construction of infrastructure. Well-placed observers expect these conditions to persist well into the future. A BHP Billiton executive explained major cost blowouts on projects in September 2005 by saying[3]:

> *"We firmly believe that this is a step change and these increased costs will continue for some time."*

This environment of increased costs, coupled with high demand growth and mandated reliability of supply obligations drives a large non-discretionary capital program for grid augmentations.

Replacement of aged assets will also be required to maintain reliable electricity supply. Parts of Powerlink's transmission network were constructed in the 1950s and 60s. These assets are now at, or reaching, the end of their useful lives. This is the first "wave" of replacements, and occurs during the next regulatory period. Part of this replacement program includes the 132kV transmission lines in North Queensland, which recently suffered major damage in severe Cyclone Larry.

[2] ACCC Update Issue 18 February 2006.

[3] The Australian, 27 September 2005.

Past capital expenditure

Queensland has experienced considerably higher growth in electricity demand and energy than was forecast in 2001 when Powerlink's revenue for the current regulatory period was determined. At that time, demand was forecast to increase by 3.1% per annum over a 10-year period – an annual increase of approximately 200 MW. As it turns out, actual statewide maximum summer demand increased by 31% over the past five years, with record growth of 29% in South East Queensland over the last three years. Forecast demand for summer 2007/08 is 8612 MW, some 1256 MW higher than that contained in the 2000 forecast for the same year.

Higher than forecast demand, combined with mandated reliability of supply obligations and higher input costs has resulted in capital expenditure above the allowances in the 2001 revenue decision, particularly in the latter years of the current regulatory period. Total actual (and forecast) capitalisations[4] for the period is expected to be $1,274.11 million, compared to the allowance of $1,054.96 million, some $219.15 million (21%) higher than the allowance.

Powerlink believes that actual expenditure is prudent, demonstrably driven by higher demand growth and higher input costs in the latter years.

Regulatory asset base

Powerlink's regulatory asset base at the start of the next regulatory period is based on the "lock in and roll forward" approach. The roll forward includes adjustments for additional capitalisations and actual CPI during the period. The closing asset base for this current regulatory period is estimated to be $3,266.53 million.

However, the AER has changed the manner in which capital expenditure is recognised in the regulatory asset base from an "as capitalised" to an "as incurred" approach. This change has resulted in Powerlink adjusting its opening regulatory asset base for the next regulatory period to incorporate assets under construction at that time, i.e. at 1 July 2007. These changes in recognition of capital expenditure are estimated to result in a "one-off" increase in Powerlink's regulatory asset base of $529.9 million.

Cost of capital

The SRP outlines most of the parameters the AER will use to determine the WACC. Powerlink nominates a 20-day averaging period for the risk-free rate.

[4] Capital expenditure in the current regulatory period was assessed on an "as commissioned" basis in accordance with the Draft Regulatory Principles.

Future capital expenditure

Powerlink's capital expenditure forecast for the next regulatory period is based on the "ex ante" framework outlined in the SRP. This framework includes a main ex ante allowance which covers most or all expected investments during the regulatory period, plus a contingent projects allowance which covers a small number of large and uncertain investments that may arise during the period but which depend upon a future trigger event.

To address the uncertainty surrounding future load growth and generation development in Queensland, Powerlink engaged independent consultants to conduct wholesale market modelling to identify plausible generation patterns for the Queensland region over the next 10 years. A total of 40 plausible scenarios were developed based on themes associated with demand growth, changes in inter-regional trade, generation from the PNG gas pipeline and potential changes in greenhouse arrangements.

Detailed network planning studies were undertaken for each of these 40 scenarios to identify load driven projects which would ensure that mandated reliability obligations would be maintained as the load grows. Joint planning studies were also undertaken with the distributors connecting to Powerlink's network to identify additional connection works required. A plan of non-load driven projects was developed which took account of the network's age and condition, improvements to security and access and other investments necessary to maintain effective operation of the transmission system.

The proposed capital expenditure forecast is the probability weighted sum of investments associated with each of the 40 scenario-based network development plans. Non-network investments were also forecast for the next regulatory period.

Forecast capex for the next regulatory period is $2.4 billion. Whilst this appears, at face value, to be a large number, it must be recognised that a significant proportion of this increase is attributable to higher input costs. The increase in physical work is much less. Powerlink has implemented, or commenced implementation of a range of initiatives to ensure that the increased physical work volume can be delivered. Powerlink is confident it can deliver the work program ahead.

To put forecast capex into perspective, it is proportionally similar to the lower end of the flexible capex allowance range recently determined by the QCA for the Queensland electricity distribution networks. Powerlink faces exactly the same load growth and high input costs as these distributors.

In the context of today's Queensland, Powerlink's forecast capex is, therefore, unremarkable.

Powerlink's total capital expenditure forecast is:

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Total Capital Expenditure	546.31	543.02	456.10	466.49	437.32	2,449.24

Future operating expenditure

Notwithstanding the impact of rising input costs, Powerlink intends to maintain its position as the most cost effective transmission entity in the NEM. Operating costs are subjected to the same rising input costs as capital expenditure. However, labour cost increases are more significant for operating expenditure.

Powerlink's total operating expenditure is made up of controllable and other operating costs, such as grid support. Total operating expenditure in this Revenue Proposal also includes other allowances for the purposes of the building block revenue calculation.

Forecast operating expenditure is based on Powerlink's historical (demonstrably efficient) costs. Actual expenditure for financial year 2004/05 is used as the base to prepare the forecast. Management accounting techniques were applied to project forward on the basis of cost drivers – predominantly labour costs, materials costs, network growth, increasing obligations, and limitations on network access.

Powerlink's total controllable operating expenditure forecast is:

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Controllable Operating Expenditure	112.60	118.89	125.85	134.85	139.26	631.45

To put this into context, Powerlink's opex as a percentage of its regulatory asset base (a key measure used by the regulator to compare cost performance) is already the lowest in the NEM by a considerable margin. By 2011/12, it will be even lower.

Powerlink has also forecast grid support requirements for the next regulatory period. The use of grid support (as a means of economically deferring capital investments) is accounted for in the capital expenditure plans to ensure there is no "double dipping" between the two revenue components. Powerlink's grid support forecast is:

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Grid support allowance	24.03	17.34	22.15	8.22	8.30	79.99

Service standards

Powerlink has proposed service standards based on the AER' Service Standards Guidelines. The measures include:

- Transmission circuit availability – including at peak and non-peak times and critical elements;
- Number of "large" and "small" loss of supply events; and
- Average forced outage restoration time duration.

Total revenue

Powerlink has estimated the total building block revenue associated with the regulatory asset base (RAB) and expenditure forecasts discussed. Total revenue amounts are shown below. Powerlink has not prepared a smoothed revenue profile, as it is uncertain how the AER will seek to account for the "one-off" step increase resulting from its change from "as commissioned" to "as incurred" recognition of capex.

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Unsmoothed revenue	540.20	597.84	653.21	696.14	751.30

Impact on prices

The AER's decision to change the basis of capex recognition from "as commissioned" to "as incurred" is estimated to result in a "one-off" increase of about 10% in transmission prices.

The impact on average transmission prices as a result of Powerlink's costs in meeting its mandated obligations is estimated at 5.5% per annum. To put this into perspective, the recent QCA decision for the electricity distribution networks resulted in an increase in distribution network prices of 7.5% per annum. Powerlink is subject to exactly the same load growth drivers and rising input costs. Thus, in the Queensland context, the estimated increase in transmission prices is unremarkable.

Moreover, since transmission costs represent only about 8% of the total delivered price of electricity for most end-use customers, the impact on the total delivered price of electricity is about 0.5% per annum. This equates to approximately $3 per annum for an average consumer.

In short, a regulated revenue cap based on this Proposal would clearly enable Powerlink to deliver **high reliability at a reasonable price.**

Chapter 1 – Introduction

1.1 Regulation of electricity transmission

The National Electricity Law[5] (NEL) and National Electricity Rules (NER) took effect on 1 July 2005. The Queensland Electricity Transmission Corporation Limited (Powerlink) is the monopoly provider of electricity transmission services in Queensland. The majority of services provided by Powerlink are prescribed services under the NER and as such are subject to revenue regulation in accordance with the NER.

1.2 The regulator

The enactment of the NEL established the Australian Energy Regulator (AER). One of the AER's responsibilities is revenue regulation of electricity transmission businesses such as Powerlink. Prior to this, revenue regulation was undertaken by the Australian Competition and Consumer Commission (ACCC).

Powerlink is the first regulated electricity transmission business to be subject to regulation by the AER.

1.3 Revenue regulation arrangements

The NEL includes a requirement (Section 35(3)) for the AEMC[6] to make Rules in relation to the economic regulation of transmission systems on or before 1 July 2006. The Rules must satisfy a range of matters as set out below. Section 36 of the NEL requires that the Rules must at all times provide for these matters or things. The AEMC prepared a Rules proposal and issued a Section 95 notice on 16 February 2006 as part of the process for changes to the National Electricity Rules.

Extract of Section 35 of the NEL:

Rules made as required by this section must—

(a) provide a reasonable opportunity for a regulated transmission system operator to recover the efficient costs of complying with a regulatory obligation; and

[5] National Electricity (South Australia) (New National Electricity Law) Amendment Act 2005.

[6] The Australian Energy Market Commission (AEMC) was also established by the NEL on 1 July 2005.

(b) provide effective incentives to a regulated transmission system operator to promote economic efficiency in the provision by it of services that are the subject of a transmission determination, including—

(i) the making of efficient investments in the transmission system owned, controlled or operated by it and used to provide services that are the subject of a transmission determination; and

(ii) the efficient provision by it of services that are the subject of a transmission determination; and

(c) require the AER, in making a transmission determination, to make allowance for the value of assets forming part of a transmission system owned, controlled or operated by a regulated transmission system operator, and the value of proposed new assets to form part of that transmission system, that are, or are to be, used to provide services that are the subject of a transmission determination; and

(d) require the AER to have regard to any valuation of assets forming part of a transmission system owned, controlled or operated by a regulated transmission system operator applied in any relevant determination or decision.

(4) In this section—

relevant determination or decision means—

(a) any previous transmission determination; or

(b) a determination or decision under the National Electricity Code or jurisdictional electricity legislation regulating the revenue earned, or prices charged, by a regulated transmission system operator in respect of services provided by it that were regulated under the Code or that legislation.

Section 16 of the NEL places obligations on the AER in performing its economic regulatory functions. Section 16(3) includes the same requirements shown above in relation to the AEMC, which apply to the AER in making a revenue determination.

Given the timetable for the AEMC Review of the Rules overlaps with the AER's regulatory revenue determination for Powerlink, there is a need for the AEMC to include appropriate transitional provisions for this revenue determination.

Powerlink has prepared this Proposal taking into account the obligations on both the AEMC and AER under the NEL. In particular, this Proposal relates only to prescribed services which Powerlink provides in accordance with its obligations in the NEM and under relevant legislation.

1.4 Statement of Regulatory Principles

The Statement of Principles for the Regulation of Electricity Transmission Revenues (SRP) was issued by the ACCC, as economic regulator of transmission businesses, on 8 December 2004[7]. Following its establishment, the AER issued a Compendium of Electricity Transmission Regulatory Guidelines, which included the SRP, in August 2005.

Interaction of the Rules made by the AEMC, the NER as it existed at 1 April 2006 and the SRP in the Powerlink revenue determination is subject to transitional provisions included in the AEMC initiated Rules due to take effect on 1 July 2006. Powerlink has requested the AEMC to include in those Rules transitional provisions to cover this revenue determination.

Powerlink expects those Rules to substantively reflect many elements of the SRP, and has framed this Proposal accordingly.

1.5 Previous revenue decision

Powerlink made its first revenue application to the ACCC in February 2001. The ACCC made its determination on 1 November 2001 which applies to the period from 1 January 2002 until 30 June 2007.

The ACCC's 2001 revenue decision was made on the basis of forecast demand growth which was considerably lower than the actual demand growth which subsequently occurred. The additional demand growth is necessitating more investment in assets to provide prescribed transmission services than was allowed in the revenue decision. This has been exacerbated by an environment of increasing input costs which has resulted in actual expenditure higher than allowances for both

[7] The SRP was preceded in May 1999 by the Draft statement of Regulatory Principles (DRP).

capital and operating expenditure. The capital expenditure regime under the DRP (which the SRP applies to the roll forward arrangements for this revenue determination) allows for the transmission business to be appropriately compensated if prudent actual capital expenditure over the current regulatory period is above the capital expenditure allowances.

1.6 Revenue proposal

Section 3.2 of the SRP requires a transmission network service provider (TNSP) to submit its Revenue Proposal by 1 April of the penultimate year of the regulatory period. In the case of Powerlink, that is 1 April 2006. However, as this date falls on a Saturday, the AER has agreed that Powerlink's Proposal be submitted on the first business day thereafter, viz 3 April 2006.

This Revenue Proposal relates to the provision of prescribed services that are provided by means of, or in connection with, the transmission system that is owned, controlled and operated by Powerlink. The period to which this Proposal is to apply is 5 years from 1 July 2007 to 30 June 2012.

Powerlink hereby submits its Revenue Proposal dated 3 April 2006 to the AER.

1.7 Emerging issues

Powerlink has identified two issues which have emerged at the time this Proposal was being finalised. Powerlink has had insufficient time to analyse the impact of these issues on future capex and opex estimates in this Proposal.

The issues are:

(a) The <u>2006 load forecast</u> for Queensland. Powerlink has received new load forecasts from the Queensland electricity distributors. These need to be consolidated as part of the preparation of Powerlink's 2006 Annual Planning Report, due to be published by 1 July 2006.

Capex and opex forecasts in this Proposal are based on the 2005 load forecast. To the extent the 2006 load forecast is different, this may require adjustments to forecast costs.

(b) The Queensland Government's <u>review of industry structure</u> may affect contracted providers of grid support in North Queensland. If these changes are material, changes to forecast grid support costs and/or capex forecasts in relation to mooted network augmentations affecting North Queensland may be required.

Powerlink foreshadows that it may need to make a supplementary proposal in relation to one or both of these issues, once the impacts can be analysed.

Chapter 2 – Business Environment

2.1 Introduction

Powerlink is, and as this Proposal demonstrates, plans to remain, the most cost-effective electricity transmission entity in the National Electricity Market.

Powerlink's capital and operating costs are fundamentally shaped by the specific business environment in which it operates. Key elements of this environment (eg. geography/decentralisation, high demand growth, mandated reliability obligations, location of generation and key legislation such as the Vegetation Management Act) are unique to Queensland. Capital and operating cost requirements delineated in this Proposal reflect the impact of this unique business environment.

Electricity transmission is fundamentally a transportation business – the economics are driven by not only how much is transported (MW), but also by how far it is transported (km). In Queensland, the "how far" is very large – by way of illustration, it is estimated that each MW in Queensland has to be transported, on average, about 3 times as far as a MW in Victoria. The UK national grid would fit into a small corner of Queensland.

Like other bulk transportation activities, the economics of electricity transmission are also driven by whether deliveries are made in very large lots or in several smaller parcels (load density). It is inherently more economical to have fewer and larger delivery points (high load density), like the UK, than a large number of widely spaced, lower load density delivery points. The latter characterises Queensland, the most decentralised State in the NEM. It should, and does, cost more to transport each MW across Queensland's vast geography and myriad load centres than it does in more compact geographies.

Superimposed on these fundamentals is persistent high demand growth in Queensland (the growth rate is higher than the rest of the NEM). When coupled with Powerlink's mandated reliability obligations, this drives a large, non-discretionary capital program of grid augmentations.

Added to this is an environment of sustained high input costs – materials such as steel and aluminium, increasingly scarce skilled labour, and healthy contractor margins driven by competition for services from major infrastructure expansions in

Queensland and elsewhere. Well-placed observers expect these conditions to persist well into the future.

In addition, new legislation such as the Electrical Safety Act and Vegetation Management Policy/Guidelines[8] demand paradigm shifts in work practices, driving higher costs, particularly labour costs.

The "step increase" in costs from the combination of all these factors does not align with the commencement of the new regulatory period – all are apparent in the latter part of this regulatory period, resulting in actual capex and opex being higher than the allowances.

Going forward, the State Government's recently announced South East Queensland Infrastructure Plan also impacts infrastructure development, particularly in the "urban footprint".

2.2 Powerlink's role and mandated reliability obligations

The Queensland Electricity Transmission Corporation Limited, trading as Powerlink Queensland, is a Government Owned (Corporations Law) Corporation, reporting to its shareholding Ministers, via a Board of Directors.

Powerlink is the sole holder of a Transmission Authority, which authorises it, under the Queensland Electricity Act, to operate a high voltage transmission grid in the eastern part of Queensland. Powerlink is also a registered TNSP in the NEM, and must comply with the National Electricity Rules (NER).

A salient feature of arrangements in Queensland is that Powerlink has mandated reliability obligations. The Queensland Electricity Act 1994, Section 34 provides that a Transmission Authority holder has a responsibility to:

> *"ensure, as far as technically and economically practicable, that the transmission grid is operated with enough capacity (and, if necessary, augmented or extended to provide enough capacity) to provide network services to persons authorised to connect to the grid or take electricity from the grid…."*

[8] Vegetation Management Policy/Guidelines issued in 2004 under the Vegetation Management Act 1999.

The Queensland Government issued "Transmission Authority – No. T01/98" to Powerlink Queensland. Clause 6.2 of this Authority requires that:

> *"The transmission entity must plan and develop its transmission grid in accordance with good electricity industry practice such that… the power transfer available through the power system will be adequate to supply the forecast peak demand during the most critical single network element outage."*

This requirement reinforces reliability obligations embodied in the National Electricity Rules and in existing connection agreements.

Mandated reliability of supply obligations necessitate non-discretionary investment in grid augmentations as load grows.

2.3 Queensland characteristics

As noted, Queensland is the most decentralised State in the NEM. Electricity must be transmitted over vast distances, servicing a myriad of low load density regional cities, towns and industrial areas. Powerlink's grid is one of the longest (and "skinniest") high voltage transmission grids in the world, stretching more than 1,700 km from Cairns in the Far North to the NSW border in the south. The Queensland – NSW Interconnector (QNI) connects Queensland to the rest of the NEM.

Transmission distances in Queensland are very long by world standards, and by far the longest in the NEM. By way of example, the Powerlink grid stretches from Brisbane to Cairns, and the northern-most point of Powerlink's grid is farther from Brisbane than Melbourne is.

In recent years, there has been major population growth in Queensland, primarily from overseas and interstate migration. This trend is expected to continue. Most of the population growth has occurred in the south east corner of the State.

Concurrently, there has been (and continues to be) increasing infiltration of air conditioning (particularly domestic). It is estimated that around 55% of households now have some air conditioning – a penetration level well below other States, suggesting that this driver of electricity demand growth will persist well into the future.

The combination of population influx and increased use of air conditioning drives record levels of electricity demand growth, particularly in South East Queensland.

Queensland is also experiencing a boom in the expansion and development of coal mines, with some $3.5 billion of projects underway. This, in turn, is driving major upgrades to railways (which are electric-powered) and major port expansions. These developments impact Powerlink in two ways – they increase demand for electricity, and increase competition (and hence costs) for scarce skilled labour and contractors.

In addition, expansions are underway in tourist locations such as Far North Queensland (Cairns region), the Gold Coast, and Hervey Bay. Cairns is at the northern extreme of Powerlink's grid, some 880 kilometres from major base load power stations in Central Queensland.

Powerlink's network has been constructed over a long period of time. Parts of the network located in North Queensland operate in an aggressive tropical climate and have reached the end of their technical life. These and other sections of the network are in need of replacement to maintain reliable electricity supply.

2.4 SEQ infrastructure plan

In recognition of the ongoing significant population increases in South East Queensland, the Queensland Government, in 2005, produced the SEQ Regional Plan, and SEQ Infrastructure Plan, covering, inter alia, land use and infrastructure planning for the next 20 years.

A key feature of the SEQ Regional Plan is the concept of the "urban footprint", to identify areas earmarked for residential use. These seminal Government plans are having two immediate effects on Powerlink.

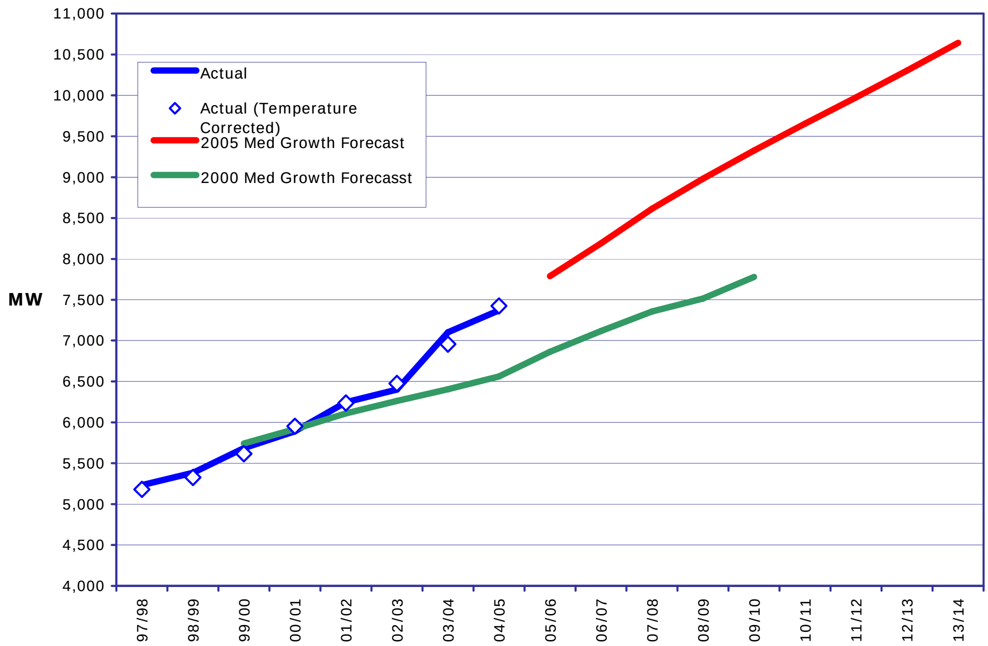
There will be more undergrounding of sections of new high voltage lines in the "urban footprint". At these voltages, undergrounding costs about 15 times as much as a conventional overhead line, and therefore requires a higher capital expenditure allowance. This was considered in formulating the capital cost estimates in this Proposal. Powerlink needs to advance its plans for acquiring strategic easements for future use, to have these incorporated into land use planning and to ensure that corridors are available to support future development envisaged in the Regional Plan. Capital forecasts in this Proposal include allowances for acquiring strategic easements.

Powerlink will also need to start deploying 500kV lines and substations in the SEQ region, to meet demand growth whilst minimising environmental impacts (a single 500kV line can carry the same power as about three 275kV lines). Capital forecasts in this Proposal include some allowance for 500kV assets.

2.5 Meeting customer demand

As noted, the combination of high demand growth and mandated reliability obligations continue to drive a major capital investment program of grid augmentations. This is well-illustrated by what has occurred in this regulatory period. Powerlink's last revenue determination (November 2001) included a capex allowance based, inter alia, on the demand forecast applicable at that time. Actual demand turned out to be significantly higher, driving the need for a higher capex spend (see Figure 2.1).

Figure 2.1: Queensland Actual and Forecast Summer Peak Demand



Looking forward, high demand growth is expected to continue. Indeed, the projected growth rate for Queensland is higher than the rest of the NEM, as shown in Figure 2.2.

Figure 2.2: Projected growth rate for Queensland compared to rest of NEM

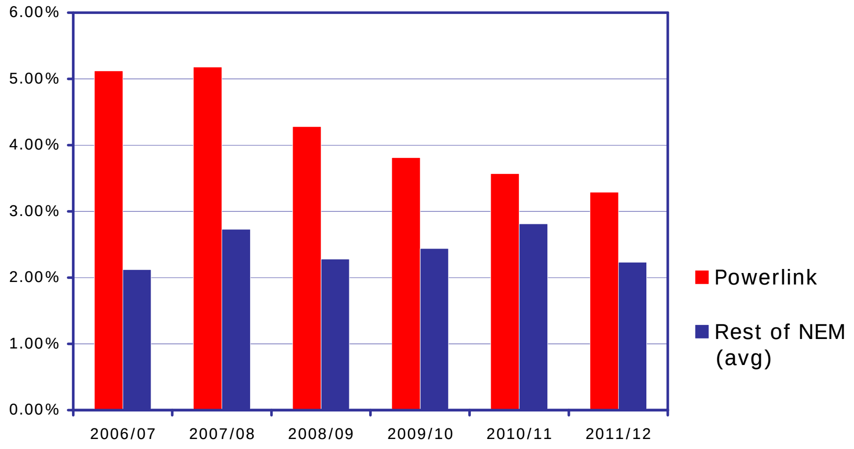
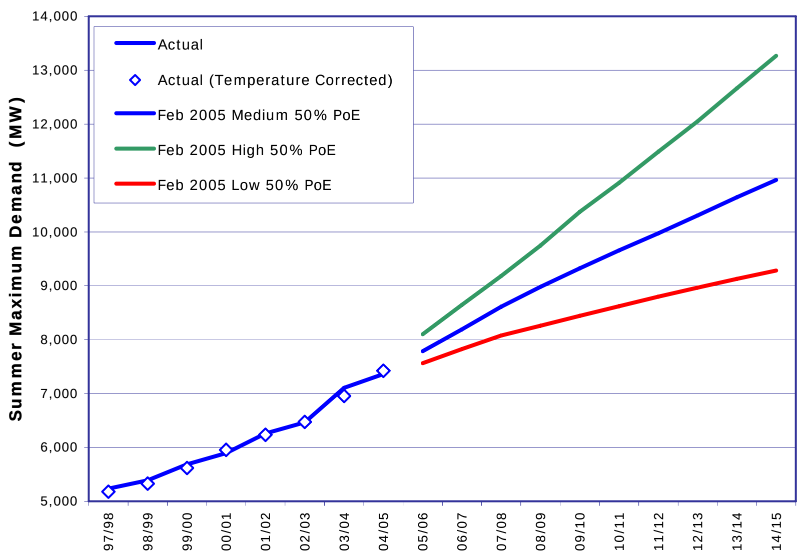


Figure 2.3 shows forecast peak summer demand over the next 10 years, for low, medium and high economic growth scenarios. In the medium growth scenario, demand growth is around 400MW per year. By way of comparison, this annual growth is equivalent to almost 20% of the record peak demand for South Australia. Put another way, the growth in Queensland's peak demand over the next regulatory period will be about the same as the current total peak demand in South Australia.

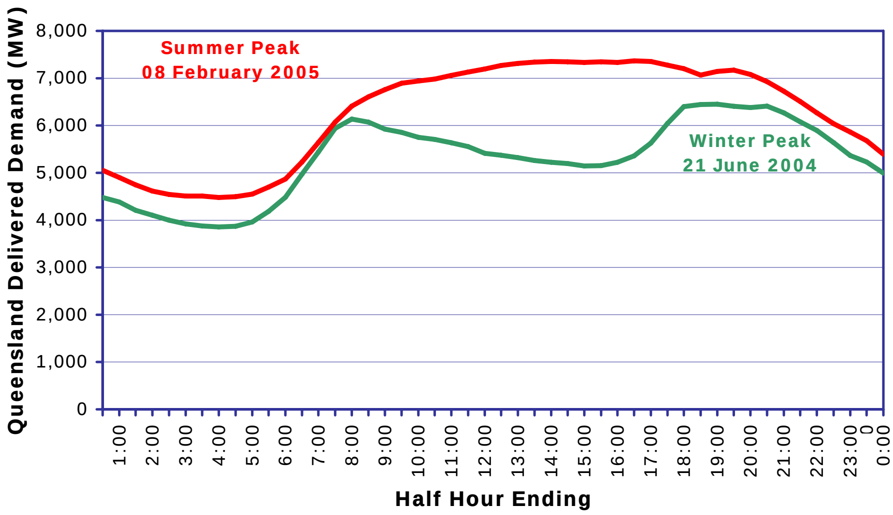
Figure 2.3: Queensland Forecast Peak Summer Demand



Due to the constant hot and humid summer climate in Queensland, peak summer demand conditions occur for the entire summer period (November – March), not just for a few days as occurs in southern States.

The daily load profile, shown in Figure 2.4, shows that daily demand typically exceeds 80% of peak demand for about 16 hours per day. Average loading on the grid throughout the entire year is about 70% of summer peak loading, which is the highest in the NEM, and very high by world standards (typically in the range 50% - 60%).

Figure 2.4: Daily Load Profile: Summer and Winter Peaks 2004/05



The load shapes mean that the Queensland grid is exposed to high levels of loading during onerous summer conditions for much longer periods than grids in other States, creating significant challenges (and costs) for Powerlink, such as:

- A greater probability of outages which could cause supply interruptions and constraints. This makes it inherently more difficult to meet the same service levels;
- Plant and equipment is subject to higher stresses, increasing wear and tear and maintenance requirements;
- Significantly fewer opportunities exist for outages to maintain and augment the network, resulting in the need for much higher cost work methods (weekends, overnight, live working).

Notwithstanding these challenges and costs, electricity consumers in a modern digital economy have ever-increasing expectations of uninterrupted supply. As noted, Powerlink has mandated reliability of supply obligations. The need for high levels of reliability were reinforced in the Somerville Report[9] into the Queensland electricity distribution networks.

[9] Detailed Report of the Independent Panel, Electricity Distribution and Service Delivery for the 21st Century, Queensland, July 2004.

The Somerville Report identified adverse impacts on reliability of supply due to under-investment in the distribution networks. It also identified that (unlike transmission) no reliability standards and planning criteria existed. In response to the report, the Government introduced mandated standards and criteria for distribution services, with the criterion for the "backbone" of the distribution network reflecting the internationally accepted N-1 standard. This standard already applies to the Queensland transmission network.

Customer expectations of highly reliable supply continue to rise, and are encapsulated in the following words from a Courier-Mail editorial[10]:

> *"The companies have a duty to their customers to explain what they are doing to try to guarantee electricity supplies".*

In April 2005, post the Somerville Report, the Queensland Competition Authority issued its final revenue determination for the Queensland electricity distribution networks. The regulator incorporated record levels of capital and operating expenditure to enable the networks to meet the new mandated standard in the face of high load growth.

The QCA identified the primacy of a reliable supply to customers. The QCA stated[11]:

> *"It is clear that the community is not prepared to risk falling service quality and potential system failure in return for lower prices. On the contrary, there is an apparent expectation that service quality should increase and that system security should be paramount."*

Powerlink must develop its network in the same high load growth environment, with the same customer expectations. This Proposal reflects that.

2.6 External factors forcing up input costs

A significant issue to emerge in the latter part of this regulatory period is a significant increase in Powerlink's input costs due to a range of external factors beyond Powerlink's control. These include labour costs, materials and construction costs and the impact of new legislation (such as the Vegetation Management Policy/Guidelines).

[10] Courier-Mail newspaper editorial dated 24 February 2004.

[11] Queensland Competition Authority (QCA), Final Determination Regulation of Electricity Distribution April 2005.

None of these factors were foreseen at the time of the 2001 revenue determination. All will continue to impact Powerlink's costs during the next regulatory period.

2.7 Labour costs

A widely publicised skills shortage exists in Australia, including in the electricity supply industry. It was clear to companies, employees and unions alike that wage rates for electricity industry workers in Queensland were significantly below levels being paid for the same skills in NSW and Victoria.

As a consequence, and faced with a huge forward program of work, in early 2005 the Queensland distribution networks reached agreement with industry unions for wage increases to narrow the wage parity gap with workers in southern States. The effective increase was 27% over 3 years.

Powerlink was obliged to follow suit as not only does it compete for workers from the same labour pool, but outsources the maintenance of about 60% of its network to one of the distribution companies.

Powerlink believes that these increased wage costs represent efficient costs in today's environment of skills shortages. These costs affect all Powerlink activities – construction, operation and maintenance.

In April 2005, the QCA included increased wage costs in the opex allowances for the two electricity distribution networks.

The QCA[12] stated:

> *"The Authority believes that the cost of the new EBA reflects the tightness of the market for certain types of skilled electrical workers in Australia at the present time, which in turn reflects the significant expenditure programs currently and prospectively being undertaken by electricity distributors across Australia".*

2.8 Increased construction costs

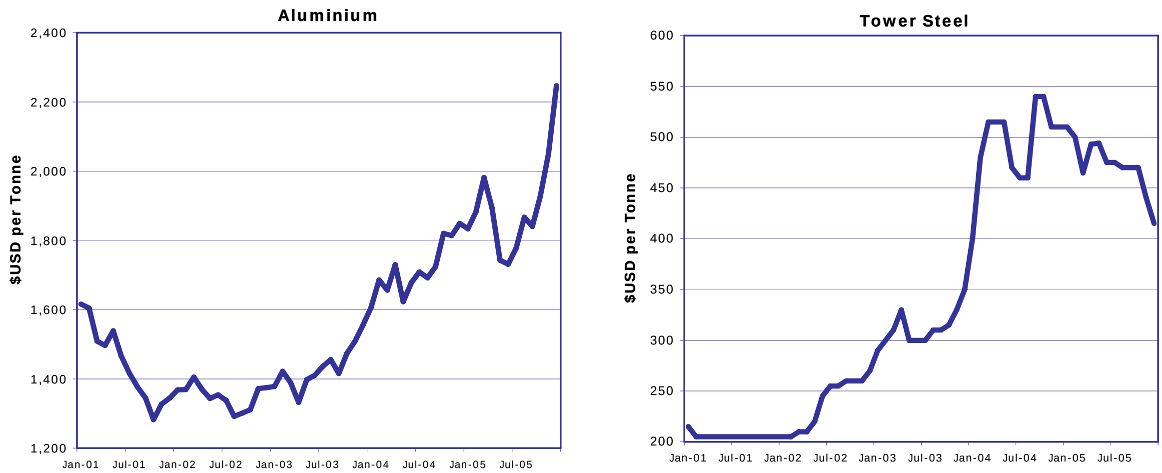
Queensland is currently experiencing a period of major investment in infrastructure for coal mines, rail, ports, roads, water and so on. This has created an unprecedented demand for construction contractors and equipment supply. After 20 years of a

12 Queensland Competition Authority (QCA), Final Determination Regulation of Electricity Distribution April 2005.

“buyers market” for these services, a “seller’s market” now exists. Contractor margins have never been higher. Unsurprisingly, contractors have experienced the same wage cost pressures as electricity network companies.

At the same time, major cost increases in materials such as steel, copper, aluminium and zinc is occurring. Aluminium is a major component of transmission line conductors and steel is used in towers and poles as well as substation structures.

Figure 2.5: Aluminium and Tower Steel price curves since January 2001



These construction cost increases are pervasive across all infrastructure developments as evidenced by a recent statement in the Australian Financial Review:

> *“Construction costs have increased by 30 to 40 percent in Brisbane in the past two years and look set to worsen over the next few years.“* [13]

In reporting cost blowouts of 28% (or $2.5 billion) on 2 major minerals projects, President of BHP Billiton’s stainless-steel materials division, Chris Pointon, cited increased labour costs, increased contractor costs and increased materials costs:

> *“It’s a world wide phenomenon, and it’s related to unexpected increases in demand for raw materials.“*[14]

The BRW article noted that:

> *“Cost pressures are likely to increase, largely as a result of a series of multi-billion dollar LNG developments.“*

[13] Australian Financial Review, 28 September 2005, page 4

[14] Business Review Weekly, 24-30 November 2005, page 25

BHP Billiton's Chris Pointon also sees these conditions persisting:

> *"We firmly believe this is a step change and these increased costs will continue for some time."* [15]

This Proposal reflects that experience and outlook.

Another observable outcome of the skills shortage is a lower quality of delivered goods and services. The incidence of equipment defects in acceptance testing is increasing, as are early life failures and faults. This is leading to higher maintenance costs in the years following commissioning as well as lower plant availability.

2.9 Vegetation management

Vegetation on transmission line easements must be kept clear of transmission line conductors to avoid "flashovers" and line tripping and to minimise the risk of igniting bushfires. The consequences of inadequate clearance can be significant – a tree touching a high voltage line was the trigger event for the major blackouts which hit northeast USA and Canada in August 2003 and nearly all of Italy just one month later.

Powerlink clears vegetation on easements just prior to constructing a new line, and then, for the life of the line, undertakes vegetation control work to maintain clearances.

The Queensland Government's introduction of the Vegetation Management Policy/Guidelines in 2004 resulted in a paradigm shift in allowable vegetation control practices and resultant costs. Prior to introduction of the Policy, vegetation clearing was highly mechanised (bulldozers) with all vegetation clear-felled on the easement prior to line construction.

However, the new Policy places severe limitations on vegetation clearing. Some vegetation cannot be cleared at all – in these areas, a new line must be constructed "over the canopy" – which entails taller towers, higher cost conductor stringing methods (helicopter) and therefore higher cost overall. Other vegetation can only be minimally trimmed and "sculpted". This involves labour-intensive, high cost methods, both in initial clearing and subsequent maintenance of the easements. Compliance with environmental requirements is essential and requires active audit programs.

[15] The Australian, 27 September 2005

These higher costs have impacted upon Powerlink's capital costs for new lines and annual maintenance costs for vegetation management.

2.10 Electricity transmission is essential infrastructure

The essential service nature of electricity transmission is reflected in the mandated reliability obligations which Powerlink must meet.

In its report on project cost blowouts, BRW reported that some minerals projects were being deferred:

> *"Non-energy resource developments cannot compete with oil, gas and coal projects that have fatter profit margins to cover rising costs of steel, concrete, and skilled workers."* [16]

Whilst some infrastructure investors can defer investments in the hope of an easing in construction costs, Powerlink does not have that discretion. Further, some of Powerlink's augmentations are driven by the coal mine expansion projects which are proceeding.

This Proposal reflects the non-discretionary nature of Powerlink's investments.

2.11 Electricity transmission is 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 Powerlink, to address the security of that infrastructure.

In a public document of this nature, Powerlink is limited in the level of detail it can provide on initiatives being undertaken to protect the transmission grid. Some details will be provided confidentially to the AER during this determination process.

Notwithstanding that the 2001 revenue determination did not provide capital or operating cost allowances for this (then unforeseen) need, Powerlink has already commenced certain initiatives. However, the bulk of these costs will be incurred in the coming years.

[16] Business Review Weekly, 24-30 November 2005, page 25

The National Guidelines state that regulators "should consider the need for investment in resilient, robust infrastructure in market regulation decisions". This Proposal reflects that view.

2.12 Geography of the grid

As noted in section 2.1, electricity transmission is fundamentally a "transportation" activity, in which "how far" MW travel is just as important as "how many" MW are transported.

An average MW in the vast geography of Queensland has to travel about 3 times the distance of an average MW in the relatively compact geography of Victoria. This is particularly important in the context of benchmarking the performance of various grids. It clearly should cost much less per MW to transmit electricity in the compact geography of Victoria than it does in the vast geography of Queensland. This makes $/MW or $/MWh measures inappropriate as a benchmark of comparative performance.

2.13 Grid users/customers

Powerlink's customers comprise generators, distributors and direct connect major loads (eg. smelters) as shown in Table 2.1.

Table 2.1: Powerlink's customers

Customer Type	No. of Customers	No. of Connection locations	No. of Connection points
Generators	11	20	81
Distributors	3	73	193
Direct Connect Loads	7	19	36
Total	**21**	**112**	**310**

As Queensland is the most decentralised of the NEM States, the Powerlink grid must be capable of transmitting relatively larger quantities of power over longer distances, to supply major regional centres, provincial cities and "remote" industries.

Transportation of high quantities of power over long distances creates high reactive loadings on the grid, which present additional challenges in terms of voltage control (particularly during contingency events). This problem, addressed by increasing network capacity and installing voltage control plant, is further exacerbated by Queensland's unique characteristic of high and constant load through the summer months.

Whilst most are not connected directly to Powerlink's grid, there are many mining and industrial customers located in regional Queensland who rely on the grid for a secure and reliable supply of electricity. Major international tourist destinations such as Cairns, the Gold Coast, Hervey Bay and coastal towns which service the Great Barrier Reef, also require a secure and reliable electricity supply to the levels expected by international visitors to a modern, digital society. This Proposal reflects those needs.

2.14 Assets

Powerlink's high voltage grid includes in excess of 11,902 circuit kilometres of lines and cables and 98 substations which include 21,352 MVA of installed transformer capacity (as at June 2005). Comparable figures at the time of Powerlink's last revenue application (February 2001) were 10,300 circuit kilometres of lines and cables, and 80 substations which included 11,813 MVA of installed transformer capacity. All these statistics will increase to meet growing demand in Queensland.

These assets are summarised in Tables 2.2 and 2.3.

Table 2.2: Summary of Powerlink's transmission line assets (at June 2005)

Line Voltage	Single Circuit	Double Circuit	Circuit Kilometres
330kV	0	346	691
275kV	3,661	1,490	6,641
132kV	1,285	1,338	3,961
110kV	39	277	593
66kV and below	1	0	1
Total	4,986	3,451	11,887

Table 2.3: Summary of Powerlink's substation assets (at June 2005)

Highest Voltage	Substations	Circuit Breaker Bays	Transformers	
			Number	MVA
330kV	4	27	4	3,475
275kV	29	303	46	12,275
132kV	51	365	78	4,332
110kV	14	236 [17]	19	1,270
Total	98	931	147	21,352

These assets experience high levels of asset utilisation and high loading, indicative of the very efficient use of capital invested in the grid.

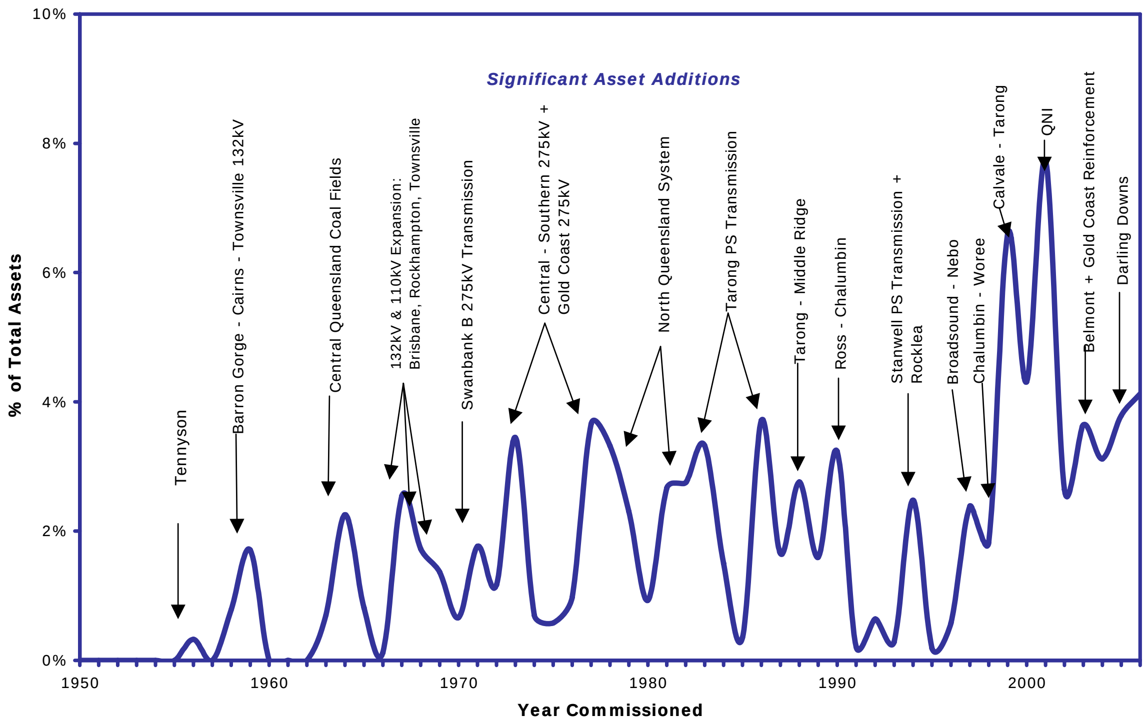
[17] Includes circuit breakers at 66kV, 33kV and 11kV

Powerlink monitors and controls its assets from a single, central network control centre (previously consolidated from three regional control centres). Other grids of similar size and geography would typically have multiple control centres. Powerlink has achieved efficiencies in a single centre through prudent investment in computing technology and an extensive high speed communications network.

In a similar vein, Powerlink has consolidated its business and field operations to a single location at Virginia, which is delivering significant efficiencies. Other grids of similar size would typically operate multiple depots and office facilities.

Powerlink's transmission assets date back to the 1950s. Indeed, this Proposal includes, inter alia, capital for replacement of assets built in the 1950s which operate in the harsh conditions of tropical north Queensland. Much of the asset base is over 30 years old, as shown in Figure 2.6. A substantial portion of the Queensland transmission network was constructed in the 1950s and early – mid 1960s. Those assets are now at, or reaching, the end of their lives. The new capex "wave" of the 1950s and 1960s is the start of a wave of replacement capex in the coming regulatory period. This Proposal reflects that history.

Figure 2.6: Age profile of Powerlink's network assets



Older assets tend to have higher maintenance costs, and a greater need for refurbishment to avoid obsolescence and to maintain required reliability standards.

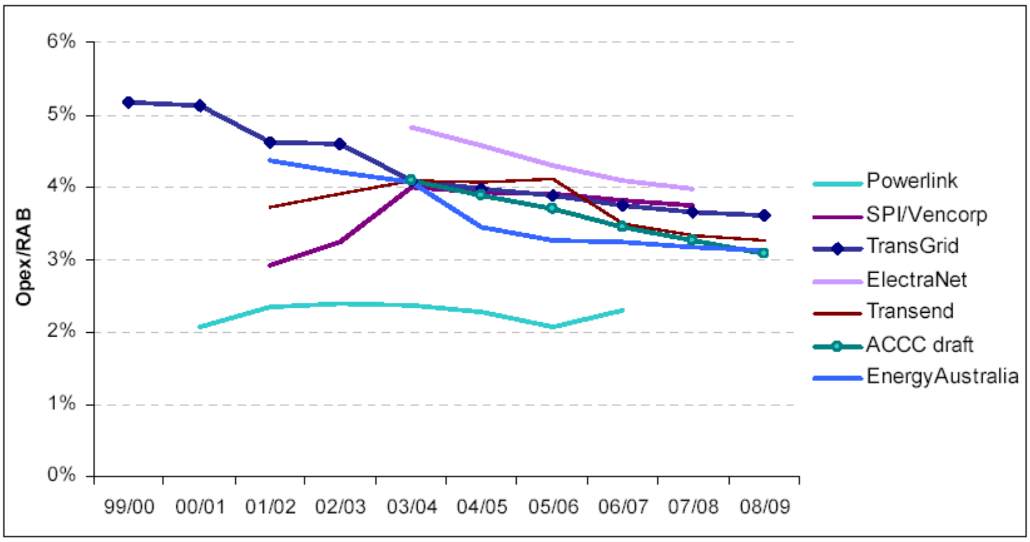
Many substations have a mix of old and new assets, with inherently different technologies. This increases maintenance costs compared to a single age/single technology substation, given the need for a wider breadth of skills on mixed age sites.

2.15 Operating costs

Notwithstanding the increased operating costs Powerlink faces due to external factors identified above, Powerlink is committed to retaining its leadership as the most cost effective transmission entity in the NEM. Powerlink agrees with the ACCC that "operating costs as a % of network assets" is the most useful comparative measure of cost performance for transmission entities, given their different size and geography.

Figure 2.7, sourced from the ACCC's most recent transmission revenue determination[18], shows Powerlink's clear leadership on cost efficiency. Whilst the absolute level of Powerlink's costs will increase in the next regulatory period due to external factors outlined herein, they will remain the lowest cost per asset base $ in the NEM. By the end of the next regulatory period, and based on estimates in this Proposal, Powerlink's opex cost per asset base $ will be only 2.1%[19].

Figure 2.7: Comparision of TNSPs' opex per asset base



It should be noted that the capital and operating cost forecasts included in this Proposal are based on a continuation of existing reliability obligations and service standards. Service standards are presented in Chapter 11. Any change in the proposed service standards will require a commensurate change in the allowances for capital and operating costs.

[18] ACCC's Draft decision opex as percentage of TransGrid's asset base compared with other TNSPs.

[19] Excludes refurbishment grid support and other allowances as per ACCC comparison.

2.16 Excluded services

The vast majority (about 90%) of Powerlink's revenue comes from operating the shared transmission grid in Queensland, and are therefore regulated. However, Powerlink earns a small amount of revenue from non-regulated activities:

(a) network activities – provision of non-prescribed (contestable and negotiable) network connection assets between new generators/major new loads and the shared grid; and

(b) non-network activities – technical consulting, oil analysis, telecommunications services, etc.

Whilst these are individually and collectively small in the overall scheme of things, Powerlink has financial IT systems in place which automatically enable the separation of regulated assets and non-regulated assets and activities **at source**, and thus provide for separate recording and reporting of assets, revenues and expenditures.

This Revenue Proposal is limited to Powerlink's regulated activities.

It should be noted that Powerlink's minority equity interest in ElectraNet SA is controlled through subsidiaries that are separate from Powerlink's regulated activities.

Chapter 3 – Past Capital Expenditure

3.1 Introduction

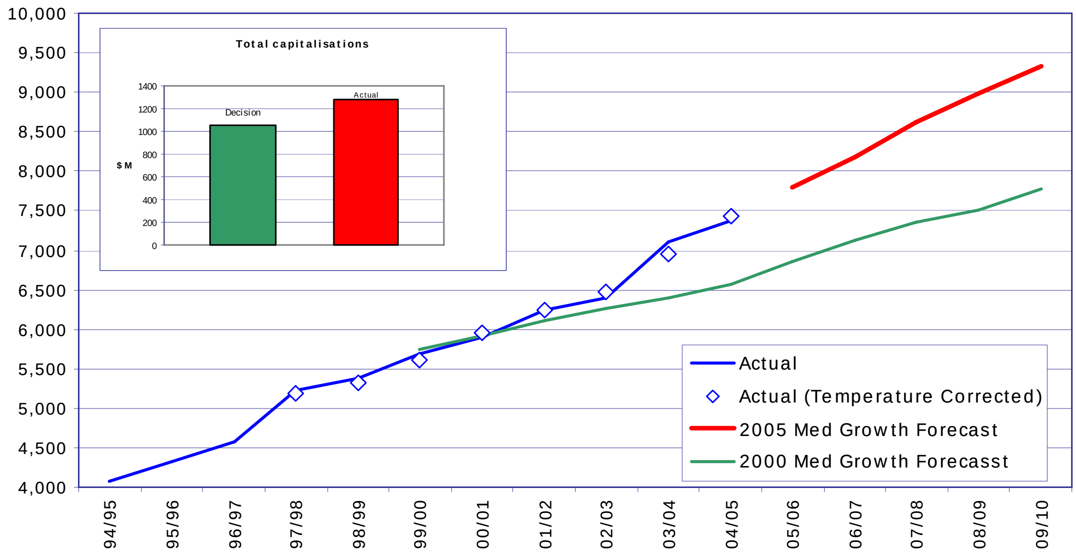
Queensland has experienced considerably higher growth in electricity demand and energy than was forecast in 2001 when Powerlink's revenue for the present regulatory period (between 2001 and 2007) was determined. This higher than forecast demand, coupled with mandated reliability of supply standards which Powerlink must meet under its Transmission Authority and substantial increases in input costs in the latter years, have resulted in considerably higher capital expenditure than was allowed in the 2001 revenue determination.

As shown in Figure 3.1, the 2005 forecast peak demand for the summer of 2007/08 is 8,612 MW, significantly higher than that forecast in 2000. Actual capitalisations for the period is expected to be $1,274.11 million, compared with the CPI adjusted allowance of $1,054.96 million.

In meeting it's mandated reliability of supply standards, Powerlink has ensured that Rules (Code) obligations in relation to consultation with interested parties and assessment under the Regulatory Test have been satisfied.

Powerlink believes that actual capex has been prudent, driven by higher demand growth and higher input costs in the latter years.

Figure 3.1: Queensland Actual & Forecast Summer Peak Demand



3.2 Background

Powerlink's November 2001 decision included an allowance for capitalisations in accordance with the Draft Regulatory Principles (1999).

The ACCC finalised the SRP in December 2004, which includes transitional arrangements in relation to capital expenditure in the current regulatory period. The SRP provides that the AER will apply the ex post prudency arrangements set out in the DRP.

Therefore, to establish the opening asset base that will apply to Powerlink at the start of the next regulatory period (1 July 2007), the AER must make an assessment as to the prudency of actual capital expenditure undertaken by Powerlink in the current regulatory period.

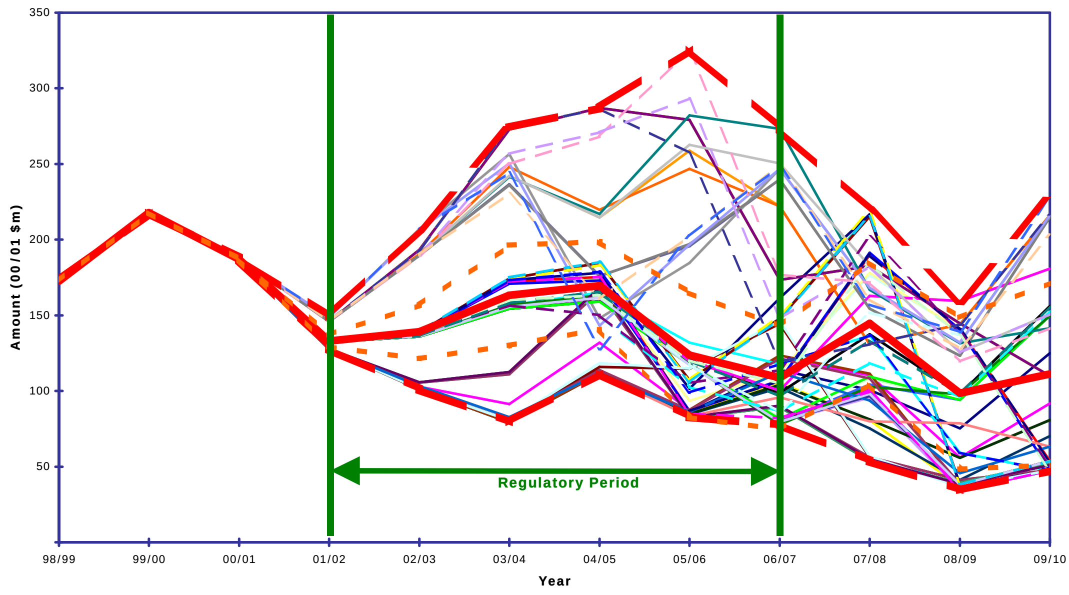
3.3 2001 revenue cap decision

Powerlink's capital expenditure forecasts for the current regulatory period were based on estimates of what was considered to be required for future transmission augmentations (new works) and replacements of aged/obsolete plant and equipment based on the load forecasts and generation forecasts applicable at that time.

Given the significant degree of uncertainty about possible generation patterns that could emerge over this regulatory period and therefore the network development necessary to meet this load growth, Powerlink derived its network capital expenditure forecasts on the basis of probabilistic scenarios about generation development, load growth, Kyoto targets and new coal facilities. The nature of the assessment was such that Powerlink did not put forward a single project list per se. Capital development plans and expenditure forecasts were developed for each of 72 scenarios, with no individual scenario having a probability of occurrence of more than 8%. The capital expenditure forecast proposed by Powerlink and approved by the ACCC was the probability weighted average of the forecasts for the 72 scenarios (depicted as the solid red line in Figure 3.2[20]).

[20] Powerlink Queensland Application: Transmission Network Revenue Cap Commencing January 2002, dated February 2001.

Figure 3.2: Capital Expenditure Profile (2001 Application)



Consistent with the DRP, Powerlink's revenue cap forecasts for the current period were developed on an "as-commissioned" basis. In other words, capital allowances were recognised when the assets came into service, and included expenditure associated with construction in progress.

Having assessed Powerlink's proposed capital expenditure program for the present (2002-2006/07) regulatory period, the ACCC approved a total capitalisation[21] allowance of $1,042.99 million.

Table 3.1: Capital expenditure allowance

$m	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total
Capex Rolled-in	155.24	179.04	187.59	230.11	199.56	91.46	1,042.99
CPI adjusted	155.24	180.11	190.78	233.23	202.34 *	93.25 *	1,054.96 *

* Based on estimated CPI of 2.9% for 2005/06 and 2.7% for 2006/07

3.4 Actual expenditure

Powerlink's current regulatory period ends on 30 June 2007. Capital expenditure for the period falls into two categories:

- o Assets which have already been capitalised and financially audited. That is, assets capitalised since the start of the regulatory period up to 30 June 2005; and

[21] Including finance during construction (FDC).

- o Assets expected to be capitalised in the remainder of the regulatory period (up to 30 June 2007). In relation to these assets, Powerlink has included its latest estimate of forecast capitalisations for the 2005/06 and 2006/07 years.

Powerlink anticipates that a total of $1,274.11 million in works will be capitalised during this regulatory period, including finance during construction. This equates to $219.15 million (or 21%) higher than the allowance provided by the ACCC.

Table 3.2: Actual and forecast total capitalisations

$m	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	Total
As commissioned capex	128.37	178.05	145.62	187.30	252.04 *	252.92 *	1,144.30 *
FDC	14.89	20.22	17.36	22.10	26.67 *	28.57 *	129.81 *
Total capitalisations rolled-in	143.26	198.27	162.98	209.39	278.72 *	281.49 *	1,274.11 *

* Forecast.

A number of factors have contributed to this increase in expenditure. Those of primary significance include:

- o **actual demand growth** is significantly in excess of that underpinning the 2001 revenue decision - in the last revenue application, demand was forecast to increase by 3.1% per annum over the 10 years from 1999 or an annual increase of approximately 220 MW. This figure was based upon a detailed load forecast prepared in accordance with the National Electricity Code and validated by independent consultants. Summer maximum demand has grown significantly over the past five years with statewide growth of 31%, including record growth of 29% in South East Queensland over the last three years. The 2005 forecast demand for the 2007/08 summer is 8612 MW, some 1256 MW higher than that contained in the 2000 forecast. This very high demand growth is expected to continue into the future. As described in Powerlink's *Annual Planning Report 2005*, some of the main reasons for the higher rate of growth are associated with a substantial and prolonged increase in air-conditioning installations, and an increase in the underlying level of expected population growth and construction activity;
- o **recent input cost increases** – Powerlink has been subject to significant cost increases associated with labour rates and construction materials in the latter years of the regulatory period.

The widely publicised shortage of skilled workers in the electricity industry in Australia (and other countries) in recent years has been largely the result of increased workload in the industry. This has increased the demand for, and consequently the cost associated with, attracting and retaining skilled workers. To narrow the "parity gap" with southern state networks and other competing sources of employment (for example, the mining industry), Queensland electricity companies have needed to accept wage increases well above the Wage Cost Index. This need was recognised (and allowed for) in the QCA's 2005 revenue determination for the Queensland electricity distribution networks. Construction materials costs have also risen sharply with worldwide demand for steel, aluminium and copper, increasing the cost of materials and equipment purchased for capital projects.

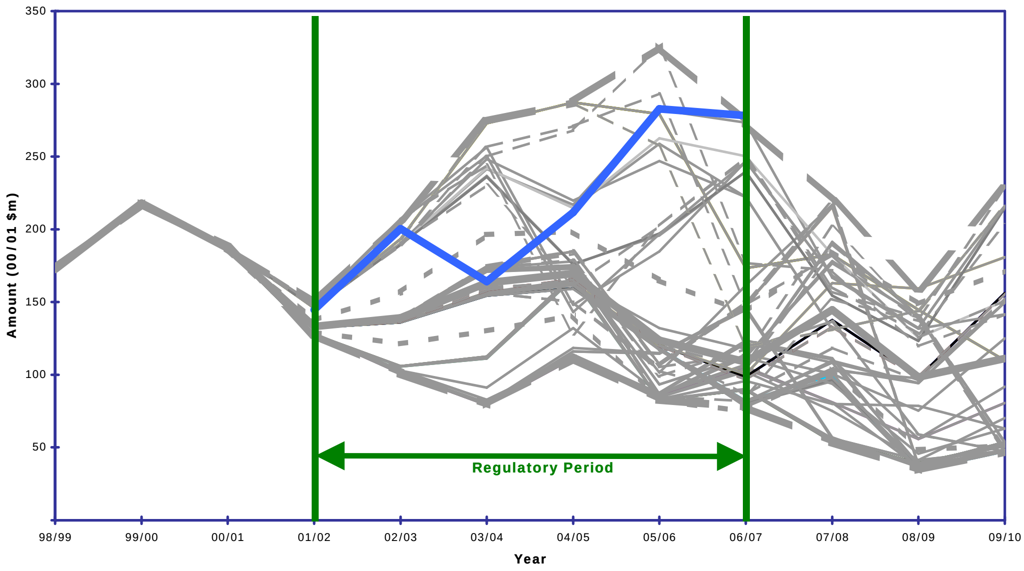
In addition, new, more onerous legislative requirements for vegetation management and safety management have added to input costs in recent years.

Given that these factors were not foreseeable at the time of the previous revenue application, the associated costs were not included in Powerlink's capital expenditure allowances; and

- the **non-discretionary nature** of investments - Powerlink is required by various statutory legislative instruments to meet its mandated reliability of supply obligations. These are obligations which Powerlink takes very seriously as failure to comply will invoke onerous penalties (or sanctions). Therefore, as the network is put under increasing pressure from higher loads, Powerlink has no option but to identify and develop efficient solutions (including non-network solutions) to satisfy mandated reliability of supply standards.

The expected actual capex for the present period is shown in Figure 3.3 as the heavy blue line superimposed on the scenarios considered in 2001. It tracks close to the upper bound of the scenarios, amongst the high load growth scenarios.

Figure 3.3: Actual capital expenditure during current regulatory period



The distribution of the actual capex by project size is:

Table 3.3: Capitalisations (incl. FDC) by cost range

	No. Projects	Capitalised Cost $m
>$10 million	25	673.50
$1million - <$10 million	145	424.33
< $1 million	176	46.47
Sub Total		1,144.30
FDC		129.81
Total (incl. FDC)	346	1,274.11

Note: Numbers may not add due to rounding.

3.5 Categories of expenditure

To assist the AER and stakeholders in understanding the nature of expenditure carried out during this regulatory period, Powerlink's network capital expenditure has been dissected into the following categories:

3.5.1 Load driven

- **Augmentations** – relate to augmentations as defined under the National Electricity Rules (NER)[22] and include those projects to which the Regulatory Test applies. Therefore, the largest component of this category relates to new large network assets with expenditure in excess of $10 million and new small network assets with expenditure of more than $1 million. Typically these

[22] Augmentations are defined as works to enlarge a network or to increase the capability of a network to transmit (or distribute) active energy.

include projects such as new line constructions, substation establishments and reinforcement of the existing network.

- **Non-Augmentations** – are outside of the NER definition of augmentations but nonetheless are undertaken to satisfy the increasing load (demand) on the transmission network. These include connections with distribution network service providers (Energex, Ergon Energy and Country Energy), transmission line easements, land acquisitions and very small network additions (less than $1 million).

3.5.2 Non-load driven

- **Replacements** – relate to the replacement of lines, substations, communications equipment, secondary systems, etc. Replacement projects are primarily undertaken due to end of life, obsolescence or safety requirements and result in either new assets or an extension to the remaining life of the existing asset. Assets are generally replaced with "modern day equivalent" assets which typically provides additional capacity even though this is not a driver for replacement.
- **Security/Compliance** – a number of projects are undertaken to ensure compliance with amendments to various technical, safety or environmental legislation. In addition, expenditure is required to ensure the physical security (as opposed to network security) of Powerlink's assets, which are regarded as critical infrastructure.
- **Other** – all other projects associated with the network that provides prescribed transmission services such as communications systems enhancements or improvements to switching functionality.

3.5.3 Non-network

Non-network capital expenditure relates to business information technology projects and "support the business" projects (such as motor vehicles, tools and commercial buildings).

3.5.4 Overall expenditure

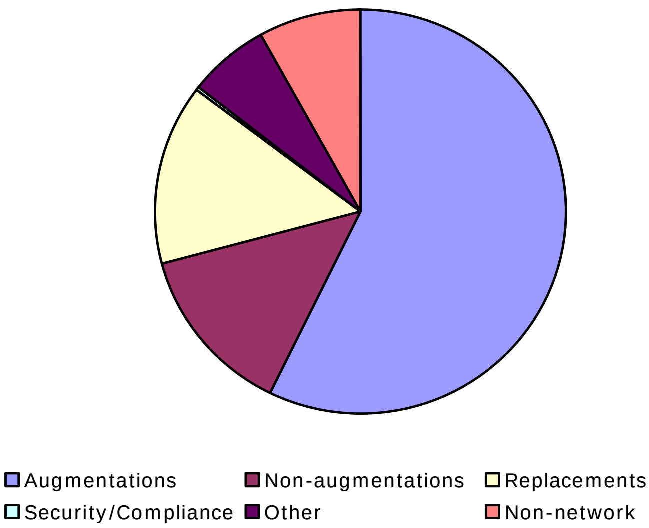
Table 3.4 provides an overview of the total capitalised value of projects in the current regulatory period according to the categories described above. The proportions are shown diagrammatically in Figure 3.5.

Table 3.4: Total capitalisations by category

Category	Total Capitalisations $m
Load Driven	
Augmentations	656.25
Non-Augmentations	153.93
Non-Load Driven	
Replacements	164.42
Security/Compliance	5.52
Other	72.23
Total Network Capex	1,052.35
Total Non-Network Capex	91.95
Sub Total Capex	**1,144.30**
FDC	129.81
Total Capex (incl. FDC)	**1,274.11**

Note: Numbers may not add due to rounding.

Figure 3.4: Total capitalisations by category



3.6 Prudency test to be applied

To determine the level of capital expenditure included in the regulatory asset base at the start of the coming regulatory period, the AER is required to assess the prudency of capital expenditure undertaken during the current period. As outlined in the SRP, the AER is to apply an ex-post prudency test to determine the appropriate level of capex to be rolled-in. The AER defines prudency in terms of:

> *"a TNSP acting efficiently in accordance with good industry practice to achieve the lowest sustainable cost of delivering services."* [23]

[23] AER (2004), Statement of Principles for the Regulation of Electricity Transmission Revenues – Background Paper, p131.

The AER has stated that the nature of its assessment will be to "step into the shoes of" the relevant TNSP at the time the investment decisions were made to determine whether or not a prudent TNSP would have made the same decisions. A three-stage prudency test has been proposed by the AER that involves an assessment of whether:

- o there was a clear and demonstrable need;
- o the most efficient investment was proposed to meet that need; and
- o the selected investment was implemented efficiently.

3.6.1 Large projects

The ten network projects capitalised[24] within the current regulatory period with the highest outturn costs are listed in Table 3.5. These ten projects account for $457.89 million (or 36%) of the total capitalisations.

Table 3.5: Ten highest capitalisations (excl. FDC) by outturn cost

Project No.	Project	Consultation	Outturn Cost (Capitalisations excl FDC) $m
CP.00771	Belmont 275kV Line Reinforcement	Reg Test	81.13
CP.00762	Darling Downs Transmission Reinforcement	Reg Test	80.94
CP.01002	Gold Coast Reinforcement	Reg Test	68.17
CP.00707	Cairns Reinforcement	Consultation	49.15
CP.01094	Belmont Murarrie Transmission Reinforcement	Reg Test	47.69
CP.00753	Stanwell-Broadsound 275kV Line Reinforcement	Reg Test	37.37
CP.00384	Lilyvale 275kV Reinforcement	Reg Test	25.79
CP.00854	Loganlea 275kV Reinforcement	Consultation	23.55
CP.00667	Molendinar 275kV Establishment	Reg Test	23.36
CP.01136	Goodna 275kV Substation Establishment	Reg Test	20.74
			457.89

3.7 Summary

Powerlink considers that all capital expenditure incurred during this regulatory period is prudent. Powerlink believes that it has applied the requisite technical, managerial and financial governance processes to ensure that:

- o network investments meet its mandated reliability obligations under the National Electricity Rules and other relevant jurisdictional instruments;
- o all investment is closely aligned with external and internal development plans and strategies; and

[24] Or forecast to be capitalised.

- o decisions have been, and continue to be made, in a consistent, co-ordinated and robust manner to achieve the most efficient and prudent outcomes for customers.

3.8 Capex efficiency savings

The DRP includes an incentive arrangement for capex efficiencies. TNSPs are encouraged to pursue capex efficiencies by being able to retain a reasonable share of the resultant benefits.

Whilst Powerlink has identified several instances of modest management-induced efficiencies in the capital program of the current regulatory period, there is one case where these efficiencies are significant. Consistent with the DRP, Powerlink considers that it is appropriate that it be able to retain a reasonable share of these efficiencies, notwithstanding that the overall capital expenditure will be above the allowance. That the total actual capex is above the allowance can be directly attributed to higher than forecast demand growth and higher input costs – both of which are outside the control of Powerlink.

Significant management-induced efficiencies have occurred in the reinforcement of supply to the Gold Coast. The efficiencies arise from acquiring an easement early, and importantly, preserving the easement for construction of overhead transmission in an area undergoing residential development. To support its case, Powerlink engaged an independent consultant to assess the cost of the alternative of acquiring an easement just prior to construction, and constructing two circuits to reinforce supply to the Gold Coast area. The independent consultant determined that the lowest cost option which would currently be available would be $112.2 million ($05/06). The required easement is located in a well developed area which is experiencing further fast development (the corridor between southern Brisbane and the Gold Coast), and includes some areas where overhead line construction would no longer be feasible.

However, Powerlink acquired the easement early, and preserved the ability to construct overhead transmission in this corridor. The easement acquisition costs at the time they were acquired were substantially lower than had they been acquired just before construction. Land values have increased at considerably more than CPI (at which previously acquired easement assets are indexed) and the cost of acquiring the easement today has been independently estimated at about three times the original acquisition cost.

Taking into account the actual cost of early easement acquisition[25] and actual construction costs for the transmission between Greenbank and Molendinar, the actual costs incurred by Powerlink for two circuits to reinforce supply to the Gold Coast is $73.8 million ($05/06), some $38.4 million lower than the $112.2 million estimated by the independent consultant for the project, had the easement been acquired just before construction. The $38.4 million saving is directly attributable to management induced efficiencies, namely the early acquisition of the easements, and preservation of the right to construct the overhead transmission between Greenbank and Molendinar.

Powerlink proposes that these efficiency savings be shared 50/50 with customers which makes the Powerlink share $19.2 million ($05/06). It is further proposed that this amount be spread evenly throughout the next regulatory period as part of the operating expenditure allowance. This has been included in Chapter 7.

[25] Escalated to $05/06 at CPI.

Chapter 4 – Regulatory Asset Base

4.1 Introduction

The regulatory asset base (RAB) at the beginning of the next regulatory period needs to be established to allow the building block calculation of the revenue requirement to be undertaken. The AER's preferred approach to determining the opening asset valuation for the regulatory period is to lock in the RAB through a "roll forward" process. The roll forward process takes the opening asset value of the previous regulatory period and adds in the outturn value of assets commissioned during that regulatory period. Economic depreciation determined in the previous decision is then deducted from the RAB for the next regulatory period.

4.2 SRP information requirements

Appendix A of the SRP contains information requirements for revenue cap resets. Section A.2 details the information requested in relation to the asset base roll forward. It suggests a schedule should be provided setting out the following:

- opening asset values at the start of the current regulatory control period broken down into individual asset classes;
- forecast and actual capex broken down into the same asset classes;
- forecast and actual disposals broken down into the same asset classes;
- forecast depreciation broken down into the same asset classes;
- actual CPI adjustment for each asset class; and
- closing asset values for each asset class at the end of the current regulatory period.

These details are provided in this Proposal to the extent practicable taking into account the 2001 revenue decision and transition from the DRP.

4.3 Powerlink 2001 revenue decision

The Decision handed down by the ACCC in 2001 for Powerlink was made in accordance with the DRP, which required that assets be rolled into the RAB at the time they are placed in service. Therefore under the DRP, capital expenditure was not rolled into the RAB as incurred, but rather the expenditure was capitalised into the regulatory base as they were commissioned. To ensure that Powerlink recovered the cost of financing the construction of the assets (FDC1), these costs were also incorporated into the asset values upon commissioning of the assets.

Furthermore, to ensure that Powerlink receives the correct return on, and return of, its RAB, a second financing component (FDC2) is added to the asset value to compensate for the delay in revenue provided by newly commissioned assets under the AER's financial model.

The decision by the ACCC/AER to change from ex post to ex ante capex framework[26] has required Powerlink to also roll into the opening RAB for the coming regulatory period the value of assets under construction. To ensure that Powerlink recovers the cost to date of financing the construction of these assets, a proportional amount of finance during construction has been incorporated into the value of assets under construction.

4.4 Roll forward information

Powerlink's roll forward of the RAB is based upon the "lock in and roll forward" approach. Powerlink has taken the opening RAB from the 2001 Decision adjusted the capex and economic depreciation for actual CPI, and added the additional capex spend during the current regulatory period. The value of assets under construction (including FDC1 and FDC2) has also been added to the RAB, to account for the change from "as commissioned" to "as incurred" required by the AER.

4.4.1 Opening asset value

Powerlink's current regulatory period commenced on 1 January 2002 and continues until 30 June 2007, covering 5½ years. The ACCC's 2001 decision determined annual allowable revenue based upon annual opex and capex figures for the 2001/02 financial year and subsequent years. The opening RAB from 1 July 2001 therefore predates the commencement of the regulatory period by six months. However, as there is no alternative RAB available at 1 January 2002, the opening RAB from the 2001 Decision has been used for the roll forward.

The opening 1 July 2001 RAB set as part of the 2001 decision was $2,276.87 million.

4.4.2 Capitalisations

As noted previously, this Proposal precedes the conclusion of the current regulatory period, therefore requiring forecasts to be made for the 2005/06 and the 2006/07

[26] As outlined in SRP and draft Position Paper on Regulatory Accounting Methodology dated September 2005.

financial years. The value of capitalisations included in the roll forward is derived from Powerlink's audited accounts from 2001/02 to 2004/05, plus forecasts for the 2005/06 and 2006/07 years. Table 4.1 summarises capitalisations allowed for in the 2001 Decision adjusted for CPI, and the actual outturn capitalisations each year. Powerlink will provide the AER an update of actual capitalisations for 2005/06 after the accounts for 2005/06 have been audited.

Table 4.1: Capitalisations in current regulatory period

$m	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Decision	155.24	179.04	187.59	230.11	199.56	91.46
Decision - CPI adjusted	155.24	180.11	190.78	233.23	202.34*	93.25*
Actual	143.26	198.27	162.98	209.39	278.72#	281.49#

* CPI has been estimated

Forecast capitalisations

Cumulatively, capitalisations for the current regulatory period are significantly higher than those allowed in Powerlink's 2001 Decision. The reasons for this variation were discussed in more detail in Chapter 3. Powerlink is entitled to additional revenue to account for the difference between actual and forecast capitalisations.

Powerlink has a policy of separation of assets that provide regulated and non-regulated services, supported by an IT system which automatically separates costs at source. Specifically, the regulatory asset base does not include the value of assets which provide non-regulated services.

4.4.3 Disposals

In performing the roll forward of the RAB, Powerlink has deducted from the asset base any revenue or compensation it has received from the sale or disposal of regulated assets. In this way, the return of assets to Powerlink is reduced by the monies received when the asset is sold or disposed of. The majority of revenue received for asset disposals relates to the normal turnover of motor vehicles in Powerlink's fleet.

4.4.4 Depreciation and CPI adjustment

In the roll forward of the RAB, economic depreciation as determined in Powerlink's 2001 Decision, and adjusted for actual CPI, has been deducted from the RAB. "Economic depreciation" is calculated by determining the depreciation for each asset class from the RAB and the remaining useful life of each class, offset by the revaluation of the asset base. Powerlink has allocated these amounts across the asset classes being rolled forward. The CPI used for the roll forward is the annual CPI to the end of March.

4.5 Change in regulatory accounting methodology

The AER released a discussion paper on Regulatory Accounting Methodologies in September 2005. The discussion paper stated the AER's preferred position of the regulatory framework to have the components of the building blocks of the revenue caps that relate to capital expenditure based on capital "as incurred" rather than "as commissioned", as was the case under the DRP.

Consequently, Powerlink has had to adjust its opening regulatory asset base to incorporate assets under construction at the commencement of the coming regulatory period in July 2007. This expenditure has been assigned to asset classes. Finance During Construction (FDC) has also been added to these assets to compensate for the economic cost of the delay between the expenditure being made and the revenue being received. FDC has been calculated by pro-rating the duration of the project against the FDC normally applied.

These changes resulting from the AER's decision on Regulatory Accounting Methodologies result in a forecast one-off increase in Powerlink's regulatory asset base of $529.9 million, or a 16% step change.

A further impact of the decision by the AER on Regulatory Accounting Methodologies is the AER's stated approach to the inclusion of the depreciation of assets under construction in the calculation of the MAR. Powerlink has noted that this practice does not comply with Australian and International Accounting Standards.

4.6 Summary

A summary of the roll forward is provided in Table 4.2.

Table 4.2: Powerlink's RAB roll forward

$m nominal	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Opening asset base	2,276.87	2,394.42	2,553.69	2,682.79	2,856.80	3,011.42
2001 decision capex at actual CPI	155.24	180.11	190.78	233.23	202.34*	93.25*
Economic depreciation (CPI adjusted)	37.70	20.84	61.68	59.23	47.72*	56.09*
Closing asset base	2,394.42	2,553.69	2,682.79	2,856.80	3,011.42	3,048.57
Add capitalisation over 2002 – 2007 allowance						219.15*
Other Adjustments						(1.19)
Closing RAB 30 June 2006						3,266.53
Transition (Assets Under Construction roll in)						529.95*
Opening RAB 1 July 2007						3,796.48

Note: Numbers may not add due to rounding

* Forecast

Chapter 5 – Cost of Capital

5.1 Introduction

The National Electricity Rules require that the AER provide TNSPs with a sustainable commercial revenue stream, which includes a fair and reasonable rate of return on efficient investment.

The regulatory rate of return should be sufficient to ensure the continuing viability of the business and to encourage necessary investment in new and replacement assets. If the rate of return is too low, discretionary investment by asset owners will be constrained and the benefits to customers that such investments would deliver will not be realised.

5.2 Post-tax framework

A commonly used model for determining the rate of return on an entity's regulated assets is to calculate the weighted average cost of capital (WACC). WACC is a weighted average of an entity's cost of debt and equity, based on the market values of debt and equity in the entity's capital structure. Formula:

$$WACC = R_e\left(\frac{E}{V}\right) + R_d\left(\frac{D}{V}\right)$$

where: R_e is the return on (or cost of) equity

R_d is the cost of debt

E is the market value of equity

D is the market value of debt

V is the market value of equity plus debt.

The AER has adopted a WACC that is a weighted average of the nominal post-tax return on equity and nominal pre-tax cost of debt – known as the nominal vanilla WACC. This formulation does not include the impact of business income tax. The AER models tax liabilities in the cash flows and adjusts the amount to account for the utilisation of imputation credits.

In the interests of enhancing certainty in investments for TNSPs, the SRP provides that the AER will continue to establish the WACC on the basis of benchmark parameters and to determine a WACC that provides a fair and reasonable rate of return applicable to TNSPs.

The SRP states that the AER will use the Capital Asset Pricing Model (CAPM) to estimate the cost of equity capital. In addition, the SRP specifies values for certain parameters as follows:

- capital structure – a benchmark gearing level of 60% for a TNSP;
- market risk premium – a value of 6%;
- equity beta – a value of 1; and
- imputation credits – an average gamma of 0.5.

Powerlink has adopted these specified values for the purposes of its revenue proposal[27]. However, in deriving the rate of return, a number of other parameters must be estimated.

5.3 Risk-free rate

The risk-free rate represents the rate of return on an asset with zero default risk. In estimating the WACC, the risk-free rate is a component of both the CAPM and the cost of debt.

In choosing an appropriate proxy for the risk-free rate, two main issues need to be considered – first, the term to maturity of the risk-free rate and second, the method of measurement of the risk-free rate. In relation to these issues the SRP states that the AER proposes to estimate the risk-free rate using a 10-year government bond rate as a proxy and that the rate will be calculated as an average over a period of between 5 and 40 days, to be nominated by the TNSP.

Powerlink nominates that the risk-free rate shall be calculated from the yield on 10-year Commonwealth Government bonds averaged over 20 trading days. Recognising that the AER will use the actual risk-free rate applicable at the time of its determination, Powerlink has for the purposes of this Proposal, applied a risk-free rate of 5.28% which is the 20-day average ending 24 February 2006.

Powerlink nominates a 20-day averaging period for the risk-free rate.

[27] The revenue cap calculations in Chapter 10 use these values. However, the AER's revenue cap calculations are expected to use the WACC parameters in the new National Electricity Rules, which are to come into effect in mid-2006.

5.4 Cost of debt

5.4.1 Debt margin

In determining the WACC for a regulated entity, the cost of debt is estimated by adding a debt margin to the risk-free rate of return. The debt margin is typically calculated on the basis of a debt instrument of equivalent term to maturity as the proxy for the risk-free rate of return. For regulated entities, this is typically 10 years.

Under the SRP the debt margin is defined as a margin for credit risk, which, therefore, excludes costs in relation to debt-raising and interest rate risk management. (These are addressed separately in sections 5.4.3 and 5.4.4). The SRP also provides that a benchmark debt margin will be calculated corresponding to a 10-year term and a benchmark "A" credit rating for a TNSP.

The ACCC's standard practice for estimating debt margins has been by reference to credit spreads observed on corporate bonds included in the CBASpectrum database. This has been justified principally on the grounds of data availability. In relation to this issue, Powerlink notes that a recent report produced by NERA[28] indicates that the credit spread data provided by CBASpectrum is understated by approximately 26 basis points for long-dated bonds. Specifically, NERA concluded that:

> *The CBASpectrum estimation procedure does not determine the best fit to the available data. The CBASpectrum estimation procedure is such that CBASpectrum estimated yields are expected to be, and in practice are, on average, less than actual yields for long-dated and low-rated bonds. Between 30 June 2003 and 10 May 2005, actual yields on Australian bonds with more than 6 years to maturity and ratings of A or below have averaged 17.1 basis points higher than the CBASpectrum estimated yields on such bonds. For bonds with more than 8 years to maturity and ratings of A or below, the difference has averaged 22.2 basis points.*
>
> *We consider that, on the basis of the data examined in this report, the most appropriate adjustment to CBASpectrum estimates of yields on low rated (A and below) 10-year bonds is to add 25.6 basis points[29].*

[28] NERA (National Economic Research Associates) (2005), *Critique of Available Estimates of the Credit Spread on Corporate Bonds*, a Report for the Energy Networks Association (ENA), May.

[29] Ibid, p21.

This issue has come under recent scrutiny by several regulators. Since the release of the NERA report a number of regulators examined the CBASpectrum outputs and have, consequently, allowed adjustments to the CBASpectrum estimates in the order of 25 basis points, as follows:

- Essential Services Commission (ESC) – in its Final Decision on the Electricity Distribution Price Review 2006-10 (October 2005), the ESC found that:

  CBASpectrum yields were likely to understate bond yields by a material amount. In particular, that the average understatement for all bonds with a remaining term of 8 to 10 years was found to be 18 basis points, and the Commission accepted that AGLE's estimate of the understatement for 10-year, BBB+ corporate bonds of 25 basis points appeared to be supported. It also found that the evidence suggested that the Bloomberg predicted yields were close to those observed in the market, overstating observed yields by 4 basis points on average. (p368)

  In maintaining its Draft Decision estimate of the debt margin of 130 basis points the ESC had regard to:

  - an adjusted yield for a 10-year BBB+ bond of 118 basis points (93 basis points predicted by the CBASpectrum service adjusted for a likely downward bias of 25 basis points); and
  - a suggested yield of 127 basis points for a 10-year bond (using a linear interpolation of Bloomberg's predicted yield of 117 basis points for a 9-year BBB+ rated bond).

- Economic Regulation Authority (ERA) – in its Final Decision on the *Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution Systems* (July 2005) for AlintaGas, the ERA noted the Allen Consulting Group's (ACG) recommendation that it reconsider and increase the allowance for the debt margin from that used in the Draft Decision. The ERA also noted that the basis for ACG's advice was confirmation of NERA's assessment that the methodology applied by CBASpectrum to predict fair yields is flawed in relation to long-dated, low-rated issues. On the basis of ACG's advice, the ERA adopted a debt margin range of 131 to 145.5 basis points – 18.5 to 33 basis points above the 112.5 basis points margin set out in the Draft Decision.

- Queensland Competition Authority (QCA) – in its Draft Decisions on the Revised Access Arrangements for Gas Distribution Networks owned by Allgas Energy (December 2005) and Envestra (December 2005), the QCA accepted NERA and ACG's views that CBASpectrum estimates of long-term bond yields are likely to underestimate the actual debt margins for Australian firms. The QCA went on to say that it is reasonable to place most weight on Bloomberg estimates as they tend to be fairly accurate relative to actual debt margins observed in the market. The QCA considered that CBASpectrum estimates could be considered with an increase to the estimated spread of around 20-25 basis points to account for the downward bias in the data. As a result, the QCA accepted ACG's recommendation of 130 basis points for the debt margin, which among other sources of evidence, had regard to an adjusted CBASpectrum predicted yield of 122-126 basis points.

Given the under-estimation inherent in the CBASpectrum data, Powerlink considered the precision of the information provided by Bloomberg. Recent evidence suggests that the Bloomberg service appears to provide more accurate estimates of actual bond margins. However, it is understood that as Bloomberg yields are intended to be representative of yields on bonds within a similar ranking group (that is, the estimated yield on "A" rated bonds are representative of yields on "A+", "A" and "A-" bonds), there is a problem in that the representative yield may be influenced by a higher/lower proportion of one particular rated bond over another.

Powerlink recognises that data from both CBASpectrum and Bloomberg sources is imperfect – in particular, that there is a limited number of observations available in the Australian market. However, Powerlink strongly believes that to the extent the AER relies upon CBASpectrum data, it would be reasonable and appropriate to allow a 25 basis point increase to the estimated data spread.

In deriving an estimate of the risk-rate, Powerlink has had regard to the following information averaged over the 20 trading days to 24 February 2006:

- an estimated yield of 81.86 basis points using CBASpectrum data for "A" rated bonds plus an upwards adjustment of 25 basis points to address the downward bias in the estimate. This provides a revised estimate of 106.86 basis points; and

- o an estimated yield of 98.69 basis points using Bloomberg data for "A" rated bonds.

Using the average of the two estimates, the base debt margin is 102.78 basis points, although this is yet to include a further "refinancing cost margin" as discussed in section 5.4.2.

5.4.2 Refinancing costs

The regulatory framework establishes a weighted average cost of funds that will apply for the duration of the next regulatory period. As part of the WACC calculation, the cost of debt is normally set prior to the start of the regulatory period consistent with the risk-free rate-setting period.

From a risk management perspective, it is prudent for a TNSP to refinance its existing debt portfolio over the same period as the risk-free rate is set. This is to ensure that the actual cost of existing debt is closely aligned to the regulated cost of debt. Refinancing a significant amount of debt over a short period of time in the Australian debt capital markets may result in the debt issuer needing to pay a "premium" above what it would otherwise pay were the debt refinanced in a more orderly manner (i.e. issuing an optimum amount of debt for its credit rating). This problem is attributable to the relative small size of the domestic debt market and the counterparty constraints within which potential investors operate. Usually investors will have lower counterparty limits for bonds issued by lower rated entities. This practical constraint for lower rated issuers is reflected in the lack of A-rated issuers that have undertaken single bond issues greater than A$1 billion at one time in the domestic market, compared with AAA to AA- rated issuers.

In support of this concept, Powerlink received independent information from Westpac[30] (provided in Appendix B). This information included an analysis of book builds of 59 deals of different maturities, amounts and credit ratings that Westpac has undertaken between 2002 and 2005. The purpose of the analysis was to determine the additional margin required to issue debt in excess of an optimal sized deal for a particular credit rating. Based upon this analysis and market experience, Westpac estimated that a clearing spread move of between 5 to 10 basis points from the

[30] Westpac's report included the following disclaimer: "The projections given and the conclusions derived within this paper are predictive in character. While every effort has been taken to ensure that the assumptions on which the projections and conclusions are based are reasonable, the projections and conclusions may be affected by incorrect assumptions or by known or unknown risks and uncertainties. The results ultimately achieved may differ substantially from these projections and conclusions".

clearing spread (that is, the margin paid to clear the amount of debt sought by the client) would be required to achieve a debt refinancing deal size applicable to Powerlink.

Having reviewed Westpac's analysis and, in light of informal discussions with another independent market practitioner, Powerlink considers that an additional refinancing cost allowance of 7.5 basis points (being the midpoint of the range proposed by Westpac) should be added to the debt margin.

Powerlink proposes an adjusted debt margin of 110.28 basis points (average of adjusted CBASpectrum and Bloomberg estimated spreads + 7.5 basis points refinancing premium).

5.4.3 Debt-raising costs

Debt-raising costs relate to those costs incurred by an entity over and above the debt margin. These costs are encountered when new debt is raised or current lines of credit are renegotiated (or extended).

In the SRP, the AER proposed to treat debt-raising costs as an operating cost item and that a further review of such costs would be undertaken.

The ACCC engaged ACG to review debt-raising costs as part of the TransGrid and EnergyAustralia electricity transmission reviews. In its report[31], ACG noted that debt-raising costs are a legitimate expense that should be recovered through regulated revenues. Having reviewed a number of data sources for debt-raising transaction fees, ACG recommended that the ACCC apply a benchmark approach to deriving an appropriate allowance. This approach provided an allowance of 10.4 to 8 basis points per annum depending on the overall size of the debt.

Table 5.1 provides information on debt-raising cost allowances adopted in recent Australian regulatory decisions.

[31] Allen Consulting Group (2004), *Debt and Equity Raising Transaction Costs*, Final Report to the Australian Competition and Consumer Commission, December.

Table 5.1: Recent Australian regulatory decisions – debt-raising costs

Regulator (Year)	Service	Allowance	Credit Rating
ERA (2005)	Gas distribution (AlintaGas)	12.5	BBB+
ICRC (2004)	Gas distribution (ActewAGL)	12.5	BBB+ to A
IPART (2005)	Gas distribution (AGL)	12.5	BBB to BBB+
IPART (2005)	Gas distribution (Country Energy)	12.5	BBB to BBB+
ESC (2005)	Elect distribution (5 businesses)	12.5	BBB+
ESCOSA (2005)	Elect distribution (ETSA Utilities)	12.5	BBB+
ICRC (2004)	Elect distribution (ActewAGL)	12.5	BBB+
IPART (2004)	Elect distribution (4 DBs)	12.5	BBB to BBB+
QCA (2005)	Elect distribution (Energex/Ergon Energy)	12.5	BBB+
ACCC (2005)	Elect transmission (TransGrid)	8	A
ACCC (2005)	Elect transmission (Energy Australia)	9	A
QCA (2005)	Gas distribution (Allgas)	12.5	BBB+
QCA (2005)	Gas distribution (Envestra)	12.5	BBB+
ERA (2005)	Gas transmission (DBGNP WA)	8-12.5	BBB+
ERA (2005)	Gas transmission (Goldfields Gas)	8-12.5	BBB+
ACCC (2003)	Elect transmission (Transend)	10.5	A
ACCC (2002)	Elect transmission (SPI Powernet)	10.5	A
ACCC (2002)	Elect transmission (ElectraNet)	10.5	A
ACCC (2002)	Gas transmission (GasNet)	25	BBB+

As the research shows, Australian regulators have commonly adopted a debt raising cost allowance of 12.5 basis points per annum. It is also clear from the table that the allowances provided in the ACCC's 2005 electricity transmission determinations is at odds with those of other jurisdictional regulators. Powerlink notes that in its recent TransGrid and EnergyAustralia decisions, the ACCC allowed 10.5 basis points per annum in its Draft Decisions. However, in light of ACG's advice, the allowances were reduced in the Final Decisions to 8 and 9 basis points, respectively, with no evidence to justify a lower allowance for an "A" rated entity compared to a "BBB+" rated entity.

On the basis of overwhelming recent regulatory precedent, Powerlink considers that a benchmark debt raising cost allowance of 12.5 basis points per annum is both reasonable and appropriate. The AER has indicated its preference to provide for such costs through operating expenditure rather than an addition to the debt-margin. Powerlink is neutral as to whether this allowance is included in the debt margin or allowed as an operating cost. Given the AER's preference, Powerlink has applied a 12.5 basis point allowance to its notional debt component each year to arrive at an average annual forecast of $3.31 million ($06/07) throughout the 2007-12 regulatory period. This is included in operating expenditure in Chapter 7.

Powerlink proposes an average annual debt-raising cost forecast of $3.31 million per annum as an operating cost.

5.4.4 Interest-rate risk management (Hedging) costs

During the course of the next regulatory period, Powerlink will need to progressively borrow additional funds in order to undertake its capital expenditure program. This presents a potential interest rate risk issue to Powerlink. If funds are drawn down at prevailing market rates as required to finance the capex program, there is a real risk that the actual cost of debt achieved will exceed the cost of debt determined by the AER at the start of the regulatory period.

One means of managing the risk associated with a possible rise in the cost of borrowing is to hedge expected future debt requirements at the start of the regulatory period, during the risk-free rate setting period. This can be achieved by entering into forward rate agreements (FRAs) during the period over which the regulated cost of debt is established. In undertaking this strategy, Powerlink will incur a number of costs as follows:

1. Queensland Treasury Corporation (QTC), as Powerlink's debt provider, currently charges an administration fee of 0.08% per annum on the face value of FRAs. This fee applies from the time the FRA is established until maturity. Based upon Powerlink's expected debt requirements and assuming 100% of borrowing requirements are hedged, QTC has estimated an annual FRA administration charge as follows:

Table 5.2: FRA administration costs

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
FRA admin costs	1.51	0.59	0.34	0.11	-

Note: FRA administration costs for 2006/07 have been escalated and included in the 2007/08 figure.

2. While FRAs can be established during the risk-free rate setting period, based upon the normal slope (i.e. positive) of the forward curve, rates applicable to future borrowings are likely to be higher than those that would typically be expected for spot yields. The "normal" shape of the yield curve is typically such that the forward rates increase above the spot rate by approximately 5 basis points per annum. Based upon the "normal" shape of the yield curve and assuming that Powerlink hedges 100% of expected future borrowing requirements, QTC estimates that Powerlink would be impacted by the "normal" positive shape of the yield curve as detailed in Table 5.3.

Table 5.3: Potential cost of hedging due to "normal" shape of the yield curve

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Hedging cost	0.07	0.29	0.62	0.98	0.47

3. The extent to which the timing and quantum of forecast debt requirements underpinning the FRAs turns out not to be correct means that additional costs or benefits may apply in the future. Additional cost may arise in circumstances where, for example, the size of the FRA is less than the amount ultimately required to be borrowed, interest rates have risen and a higher cost of funds needs to be paid for the additional amount that needs to be borrowed or if the size of the FRA is more than that required to be borrowed and interest rates have fallen. In this instance, the additional FRA amount would need to be cancelled with a mark-to-market loss incurred. Conversely, a benefit would arise if, for example, the size of the FRA is less than the amount ultimately required to be borrowed, interest rates have fallen and a lower cost of funds is to be paid for the additional amount that needs to be borrowed.

Powerlink recognises that this is a potential risk to the business. However, given the uncertainty associated with developing forecasts in relation to this issue, Powerlink believes that this is a risk that is best managed closer to the period of drawing down the funds. Therefore, Powerlink has not sought to recover any costs associated with any mismatch between the forecast timing and quantum of expected future funding requirements established in any FRAs and the actual timing and quantum of drawdown.

Consistent with the AER's preferred treatment of debt and equity raising costs, it is proposed that the costs associated with hedging against interest rate changes be included as an additional operating cost line item.

5.5 Equity-raising costs

The SRP acknowledges that equity raising costs must be paid by an entity when it raises equity capital. These include payments to equity arrangers for services such as structuring the issue, preparing and distributing information and undertaking presentations to prospective investors. The SRP flags the AER's intention to treat equity-raising costs as items of operating expenditure and to undertake a further review of these costs (as well as debt-raising and hedging costs).

ACG was engaged by the ACCC to undertake a review of equity-raising costs. ACG examined this issue from two perspectives – the opening initial equity of the business and subsequent capital expenditure. Each of these issues is addressed in turn.

5.5.1 Initial equity base

In its report to the ACCC[32], ACG advocated that the recovery of transactions costs associated with raising equity for the opening regulatory asset base is dependent upon the asset valuation methodology adopted at the time the assets first entered into a formal cost-based regulatory regime. Where a depreciated optimised replacement cost (DORC) valuation methodology is used, ACG considered that in principle a transactions cost allowance for raising finance should be allowed. This is because the DORC methodology generates an opening asset value that replicates the cost structure of a hypothetical efficient new entrant and such an entrant would have to raise equity to finance the network. ACG went on to say that this treatment of equity raising costs should be applied to both private and government owned regulated entities, justified on the grounds of competitive neutrality.

In its 2001 Decision on the *Queensland Transmission Network Revenue Cap 2002-2006/07*, the ACCC determined an opening regulatory asset base as the value established by the jurisdiction regulator (the Queensland Electricity Reform Unit or QERU) rolled forward to include asset additions, deletions and depreciation. The jurisdictional valuation was determined by means of an independent DORC valuation[33].

Powerlink has reviewed its jurisdictional valuation and notes that while account was taken of interest during construction, no specific allowance was made to reflect transactions costs associated with raising equity. Therefore, consistent with ACG's argument that these represent legitimate costs and should be provided for in establishing an opening (DORC) capital base, Powerlink now seeks compensation for these costs.

ACG further recommended that, where there is a case for allowing equity raising transaction costs, these should be capitalised into the asset base and depreciated over the life of the assets. The justification for capitalising equity raising transactions costs relates to the fact that they are, by their very nature, establishment costs. In

[32] Ibid.

[33] The DORC valuation was undertaken by Arthur Anderson, Gutteridge, Haskins and Davey, and Worley for the former QERU as at 1 July 1999.

cases where the regulatory asset value has already been established, ACG suggested that the ACCC consider the issue on its merits.

An alternative approach to recovery could be to simply recognise such costs as an additional and separate annual allowance within operating costs. It could be argued that equity raising transaction costs are merely ancillary costs incurred in the process of raising equity. The true economic value of the firm is dependent upon the income generating ability of its underlying assets. Capitalisation has the effect of increasing the recorded value of the entity's assets. As equity raising transaction costs do not increase the income generation ability of the firm, they have no impact on the intrinsic value of the entity. On this basis, capitalisation of such costs into the value of assets would arguably result in an unnecessary distortion of the economic value of the assets.

If this alternative view is adopted, the quantum of the annual allowance could be determined in a simple and transparent manner as follows:

$$\frac{\text{Notional equity funding x Benchmark equity-raising transaction cost (\%)}}{\text{Average remaining life of assets}}$$

where: Notional equity funding = Initial asset base x Benchmark equity component (40%)

Average remaining life of assets = that applying at the time the initial equity base was established.

In its report to the ACCC, ACG derived a median benchmark equity-raising cost of 3.83% by reference to the costs associated with raising capital through initial public offerings. The benchmark was formulated by updating the ACCC's previous average estimate of 3.55%.

Given that Powerlink's initial DORC valuation did not incorporate equity-raising costs, Powerlink has calculated an average annual equity-raising forecast of $1.50 million ($06/07) by means of the formula above and the application of ACG's recommended benchmark. This amount has been included in operating expenditure forecasts in Chapter 7.

Powerlink proposes an equity-raising forecast of 3.83% on the initial equity base and an equity raising forecast of $1.50 million ($06/07) per annum in the opex allowance.

5.5.2 Subsequent capex

ACG considered that an allowance for equity-raising costs associated with capital expenditure added to the initial regulatory asset base should only be allowed under limited circumstances. The reasoning behind this is ACG's presumption that subsequent capital expenditure should be financed in the least cost manner, which implies financing from retained earnings to the extent possible rather than raising equity from external sources (based upon the Pecking Order Theory of capital structure).

Powerlink disagrees with ACG's general assumption and draws the AER's attention to a study[34] that looked at the financing behaviour of a broad cross-section of publicly traded American firms over the 1971-1998 period. This study casts considerable doubt on the validity of the theory, especially during the 1980s and 1990s. Importantly, the study found that:

> *In contrast to what is often suggested, internal financing <u>is not sufficient</u> to cover investment spending on average. External financing <u>is heavily used</u>. Debt financing <u>does not dominate equity financing</u> in magnitude. Net equity issues track the financing deficit quite closely, while net debt <u>does not do so</u> (p241) – emphasis added.*

The analysis suggests that in practice, an entity's operations and associated accounting structures are more complex than that assumed under the theory. Support for the theory appears to hinge on the size of the entity in question as well as the time period under consideration.

Powerlink further considers that the position adopted by ACG is based upon a theory that is internally inconsistent with the assumptions underpinning the WACC formula. One implication of the theory is that there is no well-defined debt-equity target mix – the only determinant of how much debt an entity holds is their requirement for external finance. This is completely inconsistent with the benchmark regulatory assumption that in calculating the WACC, TNSPs seek to finance their operations in a way that enables them to maintain a gearing level of 60%. That is, the ACCC's assumption of calculating WACC implies that in deciding what form of finance to raise, the entity's key consideration is the impact of the additional financing on its target gearing level. Preferences for internal versus external sources of finance have

[34] Frank, MZ and Goyal, VK (2003), 'Testing the Pecking Order Theory of Capital Structure', *Journal of Financial Economics*, No. 67, pp217-248.

no role to play in this decision. An entity will issue equity if doing so allows it to maintain or move towards its target level of gearing.

Consistent with the benchmark capital structure assumption underpinning the regulatory WACC framework, Powerlink strongly believes that funding requirements for capital expenditure during the next regulatory period as well as the current regulatory period must be adequately provided for. The ACG report did not suggest a method of recovering benchmark costs associated with raising equity to undertake capital expenditure within-period. However, Powerlink considers that the approach described in relation to the initial equity base could equally be applied here. Based upon a total forecast capital spend of $1,274.11 million in the current regulatory period (from Chapter 3) and $2,449.24 million in the next regulatory period, Powerlink seeks recovery of an average annual equity-raising transaction forecast of $0.37 million and $0.60 million ($06/07), respectively. Recovery of these costs as an opex item requires that an allowance be provided for the remaining life of the assets. These amounts are included in operating expenditure forecasts.

Powerlink proposes an equity-raising transaction forecast of 3.83% on the equity portion of subsequent capital expenditure.

5.6 Expected inflation rate

The inflation rate is not an explicit parameter in the WACC calculation but is an inherent aspect of the risk-free rate and cost of debt parameters. Inflationary expectations are primarily sourced from:

- financial markets – derived as the difference between nominal and indexed bonds over a corresponding period; or
- government estimates – Commonwealth Treasury provide inflationary forecasts based on internal modelling.

The ACCC has historically derived its inflation rate forecasts on the basis of the difference between the nominal bond rate and inflation indexed bond rate. Consistent with this approach, Powerlink has derived an inflation rate forecast for the 2007-2012 regulatory period of 2.91%.

Powerlink proposes an inflation forecast of 2.91%.

5.7 Summary

Powerlink has estimated a post-tax nominal regulatory rate of return on its transmission network business of 8.34% based upon the WACC approach and application of the CAPM to the cost of equity capital.

The key input parameters underlying Powerlink's calculation of the cost of capital are summarised in Table 5.4.

Table 5.4: Summary of results

Parameter / Definition	Powerlink Proposal
Risk-free rate (nominal)	5.28%
Expected inflation	2.91%
Debt margin (adjusted)	1.10%
Market risk premium	6.00%
Debt/value ratio	60.00%
Value of imputation credits (Gamma)	0.50
Equity beta	1.00
Corporate tax rate	30.00%
WACC Vanilla (nominal)	8.34%

Powerlink's revenue proposal reflects the values for the market risk premium, capital structure, imputation credits, equity beta and benchmark credit rating prescribed in the SRP at the date of this proposal. However, should different values for WACC parameters be incorporated into the new National Electricity Rules in mid-2006, the AER is to adopt the new values for the purposes of Powerlink's final determination.

Chapter 6 – Future Capital Expenditure

6.1 Introduction

Powerlink is the sole holder of a Transmission Authority in Queensland, which authorises it, under the Queensland Electricity Act, to operate a high voltage transmission grid in the eastern part of Queensland. Powerlink is also registered as a TNSP in the NEM, and must comply with the relevant National Electricity Rules.

A salient feature of the arrangements in Queensland is that Powerlink has mandated reliability obligations that drive **non-discretionary** investments in grid augmentations as electricity demand grows.

The Queensland Electricity Act 1994, S34 also includes a responsibility to:

> *"ensure, as far as technically and economically practicable, that the transmission grid is operated with enough capacity (and, if necessary, augmented or extended to provide enough capacity) to provide network services to persons authorised to connect to the grid or take electricity from the grid..."*

In addition, Clause 6.2 of Powerlink's Transmission Authority (No. T01/98) requires that:

> *"The transmission entity must plan and develop its transmission grid in accordance with good electricity industry practice such that power quality and reliability standards in the NER are met for intact and outage conditions, and the power transfer available through the power system will be adequate to supply the forecast peak demand during the most critical single network element outage, unless otherwise varied by agreement."*

Powerlink has connection agreements with each of the parties connected to the transmission network. These connection agreements include obligations regarding the reliability of supply as required under clause 5.1.2.2 of the NEM Rules. The connection agreements generally require that capacity be provided to a supply point or area such that forecast peak demand can be supplied with the most critical element out of service, without the necessity to interrupt customer load i.e. an N-1 requirement.

As a TNSP, Powerlink must comply with the requirements of Schedule 5.1 of the National Electricity Rules (NER) and in particular, clause S 5.1.2.1:

> *"Network Service Providers must plan, design, maintain and operate their transmission networks and distribution networks to allow the transfer of power from 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, whether or not accompanied by the occurrence of certain faults (called "credible contingency events").*
>
> *The following credible contingency events and practices must be used by Network Service Providers for planning and operation of transmission networks and distribution networks unless otherwise agreed by each Registered Participant who would be affected by the selection of credible contingency events:*
>
> *(a) The credible contingency events must include the disconnection of any single generating unit or transmission line, with or without the application of a single circuit two-phase-to-ground solid fault on lines operating at or above 220 kV..."*

In meeting these obligations, Powerlink's approach to network planning is economically based, subject to environmental, safety and land use planning legislation, and is consistent with both the NER and the Regulatory Test. Joint planning with distribution network service providers (DNSPs), directly supplied industrial customers and interstate TNSPs is carried out to ensure the most economic options consistent with customer needs and other legislative requirements are identified and implemented.

Given the high load growth, this results in a significant ongoing program of capital expenditure to develop the grid. The age profile of the grid also dictates a significant program of replacement of aged assets. The program of works extends beyond investment in the "primary" transmission network to include investment in communication networks, Energy Management System (EMS) and other control and secondary systems, security, buildings and other "support the business" assets.

6.2 Ex-ante capex framework

Regulated revenue determined for Powerlink for the next regulatory period will necessarily include an allowance for new investments for the provision of prescribed transmission services to ensure that Powerlink can continue to satisfy its mandated reliability of supply obligations and effectively operate its network.

The AER has adopted an ex ante framework for determining the levels of capital expenditure to be included in forthcoming revenue determinations. The framework is based on determination at the start of the regulatory period of an efficient level of capex for the duration of the regulatory period. There are two proposed elements:

- **the main ex ante allowance**: this covers most or all expected investments during the regulatory period. Whilst the majority of this will be driven by mandatory reliability obligations, it may also include discretionary investments, such as those which can deliver a net market benefit. Powerlink has determined this requirement based on the various drivers for investment in prescribed services. For demand driven investments, Powerlink has applied a probabilistic assessment of expected investments to encapsulate the uncertainties surrounding future load growth and generation patterns; and
- **a contingent projects allowance**: this will cover a small number of large and uncertain investments which may arise in the period, but which depend upon a future trigger event. This includes a foreshadowed joint project with TransGrid to upgrade the Qld-NSW Interconnector, should the economic assessment pass the Regulatory Test.

The nature of the ex ante framework and associated incentive means that the capital expenditure allowance does not signify approval for specific projects. This is particularly so in Powerlink's case, as a range of possible development plans are taken into account through the use of scenario planning techniques. The actual investments to be made will be determined over time and will be identified in accordance with any obligations on Powerlink as a TNSP under the National Electricity Rules (eg. Regulatory Test processes) and normal business practices.

Powerlink has developed its capital expenditure forecast in this Proposal in a way which ensures there is no "double counting" between these capital requirements and grid support which could be used to economically defer certain transmission investments. Grid support allowances are discussed in more detail in Chapter 7.

6.3 Types of capital investments

Powerlink has categorised its forecast capital expenditure requirements as shown in Table 6.1. These categories are consistent with those used in the assessment of past capital expenditure. Each of the categories of investment will be discussed in more detail in the following sections.

Table 6.1: Capital expenditure categories ($m 06/07)

Network	Load driven	Augmentations	1,222.71
		Connections	69.03
		Easements	104.07
	Non-load driven	Replacements	812.80
		Security/compliance	115.85
		Other	21.06
	Total Network		**2,345.52**
Non-network	Business IT	Business IT	57.38
	Support the Business	Buildings	19.61
		Motor vehicles	18.51
		Assets, Tools & Other	8.22
	Total Non-network		**103.72**
Total capital expenditure			**2,449.24**

6.3.1 Network investments

Load driven

- **Augmentations** – relate to augmentations as defined under the National Electricity Rules (NER)[35] and include those projects to which the Regulatory Test promulgated by the AER applies. Typically, these are new line constructions, substation establishments and reinforcement of the existing backbone (shared) network.

- **Non-augmentations** – are undertaken to satisfy the increasing load (demand) on the transmission network but are not augmentations under the NER definition. These are typically connections with distributors, transmission line easements, land acquisitions and very small additions (less than $1 million).

Non-load driven

- **Replacements** – relate to the replacement of lines, substations, communications equipment, secondary systems, etc. Replacement projects are primarily undertaken due to end of life, obsolescence or safety requirements, and result in either new assets or an extension to the remaining

[35] Augmentations are defined as works to enlarge a network or to increase the capability of a network to transmit (or distribute) active energy.

life of the existing asset. Replacement investment is needed to maintain reliability of supply.

- **Security/Compliance** – a number of projects are undertaken to ensure compliance with amendments to various technical, safety or environmental legislation. In addition, expenditure is required to ensure the physical security (as opposed to network security) of Powerlink's assets which are regarded as critical infrastructure. Powerlink applies the "ENA Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure" to prevent unauthorised access to its assets.
- **Other** – all other projects associated with the network which provides prescribed transmission services such as communications systems enhancements or improvements to switching functionality.

6.3.2 Non-network investments

Non-network capital expenditure relates to business information technology projects and "support the business" projects (such as motor vehicles, tools and commercial buildings).

6.4 Assets under construction

The AER's adoption of the ex ante framework has also resulted in its decision to invoke a change to the regulatory accounting arrangements[36]. The AER has prescribed that a requirement for capital investment allowances during the next regulatory period be accounted for on an "as incurred" basis. During the present regulatory period[37] Powerlink has used an "as commissioned" approach to regulatory accounting, as specified in the DRP.

As a result of this change in regulatory accounting, assets under construction as at 1 July 2007 need to be rolled into the Regulatory Asset Base (see Chapter 4). In addition, the expected yet-to-be incurred expenditure on projects which are still under construction at the end of the current regulatory period (30 June 2007) needs to be included in the capital expenditure allowances for the next regulatory period.

This estimated yet-to-be incurred capital expenditure for assets under construction as at 1 July 2007 has been collected from the Powerlink enterprise financial system

[36] AER draft Regulatory Position Paper on Accounting Methodology dated September 2005.

[37] From 1 January 2002 until 30 June 2007.

(SAP). This forecast expenditure is included in the ex ante capex forecast, as shown in Table 6.2.

Table 6.2: Forecast capital expenditure on assets under construction

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	273.91	74.91	0.09	N/A	N/A

6.5 Network investments

6.5.1 The process

To forecast future capital expenditure, Powerlink has estimated the cost of what is expected to be required for future transmission development which increases capacity to supply forecast load and replaces aged/obsolete plant and equipment, including plant whose service rating is, or will be, exceeded.

The network development plans which support this Proposal relate only to regulated assets and services.

The significant inputs into the network planning process within Queensland are:

- o The forecast of customer electricity demand (including demand side management) and its location;
- o Location, capacity and expected operation of generation;
- o Planning criteria for the network and adequacy;
- o Prediction of future loadings on the transmission network; and
- o The assessment of future network capability and adequacy.

Considerable uncertainty exists with respect to generation developments that will emerge to meet forecast load growth in the National Electricity Market (NEM). The capacity, plant type and location of future generation plant depends on many economic and environmental factors. To deal with this, and other uncertainties, Powerlink has again developed its required capital expenditure forecast using a probabilistic approach. This approach was adopted for Powerlink's 2001 Revenue Reset Application.

A probabilistic approach requires the development of a number of plausible generation and load development scenarios for the Queensland region (see Section 6.5.2.2). Each one of these plausible scenarios is analysed using a combination of wholesale market modelling and transmission network analysis techniques. The capital expenditure required for Powerlink to meet its obligations and standards is identified for each scenario. The opportunities to utilise grid support to economically defer network investment is taken into account in identifying network development plans.

Powerlink also plans the network developments which are not directly caused by demand growth. Replacements are the major component of non-load driven investments. Asset age is a trigger assessing the condition of an asset or other analysis that then determines whether the asset requires replacement due to issues with capacity, capability or compliance. Additions to the network for security, compliance or for effective operation of the transmission network such as additions to the operational telecommunications network.

6.5.2 Load driven investments

As the sole holder of a Transmission Authority for coastal Queensland, Powerlink has mandated reliability obligations. Powerlink must comply with the requirements of Schedule 5.1 of the National Electricity Rules (NER) and its Transmission Authority under the Queensland Electricity Act. These mandated reliability of supply obligations mean non-discretionary investment in grid augmentations as the load grows.

6.5.2.1 Load forecast

The demand forecasts assumed for the scenarios used to forecast capital expenditure for this Proposal are consistent with the 10-year demand and energy forecasts published in Powerlink's Annual Planning Report 2005.

In accordance with the NER, Powerlink obtained these demand and energy forecasts over a 10-year horizon from Queensland DNSPs, and from directly connected customers, at each connection point in its transmission network. These individual connection point forecasts were aggregated into estimated demand forecasts for the total Queensland region and for ten geographical zones.

Powerlink also used National Institute of Economic and Industrial Research (NIEIR) economic outlook forecasts to enable an independent check on the energy and demand forecasts in Queensland and these were found to be consistent.

National Electricity Market Management Company (NEMMCO) also engaged NIEIR to provide an updated independent assessment of the economic outlook for all regions of the NEM in April 2005, including high and low growth scenarios and embedded generation levels. These reports contained no significant changes to the Queensland economic outlook previously provided. Accordingly the forecasts used for this Proposal are consistent with the Queensland forecasts in NEMMCO's 2005 Statement of Opportunities (SOO).

Electricity usage in Queensland has grown strongly during the past ten years, and this trend is expected to continue. The summer maximum demand has grown significantly over the past five years with a statewide growth of 31%, including a record growth of 29% in South East Queensland over the last three years.

Summer maximum demand (temperature corrected) delivered from the transmission grid is forecast to increase at an average annual rate of 4% p.a. from 7424MW in 2004/05 to 10959MW in 2014/15. However, this 10-year average masks the accelerated summer demand increase forecast for the near future. This accelerated demand growth is attributable to the expected continuing rapid increase in penetration and usage of domestic air conditioners and strong population growth, which have been evidenced in recent years, particularly in South East Queensland.

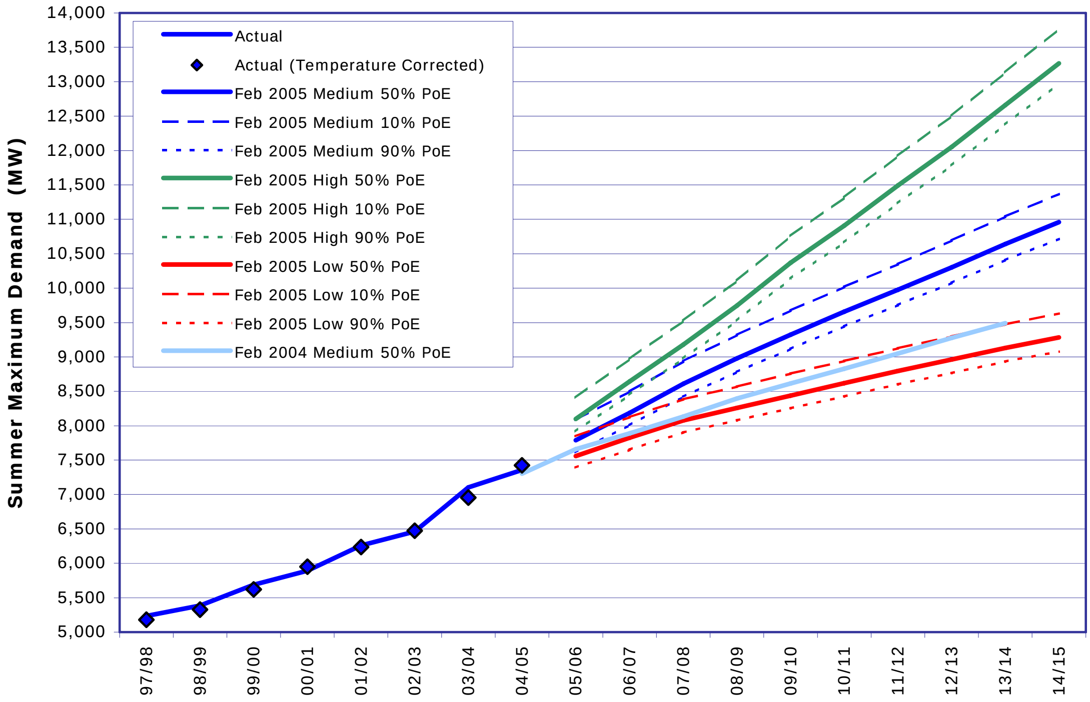
Penetration rates of air conditioners in Queensland have increased from around 18% in 1994 to an estimated 55% of households now having some form of air-conditioning. The QCA notes that saturation levels have not yet been reached when considering revenues for Queensland distribution businesses.

> *"However, despite this growth, penetration rates in Queensland are still considerably less than in other parts of Australia, and parts of the US with similar climatic conditions. In the surveyed climatic category most closely aligned to the Brisbane region, 64 per cent of households had air conditioning, which suggests room for further growth in air conditioning penetration. It is estimated that the saturation level of air conditioning in Brisbane may be around 70 per cent, while in the hotter parts of Queensland it may approach 95 per cent."*[38]

Also contributing to this strong growth is some new small industrial loads and a boom in the expansion and development of coal mines and supporting infrastructure such as rail, ports and townships. This strong growth is expected to continue.

[38] Queensland Competition Authority – Final Determination Regulation of Electricity Distribution April 2005

Figure 6.1: 2005 State Summer Peak Demand Forecast



The forecast high level of load growth will require substantial additions to the capability of the Queensland transmission network to ensure grid capacity keeps pace with demand.

The Queensland Competition Authority (QCA) acknowledged this same impact of strong load growth on the required level of network investment in its revenue determination for the distribution networks (Energex and Ergon Energy) in April 2005. Energex is forecast to spend at least $2.71 billion on capital. If needed, the regulator has provided flexibility for this amount to increase during the regulatory period to $3.43 billion. Ergon Energy is forecast to spend $2.77 billion on its general network and has a further $400 million available to meet the needs of certain large customer-related projects. In addition, Ergon Energy's general capex requirement could be increased by a further $47 million during the period, depending on the circumstances, taking its total capital expenditure to a possible $3.22 billion. To put this into perspective, these forecast capital expenditures represent about 80% of the RAB of these networks which are exposed to exactly the same drivers as Powerlink.

6.5.2.2 Generation scenarios

Powerlink engaged consultants, ROAM Consulting, to conduct wholesale market modelling to identify plausible generation patterns for the Queensland region over the next 10 years.

The manner in which generation developments will actually unfold over the coming decade is a matter of considerable uncertainty. For instance, Powerlink is presently dealing with the proponents of a total of more than 5000MW of new generation capacity, in a region where the total annual demand growth is closer to 400MW per annum. There are a practically unlimited number of different plausible scenarios reflecting different permutations (size, location) of generation development. To encompass this diversity, ROAM Consulting identified themes that are considered plausible in the coming period. These themes are listed in Table 6.3.

From these themes, ROAM Consulting developed a total of 40 plausible scenarios and the relative probability of occurrence of each scenario. These 40 scenarios cover a wide range of development possibilities, as well as possible retirements of older plant. The scenarios also consider the placement of generation which assists the transmission system. Examples of these are possible new generators in North and South East Queensland.

The actual outcome may (and probably will) differ from all of the scenarios with respect to the final size, timing and constitution of the projects. However the range of scenarios provided in this assessment should provide a broad enough range of possibilities such that the scenario that actually evolves fits within the envelope of the plausible scenarios.

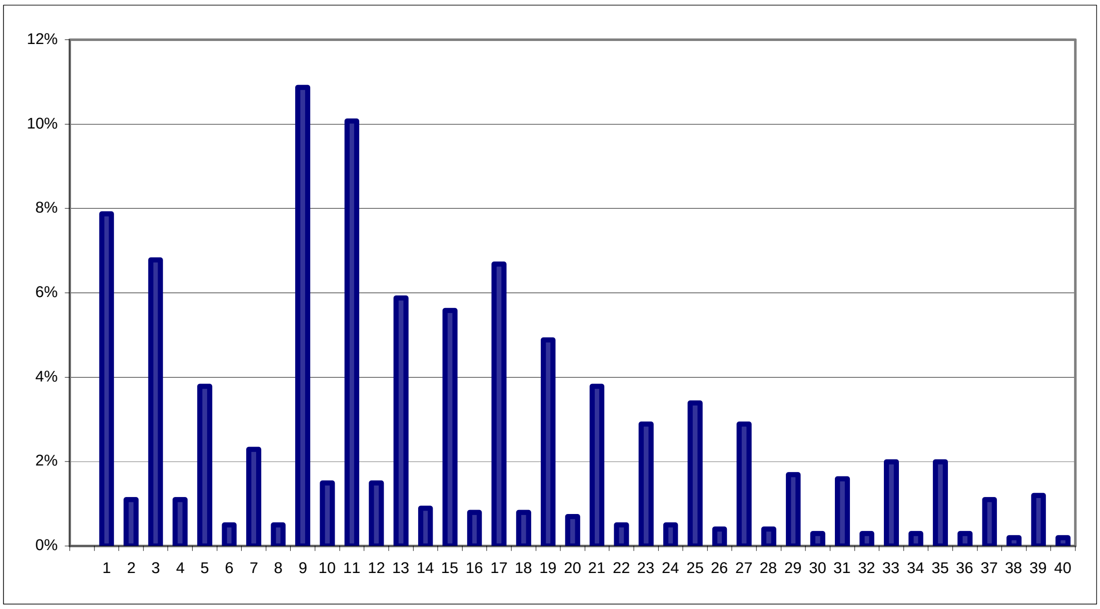
Table 6.3: Probabilistic scenario themes

Possible Outcome	Notes
Inter-Regional Trade	
Power transfer capability remains at current levels	Existing policy settings for the level of interconnection remain.
Power transfer capability exceeds current levels	Change in policy settings to increase the level of interconnection, manifested by a 500MW upgrade of the Qld – NSW interconnector by 2010/11.
Load Growth	
Low load growth	As in the Powerlink Annual Planning Report 2005
Medium load growth	As in the Powerlink Annual Planning Report 2005
Accelerated Medium load growth	Continued rapid penetration of new and upgrading of existing air conditioning plant
Medium load growth with added new industrial load in CQ	Included in this scenario is an additional 1000MW located in central Queensland (Aluminium Smelter and/or refinery) with staged timing: 500MW in 2009/10; 500MW in 2010/11
High load growth	As in the Powerlink Annual Planning Report 2005
Generation from Gas	
No generation supplied from PNG gas pipeline in the regulatory period	Demand for new plant utilising gas supplies will be very limited
Generation from PNG gas pipeline in the regulatory period	Development of associated generation projects in Queensland following the development of PNG gas pipeline in 2010
Greenhouse Options	
No Greenhouse CO_2 Tax or similar	Continuation of existing government policy with no specific incentives provided to push the market to implement new technologies before they are commercially viable (or to favour gas-fired options as an interim step).
Greenhouse CO2 Tax or similar	Some form of carbon tax or emissions price aimed at incentivising the development of new low (or zero) emissions technology, and accelerating the closure of existing (higher emissions) plant.

There are 40 (2 x 5 x 2 x 2) combinations which arise from these theme sets.

Figure 6.2 shows the probabilities of the 40 scenarios as estimated by ROAM Consulting. It is notable in this graph that no scenario has a probability of greater than 10.9%, highlighting the significant uncertainty.

Figure 6.2: Scenario probabilities assessed by ROAM consulting



6.5.2.3 Augmentations

Augmentations are defined under the National Electricity Rules (NER)[39] and include those projects to which the Regulatory Test promulgated by the AER applies. These projects are typically the largest part of the total capital investment plan, and include the largest individual projects within the plan. Typically these will be large additions to the main shared grid, and could include new line constructions and major substation establishments.

Due to the change from "ex post" to "ex ante" capital expenditure allowance under the SRP, Powerlink has, in formulating this Proposal, undertaken significantly more detailed analysis than previously to identify the projects which would be necessary to meet our reliability of supply obligations. For each scenario, proven transmission planning techniques were used to identify the set of projects needed to ensure compliance with the NER, Powerlink's Transmission Authority and other obligations. Detailed power system analysis was performed to identify the optimal transmission

[39] Augmentations are defined as works to enlarge a network or to increase the capability of a network to transmit (or distribute) active energy.

development plan for each scenario. This included full AC power flow analysis to determine the required power transfer over the main "grid sections" of the Powerlink transmission network to meet statutory obligations. These transfer levels were compared with the capability of the network to determine the required transmission augmentations. Thermal, voltage stability and transient stability limits of the network were all considered. This detailed analysis was performed to give the necessary high degree of confidence required under the ex-ante capex framework.

To identify required augmentations or connections at a zonal level[40], joint planning was performed with the relevant DNSP. Joint planning identified limitations within both the DNSP's network and on Powerlink's sub-transmission network and determined the optimal solution to address these limitations. To the extent that the optimal solution included augmentations to the Powerlink network, the capital cost estimate for that was included.

It should be noted that there is a 2 to 4 year lead time in transmission augmentation projects. Consequently, for augmentations required both within the zones and on the main transmission system, the capex forecasts have been developed out to 2015/16 to ensure that all capex costs likely to be incurred within the next regulatory period were identified.

A plan of augmentations to the shared transmission network has been developed for each of the 40 scenarios and in coordination with the other parts of the network development plan (eg. replacement projects). In all scenarios, the availability of grid support to economically defer network investments has been taken into account in developing the plan for augmentations. Where appropriate, the cost of grid support has been included in the forecasts outlined in Chapter 7, and the network deferral has been taken into account in the capital expenditure forecast.

Table 6.4 and Figure 6.3 show the historic[41] and forecast capex for augmentations. The forecasts for the coming regulatory period are the probability weighted average across the 40 scenarios. The total augmentation capex forecast over the next regulatory period is $1,222.71 million ($06/07).

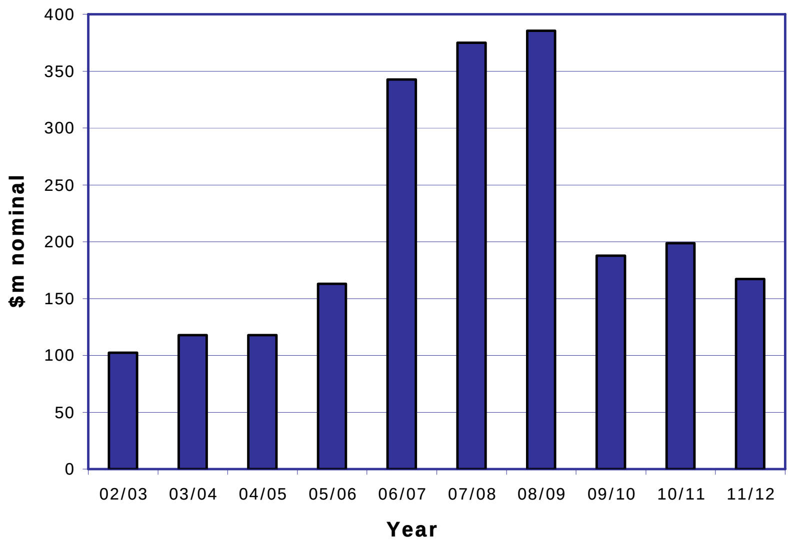
[40] With 10 geographical zones used for planning and analysis purposes.

[41] Historic capex is used not capitalisations which were reported in Chapter 3.

Table 6.4: Historic and forecast capital expenditure for Augmentations

$m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	102.41	117.97	117.79	162.89	342.64	374.86	385.64	187.86	198.74	167.08

Figure 6.3: Historic and forecast capital expenditure for Augmentations



6.5.2.4 Connections

This category includes projects for additional connection point capability between Powerlink and the DNSPs. These projects are identified through joint planning with the relevant DNSP, which achieves the optimal outcomes for customers, irrespective of ownership boundaries. Powerlink and DNSPs conduct annual strategic planning workshops, as well as regular joint planning investigations to address specific needs as they arise.

Powerlink's transmission plans and capex forecasts do not include any future connection investments that are categorised as non-regulated, such as connection assets for new generators or opportunistic loads.

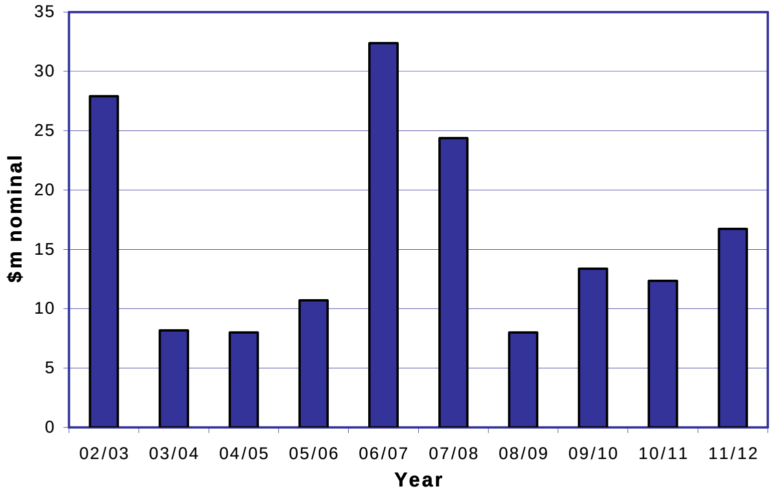
Table 6.5 and Figure 6.4 show the historic[42] and forecast capex for connections. The forecasts are the probability weighted average across the 40 scenarios. The total connections capex forecast over the next regulatory period is $69.03 million ($06/07).

[42] Historic capex is used, not capitalisations which were reported in Chapter 3.

Table 6.5: Historic and forecast capital expenditure for Connections

$m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	27.90	8.18	8.49	11.19	32.38	24.39	8.00	13.37	12.35	16.72

Figure 6.4: Historic and forecast capital expenditure for Connections



6.5.2.5 Easements and land

An electricity easement is a right to construct, operate and maintain a power line. It does not involve ownership of the land under the line. Easements are required to facilitate projected expansion and reinforcement of the transmission network. Land is acquired where appropriate, usually for construction of substations or communications sites, where the nature of the development means that the land cannot coincidentally be used for other purposes.

Increasing legal and forward planning obligations have placed greater emphasis on obtaining easements and land well in advance of the need to accommodate electricity infrastructure. The time taken to acquire an easement is typically two – three years, but can be much longer depending on the route and geographic area.

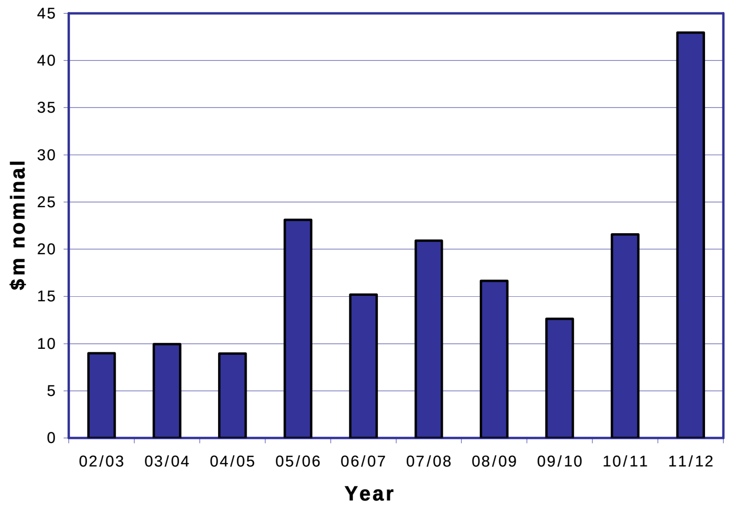
Powerlink has an obligation of disclosure to government and local councils of any substantial future transmission developments under the South East Queensland Infrastructure Plan. This plan establishes significant infrastructure within a 20-year planning horizon in order to achieve the most efficient use of land, infrastructure and services within the period. The identification and acquisition of strategic easements supports these processes, reflecting best planning practices by providing land use certainty for the whole community.

Table 6.6 and Figure 6.5 show the historic[43] and forecast capex for easements and land. The forecasts are the probability weighted average across the 40 scenarios. The total easements and land capex forecast over the next regulatory period is $104.07 million ($06/07).

Table 6.6: Historic and forecast capital expenditure for Easements

$m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	8.99	9.97	8.95	23.10	15.21	20.90	16.63	12.63	21.58	42.96

Figure 6.5: Historic and forecast capital expenditure for Easements



6.5.3 Non-load driven investments

Non-load driven network projects are predominantly associated with the replacement of assets to maintain the capacity or capability of the transmission network, to ensure security of the network infrastructure, or compliance with legislation and statutes. Unlike load-driven projects, investment decisions in this environment are taken against risk management frameworks, to optimise the timing and type of replacement against the risks of the aged asset remaining in service.

6.5.3.1 Replacements

The drivers for asset replacement evolve from a number of factors, which can be broadly summarised as Powerlink's statutory and Rules obligations, Australian Standards, industry standards and Powerlink's approved strategies. Specific triggers related to asset replacement are age, capacity, capability and compliance. All these factors can impact on the reliability of supply to our customers if performance standards cannot be maintained. In the first instance, the age of an asset is used as

[43] Historic capex is used not capitalisations which were reported in Chapter 3.

a trigger for performing a condition assessment or other analysis, which then determines whether the asset requires replacement.

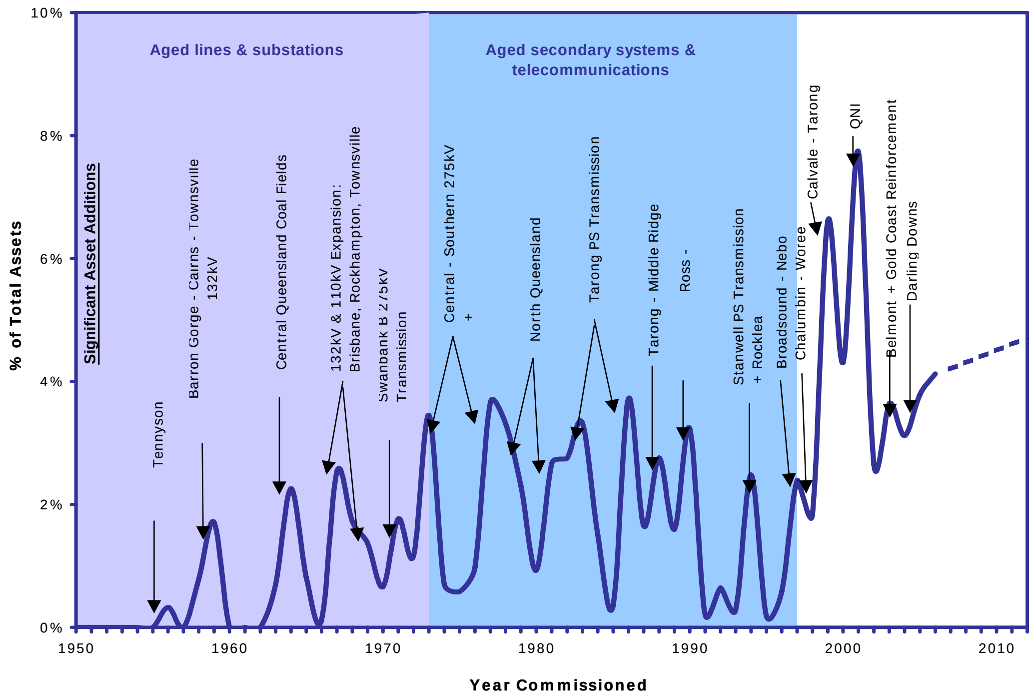
Powerlink uses a risk assessment framework to determine the priority of asset replacement projects. This framework is in line with AS/NZS 4360:2004 Risk Management. Each potential replacement project is evaluated for risk against the parameters of likelihood and consequence, brought together under a risk matrix arrangement. Safety and reliability consequences are particularly relevant when assessing project priorities as electrical safety is of paramount importance and reliability needs to be maintained to avoid loss of supply incidents. The resultant risk level is then used to determine a priority for each project.

Powerlink's network development plans include coordination of the asset replacement requirements with the broader capital works program (which is primarily driven by load growth). In this way, Powerlink makes the most of opportunities to coordinate a range of synergistic projects (through work type, geographical location or timing) to achieve economies of scale and optimised delivery.

Figure 6.6 shows the age profile of the Powerlink network. By the end of the next regulatory period (30 June 2012), significant levels of network assets will be at or beyond the end of their economic life. Transmission lines normally have an economic life of 50 years[44], substation plant and transformers 40 years, secondary systems and telecommunications have 15 years. Figure 6.6 also shows the range of assets which would be older than their economic life at the end of Powerlink's next regulatory period.

[44] In a non-hostile environment.

Figure 6.6: Assets facing replacement in the coming regulatory period



Age alone is not a reason for replacement of assets, but is a trigger to assess the condition and serviceability of the assets in providing transmission services. As can be seen from Figure 6.6, significant investments made 40 – 50 years ago are now reaching end of life and signal the start of a wave of replacements. Secondary systems equipment has a much shorter physical and economic life, particularly solid state equipment commissioned during the 1980s.

The transmission lines in North Queensland whose conditions had already been assessed as requiring replacement in the coming period have suffered damage in the March 20 severe Cyclone Larry.

Powerlink has forecast asset replacement (including life extension if appropriate) over the regulatory period based on the age of the assets, condition assessments and the prioritisation through risk assessments.

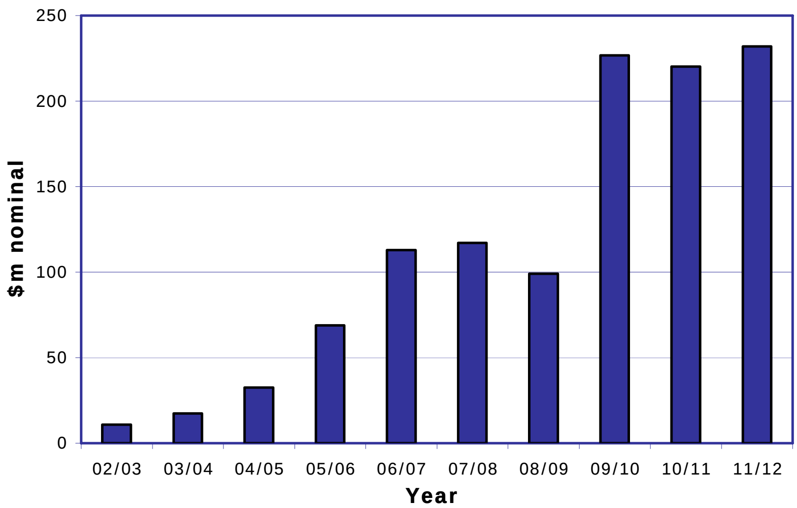
Table 6.7 and Figure 6.7 show the historic[45] and forecast capex for replacements. The total replacement capex forecast over the next regulatory period is $812.80 million ($06/07).

[45] Historic capex is used not capitalisations which were reported in Chapter 3.

Table 6.7: Historic and forecast capital expenditure for Replacements

$m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	10.96	17.49	32.59	68.90	112.95	117.03	99.11	226.76	220.26	232.05

Figure 6.7: Historic and forecast capital expenditure for Replacements



6.5.3.2 Security/Compliance and other non-load driven investments

Electricity transmission infrastructure is considered to be critical infrastructure and therefore needs to comply with the "National Guidelines for Protecting Critical Infrastructure from Terrorism". Powerlink has identified a program of investment to satisfy the obligations outlined in these guidelines. Powerlink has a commitment to the safety of the public, Powerlink staff, protection of the Powerlink network and ensuring business continuity. Specific details of the arrangements Powerlink is implementing cannot be disclosed in this Proposal for security reasons, however it should be noted that Powerlink's transmission network covers a large and diverse geographic area and significant expenditure is forecast as a result.

Powerlink also applies the "ENA Guidelines for Prevention of Unauthorised Access to Electricity Infrastructure" aimed at preventing access to unmanned electrical infrastructures by determined unauthorised persons and the general public.

An ongoing program of work is required to ensure compliance with Australian Standards, the National Electricity Rules and other relevant instruments. Powerlink is committed to complying with all of its legal and statutory obligations and therefore considers the implications and risk of non-compliance in planning investments to satisfy obligations. In considering those obligations, some standards must be complied with to maintain power system security within the National Electricity Market. In particular, the NEMMCO Power System Data Communications Standard

(COMMDC), control system standards and protection system standards must be satisfied.

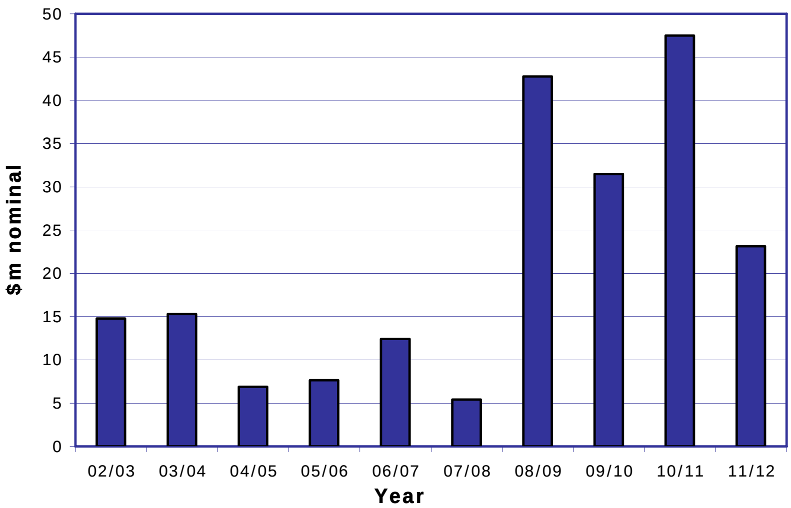
Powerlink's assets include a telecommunications network used for protection signalling, supervisory control and data acquisition (SCADA) and remote monitoring. This telecommunications network needs to be upgraded over time due to expansion of the network, changes in available frequency bands and technology.

Table 6.8 and Figure 6.8 show the historic[46] and forecast capex for security/compliance and other non-load driven investments. The total capex forecast for security/compliance and other non-load driven investments over the next regulatory period is $136.91 million ($06/07).

Table 6.8: Historic and forecast capital expenditure for Security/Compliance and Other Non-Load Investments

$m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	14.78	15.32	6.90	7.65	12.40	5.42	42.76	31.48	47.47	23.14

Figure 6.8: Historic and forecast capital expenditure for Security/Compliance and Other Non-Load Investments



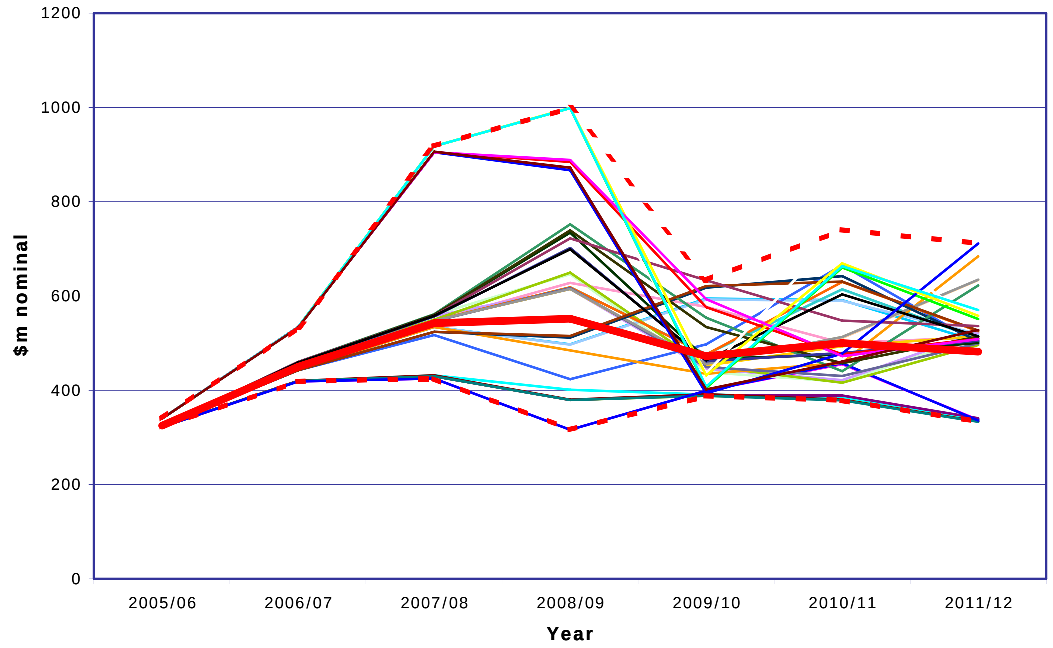
6.5.4 Network development plans

The 40 input scenarios have resulted in 40 network development plans. Some projects identified are common to all scenarios. These network development plans do not include any non-regulated network investments (eg. new generator connections) which Powerlink may undertake in the future.

46 Historic capex is used not capitalisations which were reported in Chapter 3.

Figure 6.9 shows the annual regulated capex profile which results from each of the 40 scenarios including non-load driven requirements. The red dotted traces shows the envelope of expenditure while the solid red trace shows the expected capex requirement (being the probability weighted average of the 40 scenarios). The probability that is attributed to each network development plan is that of the input scenario from which it was derived.

Figure 6.9: Network Capital Expenditure Profile



The following table lists the numerical values of the expected network capex forecast.

Table 6.9: Network capital expenditure forecast

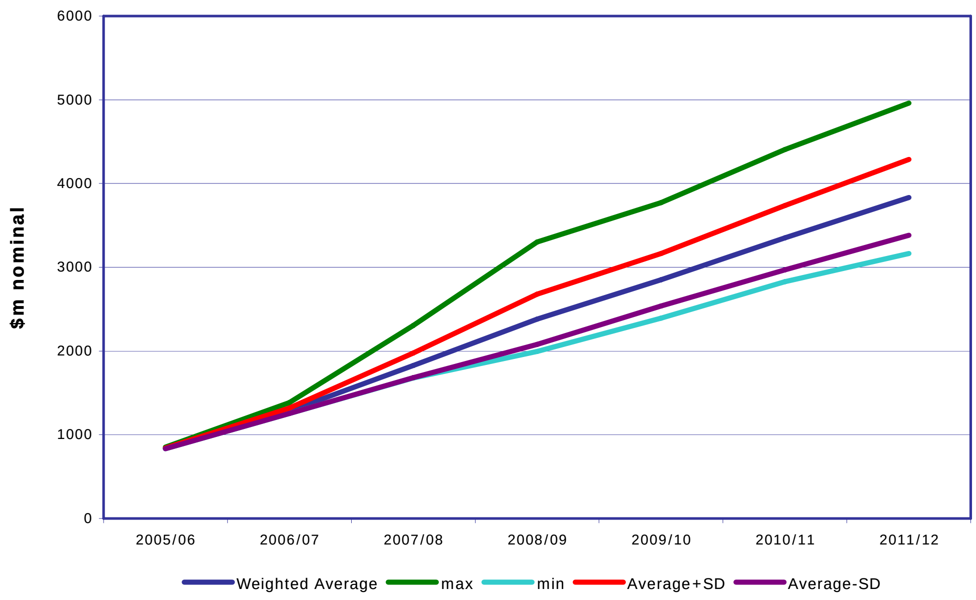
$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Network Capex	527.25	521.36	433.18	446.16	417.57

The annual average for the 5-year period 2007/08 to 2011/12 is $469.10 million.

The same information can be viewed in a cumulative expenditure profile, as shown in Figure 6.10. A cumulative presentation of expenditure tends to dampen the timing differences of annualised expenditures. This cumulative approach therefore allows confidence levels of expenditure to be more readily illustrated.

The weighted average capital expenditure profile is not equidistant between the maximum and minimum spend profiles. This is a direct result of asymmetry of higher/lower expenditure due to higher/lower demand growth and the probabilities assigned to the scenarios. The consequences of conditions eventuating during the next regulatory period (eg. higher economic load growth) that require greater than the weighted average expenditure are significant.

Figure 6.10: Cumulative Network Capital Expenditure Profile



6.6 Non-network investments

6.6.1 Business IT

Powerlink implements and manages all digital technology consistently so as to promote standardisation and avoid duplication, and to enable the integration of information across the whole business. This is achieved through the use of the same organisational structure, strategies, standards and processes for managing all digital technology.

Business IT planning is structured into two key process areas: IT projects and IT replacements. IT projects are further separated into infrastructure and applications, while replacements encompass cyclical upgrades and replacements.

In response to these drivers, Powerlink has identified strategies that address:

o *Power System Management and Operation* – to improve IT applications support for processes, such as forecasting power system performance, outage management and incident management, driven by the need for more alignment of network operation with the market.

- *Power System Master Data Management* – to ensure network plant data is consistent throughout the end-to-end network delivery process with a minimum of duplication and re-work.
- *Power System Measurement Data – Capture and Analysis* – to ensure that appropriate data is recorded from the operation, maintenance and monitoring of the transmission network and made accessible for subsequent analysis and decision support. This includes data from the management of transmission land corridors.
- *Information and Knowledge Access* – to support effective acquisition and exploitation of corporate information and knowledge, and compliance with record keeping obligations.
- *Application Support for Business Processes* – to improve IT applications support for business processes in order to enable best practice.

An increase in business IT spending is evident in the later years of the current period and going forward. This is required to accommodate the need for large amounts of information and data to be provided about the transmission network, virtually in real time, to allow effective decision making. This information, and its interaction with the electricity market, is required to be provided to network operators and decision makers, so as to allow such interaction to be taken into account in operating the transmission network. In addition to large amounts of data, the data needs to be provided in a timely manner, 24 hours a day, 365 days a year, so that decisions can be made on the basis of what is actually occurring on the transmission network and its actual interaction with the electricity market. These requirements drive increased business IT expenditure.

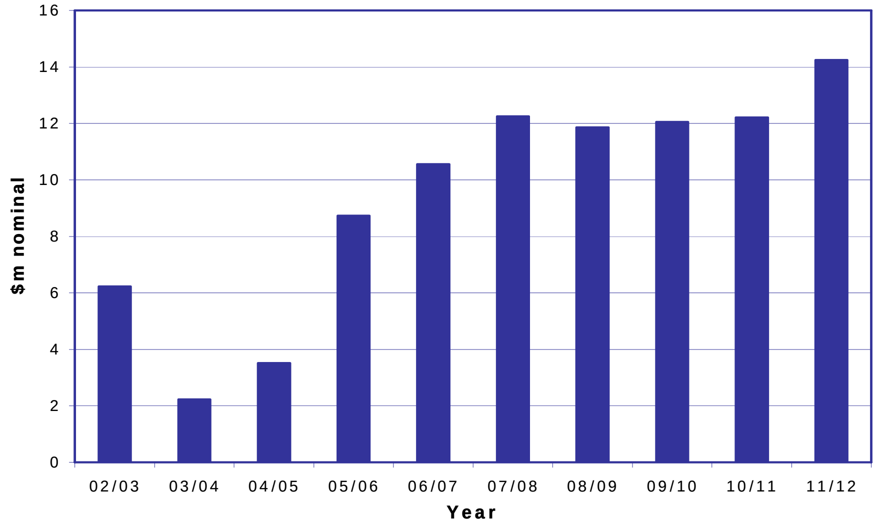
Table 6.10 and Figure 6.11 show the historic[47] and forecast capex for Business IT capital expenditure. The total capex forecast for business IT investments over the next regulatory period is $57.38 million ($06/07)

[47] Historic capex is used not capitalisations which were reported in Chapter 3.

Table 6.10: Historic and forecast capital expenditure for Business IT

$m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Capex	6.23	2.23	3.52	8.73	10.56	12.25	11.86	12.05	12.21	14.24

Figure 6.11: Historic and forecast capital expenditure for Business IT



6.6.2 Support the Business

Support the Business capex can be categorised under three typical sub-categories:

- o Buildings, miscellaneous assets & office equipment;
- o Motor vehicles & mobile plant; and
- o Other.

6.6.2.1 Buildings

Powerlink relocated office premises to a lower cost non-CBD location prior to the start of this regulatory period. Powerlink continues to take advantage of its lower cost location as expansion of office accommodation is required due to the increasing size of the business.

Future storage requirements have also been considered in the context of the substantial increase in the capital investment program and changes to work practices. Warehousing and storage requirements for project and maintenance work will increase to the extent that additional facilities are now required.

6.6.2.2 Motor vehicles & mobile plant

Powerlink's geographically dispersed network requires motor vehicles and mobile plant to support its capital program as well as its ongoing maintenance activities. The increasing capital program inherently impacts on the vehicles required to support the program. Similarly, as Powerlink's asset base grows, so too does the maintenance requirement which, in turn, increases the vehicle requirement.

Specially equipped vehicles are often needed to meet Powerlink's physical operating environment and the types of assets to be worked on, such as those needed for live substation and live line activities. There is an ongoing need for these additional special vehicles, such as elevated working platforms to manage "working at heights" issues.

6.6.2.3 Other tools, equipment & miscellaneous assets

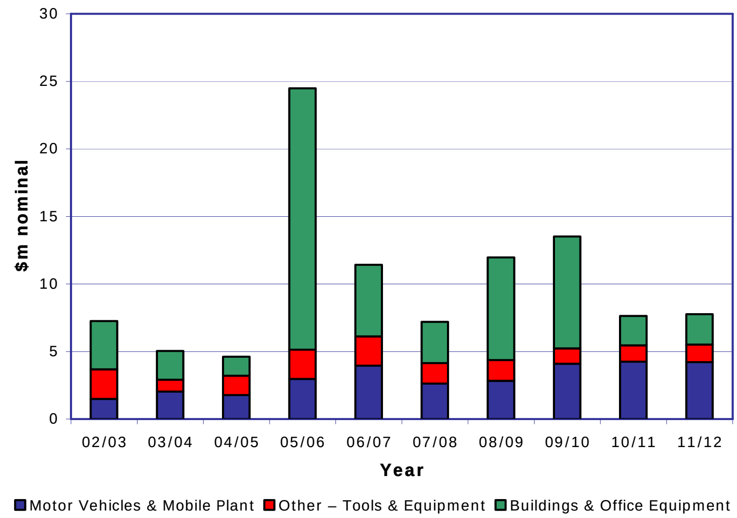
Tools & equipment make up the significant portion of other non-network capital expenditure.

Table 6.11 and Figure 6.12 show the historic[48] and forecast capex for Support the Business capital expenditure. The total capex forecast for Support the Business investments over the next regulatory period is $46.34 million ($06/07).

Table 6.11: Historic and forecast capital expenditure for Support the Business

STB Capex Forecasts $m nominal	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12
Motor Vehicles & Mobile Plant	1.49	2.03	1.78	2.98	4.06	2.77	3.09	4.60	4.90	4.99
Buildings & Office Equipment	1.96	2.46	1.68	20.55	5.30	3.07	6.47	7.22	4.49	2.25
Other – Tools & Equipment	1.81	0.56	1.16	2.25	2.18	1.52	1.52	1.12	1.21	1.32
Total STB Capex	**5.26**	**5.05**	**4.62**	**25.78**	**11.54**	**7.36**	**11.07**	**12.94**	**10.59**	**8.56**

Figure 6.12: Historic and forecast capital expenditure for Support the Business.



[48] Historic capex is used not capitalisations which were reported in Chapter 3.

6.7 Cost estimation for capital projects

Project costing is a very important component of any capital expenditure forecast. The nature of investment by electricity businesses involves multiple projects over varied geography and timeframes. This, coupled with increasing input costs, makes project costing challenging. A BHP Billiton executive, in explaining major cost blowouts in September 2005, said[49]:

> *"We firmly believe that this is a step change, and these increased costs will continue for some time."*

One of Powerlink's major equipment suppliers has advised that electrical equipment prices are forecast to increase by between 1 and 10% per annum for the foreseeable future, due to increases in input costs. These higher project costs are already being experienced first hand by Powerlink.

Due to the change from the "ex post" to "ex ante" capital expenditure framework under the SRP, Powerlink has undertaken a more comprehensive cost estimation process for the capital projects identified in all scenarios. However, even these estimates are exposed to ongoing input cost increases.

The level of commitment of each project identified is an input into the level of detail which has been applied in assessing the scope and cost estimate for a project:

- *Committed projects* – The estimated expenditure on committed projects has been forecast in detail based on known cost elements at the time of this Proposal. Projects in this category will normally have expenditure spanning both the current and the coming regulatory period.
- *Projects nearing commitment* - As projects near approval, a detailed estimate of project costs is prepared based on the known scope. Projects in this category will normally have expenditure spanning both the current and the coming regulatory period.
- *Uncommitted projects* - These are projects which are included in the scenario development plans, but are not yet in the detailed planning phase immediately prior to approval. There are a large number of these projects which have been costed on the basis of desktop investigations and typical costs of the major construction elements.

[49] The Australian, 27 September 2005.

A number of significant external factors are driving up construction input costs and consequently increasing the cost of capital projects included in this Proposal. These matters are outside the control of Powerlink and include rising labour costs, labour shortages, increases in commodity prices used in the provision of electricity transmission infrastructure (aluminium, steel, zinc, etc), increasing contractor margins due to a change from a buyers market to a sellers market, and changes to legislation imposing higher requirements on the business. Powerlink has sought to take these matters into account in preparing the cost estimates for individual projects and in accumulating those projects in the scenario network development plans into a single capital expenditure forecast.

A further cost driver is the need to allow for the higher costs of undergrounding some sections of new transmission lines to enable these developments to achieve Ministerial designation and approval under the Integrated Planning Act. Community expectations on this matter are expected to continue to rise. The area designated as "urban footprint" in the SEQ Regional Plan is likely to give rise to most of the sections forecast to require undergrounding.

The long duration of Powerlink's capital works projects, combined with their exposure to outside influences, means that at any point up until all costs have been expended, the forecast cost at completion will be a range, rather than a single number. This uncertainty in the final cost of a project is directly related to the risk profile of that project. In practice it is more likely that an individual project will cost 20% more rather than 20% less than the initial estimate. In statistical terms, the future cost of a project is stochastic in nature, not deterministic. Powerlink has applied a risk profile to each project which recognises the inherent uncertainty involved with accurately estimating project completion costs.

Powerlink's future capital works program is made up of about 400 individual projects. A portfolio of projects like this will have a combined level of risk which is less than the arithmetic sums of the risk of each of the component projects. The impact of the portfolio effect on capital expenditure over the next regulatory period has been calculated by Monte Carlo simulation techniques. By conducting repeated random samples of each project, and adding these samples together, the expected risk distribution of the final capital works cost has been established and included in the capital expenditure forecasts.

6.8 Deliverability of the increased capital program

Powerlink recognises that the required capex program for the next regulatory period ($2.4 billion) is a material increase on its current program for the current period ($1.5 billion). Initiatives have already been implemented to ensure the deliverability of the program.

6.8.1 Putting the increase into perspective

It should be recognised that whilst the program is 60% larger in dollar terms, a significant proportion of this is attributable to higher unit input costs. Therefore the work increase in physical terms is much less.

In addition, the capex program in the current period contains above average spends and work volumes in the later years (2005/06 and 2006/07), such that the step up to the next regulatory period is less significant. Capex expenditure in 2005/06 will exceed $300 million, with about $500 million in 2006/07, compared with an average per annum capex in the next regulatory period of just under $500 million. Powerlink is on track for a 60% increase in capex in 2005/06 in dollar terms, which is less than that in physical work terms. A similar increase is in train for 2006/07 to achieve the forecast expenditure.

Powerlink uses large, established contractors to undertake its network construction work for this capex program. Internal resources are used for engineering design and for project management.

6.8.2 Key project delivery initiatives

Powerlink has already implemented, or commenced implementation of, a range of initiatives to ensure that the increased physical work volume can be delivered.

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 more of the engineering design work), and commissioning resources.

Standardisation also has significant beneficial impacts on 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 the 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 Powerlink to optimise the deployment of its program/project management resources.

Supply chain management

The combination of design standardisation and the program management approach enables Powerlink to procure materials and equipment via long term, high volume contracts. This enables long lead-time materials and equipment to be ordered well in advance, and delivered in good time for when they are needed.

Powerlink has also leveraged its leading participation in the Asia Pacific Utilities Group (which comprises the major utilities in the region, and involves procurement co-operation and information sharing) to identify new, credible sources for materials and equipment.

Streamlined easement acquisition

Many of the new transmission lines will be built on previously acquired strategic easements. Each transmission line development on these easements still requires planning approval – however, the Queensland Integrated Planning Act provides a streamlined process in which the Minister can designate the development as "community infrastructure". This process obviates the need for other, potentially more time-consuming planning approvals (eg. by local governments).

Powerlink has worked with the government to establish an efficient process for these Ministerial designations.

Where new easements need to be acquired, Powerlink has set up a dedicated and well-resourced team to identify and acquire easements. Again, the streamlined Ministerial designation process is applied to minimise planning approval timeframes.

Increased outsourcing

Historically, Powerlink has undertaken the engineering design work internally. The design standardisation initiative has enabled material volumes of design work to be outsourced to engineering consultants. This has proven effective in meeting the increasing workload.

Powerlink has also established a model for the turnkey development of new substations. Initial contracts for these works have been awarded.

In both cases, the long term nature of the contracts provides the consultants/contractors with the certainty they need to invest in resources and training.

Increased internal staffing

Powerlink continues to increase its internal resources to enable delivery of the increased workload. The 2005 Enterprise Agreement has reduced the wage parity gap with southern States, and this has facilitated the recruitment and retention of resources.

The apprentice intake has increased, as have traineeships. Powerlink continues to recruit more graduates (engineers, environmental scientists, IT professionals, etc.) into its highly regarded graduate development program – applicants continue to be high quality and orders of magnitude larger than the available places.

More of the engineering workforce comes from overseas, in response to the attractive combination of technical challenge and lifestyle. Powerlink has implemented a staged retirement program, to enable several years of part-time employment prior to full retirement.

Finally, a reasonable level of overtime is used to ensure timely completion of work.

As a recent winner of Best Employer awards, Powerlink typically achieves a strong response to its recruitment activities, and is confident that it can continue to increase its internal resources as required.

Strengthened governance/management structures

Powerlink has recently made significant changes to its governance and management structures, aimed at streamlining processes and decision-making.

All activities associated with Network Services Delivery (planning, asset management, investment decisions, engineering, procurement, operations and maintenance) now report to a single senior executive, the Chief Operating Officer (COO). The COO has the mandate to streamline the network services delivery processes, and to develop initiatives (such as those outlined above) to ensure timely delivery of the program of work.

This new structure has significantly enhanced the organisational focus on network delivery.

6.9 Breakdown to asset classes for revenue calculation

In determining the MAR, capital expenditure is grouped into the following asset classes:

Table 6.12: Capital expenditure forecast by asset classes

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Transmission Lines (overhead – including wood poles)	230.05	269.24	182.61	197.58	107.14
Transmission Lines (underground)	11.24	18.26	26.73	13.13	66.98
Substations Primary Plant	198.48	158.59	145.43	98.56	93.95
Substations Secondary Systems	58.00	41.51	55.67	91.38	103.72
Communications – Civil Works	0.10	4.41	0.20	4.05	0.10
Communications – Other assets	8.65	13.40	10.95	22.21	8.45
Network Switching Centres	0.42	0.26	0.00	-	-
Land	0.26	0.26	0.26	0.26	0.26
Easements	20.31	15.70	11.59	19.24	37.22
Houses	-	-	-	-	-
Commercial Buildings	2.57	5.69	6.21	3.59	1.54
Computer Equipment	11.90	11.20	11.05	10.89	12.34
Office Furniture & Miscellaneous	0.15	0.15	0.15	0.15	0.15
Office Machines	-	-	-	-	-
Vehicles	2.69	2.92	4.22	4.37	4.32
Moveable Plant	1.48	1.43	1.03	1.08	1.14
Insurance Spares	-	-	-	-	-
Total	**546.31**	**543.02**	**456.10**	**466.49**	**437.32**

Note – Numbers may not add due to rounding.

6.10 Summary of ex ante capex allowance

Table 6.13 shows the total capital expenditure proposed to be included in the main ex ante capex allowance. This has been broken down into network and non-network capital expenditure.

Table 6.13: Main ex ante capital expenditure allowance

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Network	527.25	521.36	433.18	446.16	417.57	2,345.52
Non-network	19.05	21.65	22.92	20.33	19.76	103.72
Total	**546.31**	**543.02**	**456.10**	**466.49**	**437.32**	**2,449.24**

To put this capex requirement into perspective, the total of $2.4 billion, represents about 63% of Powerlink's RAB at the start of this coming regulatory period. To put this in perspective, the QCA has recently allowed the Queensland electricity distribution networks capex allowances of up to 80% of their RAB. Powerlink faces the same load growth drivers and is exposed to the same increasing input costs as those businesses.

6.11 Contingent projects

Contingent projects are those which are significant, likely to arise in the period, but not yet committed. Such projects are linked to unique investment drivers such as a major point load rather than to general investment drivers (such as expectations of load growth within a region).

Table 6.14 contains a list of projects, indicative costs and associated triggers that are proposed to be considered under the contingent projects allowance. Potential loads marked with an asterisk (*) are not included in the load forecasts applied in determining the ex-ante capex forecast.

Given that there is some regulatory uncertainty about the treatment of contingent projects, Powerlink has proposed a treatment (see Appendix A) which will optimise its ability to respond to customers' needs whilst providing regulatory certainty.

Table 6.14: Contingent projects and triggers

Project Name	Trigger	Indicative cost $m
QNI Upgrade - QLD Component	Passes the "net market benefits" limb of the Regulatory test	100 #
Supply to Queensland Rail for "Missing Link"	Additional supply points for new section of railway line *	70
Augmentation of supply to SEQ	Significant changes in generation pattern in SQ	50
Ebenezer 330/275/110kV Establishment	Mooted "point load" Industrial developments west of Ipswich*	40
Yabulu 275/132kV 300MVA Transformer	Mooted "point load" Industrial development in Thuringowa area*	25
Stuart North 132/66kV industrial substation	Mooted "point load" industrial development in Stuart North area (Townsville)*	10
Nebo to Moranbah 275kV DCST & Lilyvale to Dysart 132kV SCST	Coal mining demands in the Bowen Basin expand at levels materially above the load forecast*	17 – 115
Biloela to Moura SCST	Mooted additional industrial load in Biloela area*	17
Nudgee establishment and 275 kV Nudgee – Murarrie	Change of reliability standard, or higher than forecast demand at Brisbane airport*	100
Desalination plant in SEQ	Approximately 80 MW point loads requiring new 275/110 kV injection and upstream augmentation *	37

The allocation of project works and therefore costs between Powerlink and TransGrid are yet to be finalised.

Chapter 7 – Operational Expenditure

7.1 Introduction

7.1.1 Historical opex trends

Powerlink's recent operational expenditure has been adversely impacted by rising input costs due to external factors. There have been major increases in labour costs (driven by the need to close the wage parity gap with southern States in the face of skills shortages) and the costs of maintenance materials (due to steep increases in materials prices). Powerlink has also been subject to increasing legislative obligations which result in additional operating costs. In particular, increased obligations have arisen from material changes in safety legislation and the application of the Vegetation Management Act. Finally, Powerlink has a larger network to operate and maintain than was envisaged at the time of the 2001 revenue determination. This additional network is a consequence of the much higher than expected load growth in Queensland. The upshot is that actual opex in the current period (particularly the latter years) has been higher than forecast.

Notwithstanding the adverse effect of these external factors on costs, Powerlink remains the most cost-effective transmission business in the NEM. Comparisons by the ACCC show Powerlink has by far the lowest controllable opex/RAB of all NEM transmission businesses. This remains the case now, even after these adverse impacts. Recent international benchmarking results (ITOMS[50] 2005) confirm Powerlink's cost efficiency leadership.

7.1.2 Future opex trends

The underlying drivers of higher input costs (skills shortages, materials prices, fuel prices, legislative changes) are expected to continue well into the future. These are impacting all capital-intensive businesses. A recent BRW article[51] stated:

> *"Rio Tinto …revealed at the release of the group's last full-year results a 135% increase in costs, to US$598 million. BHP Billiton's costs blew out by almost $US800 million in the half year."*

[50] International Transmission and Operations Maintenance Study.

[51] Business Review Weekly February 23, 2006.

Unsurprisingly, in this environment, Powerlink's costs are expected to increase at rates well above CPI. Powerlink has, in this Proposal, identified the key drivers for all cost components and the resultant impacts on cost trends.

Notwithstanding this severe upward pressure on operating expenditure, Powerlink's opex is forecast to increase at a slower rate than the growth in the size of the network to be managed. This is due to our ongoing targetted operational efficiencies, as well as the harnessing of scale economies, with the effects of both reflected in the opex forecasts.

Consequently, Powerlink's forecast opex/RAB at the end of the coming period (2011/12) is 2.13%, compared with 2.46% in the base reference year (2004/05). In short, Powerlink will remain the most cost-effective transmission entity in the NEM, and is likely to retain its international cost leadership position.

Under the revenue regulation arrangements, operating expenditure includes, in addition to the "controllable" opex, a number of additional elements, eg. grid support costs associated with the economic deferral of network investment, a share of management-induced capex efficiencies and debt and equity raising costs.

In terms of cost allocation, Powerlink's accounting systems automatically allocate costs directly to assets (or projects/activities) which are categorised as being either regulated or non-regulated. In this way, the systems <u>automatically separate</u> operating costs for any non-regulated assets or activities <u>at the source of the data</u> input, and consequently no specific after-the-fact adjustments are required.

7.2 Powerlink's business model

7.2.1 Opex framework

Powerlink operates an Asset Owner/Asset Manager/Service Provider (AO/AM/SP) business model to enable the effective and efficient management of assets involved in the provision of transmission services, including the management of operation and maintenance arrangements. The model separates corporate governance functions, from the purchasers of goods and services, and from the providers of those services. Each role has accountabilities as follows:

- *Asset Owner (AO)* – provides ownership functions such as corporate governance and financing.

- *Asset Manager (AM)* – achieves both mandated reliability obligations and required total return on investment in the assets by ensuring that there is effective long term asset investment, utilisation and management.
- *Service Provider (SP)* – comprising network service providers which deliver services such as planning, operation and maintenance to achieve the asset manager's requirements, and corporate service providers such as accounting, administration and human resources management.

Powerlink considers that the AO/AM/SP model remains an essential element in managing the complex, and sometimes conflicting, environment in which it operates. The model delivers an integrated and responsive management structure, capable of reconciling complex issues through well-defined responsibilities coupled with collaboration to ensure that all relevant information is available. The segregation of the purchasers of goods and services (asset manager) from the providers of those services (service provider) delivers increased accountability and contestability (where appropriate) in the service provider function.

The prime benefit Powerlink has achieved with the AO/AM/SP model is that decisions relating to strategic asset management decisions are integrated to allow a whole of life approach to assets (including policy) separately from resourcing for delivering of the required services. This approach has continued to deliver expected end-result benefits of efficient and effective opex management, and delivery of opex in line with technical requirements/standards.

The Asset Manager's responsibilities ensure that the desired asset performance is achieved by setting and monitoring reliability and operating criteria, determining maintenance strategy and policy, and allocating the maintenance and operating work. Service providers are responsible for maintaining the assets by completing preventive and corrective maintenance, undertaking refurbishment activities, and operating the assets.

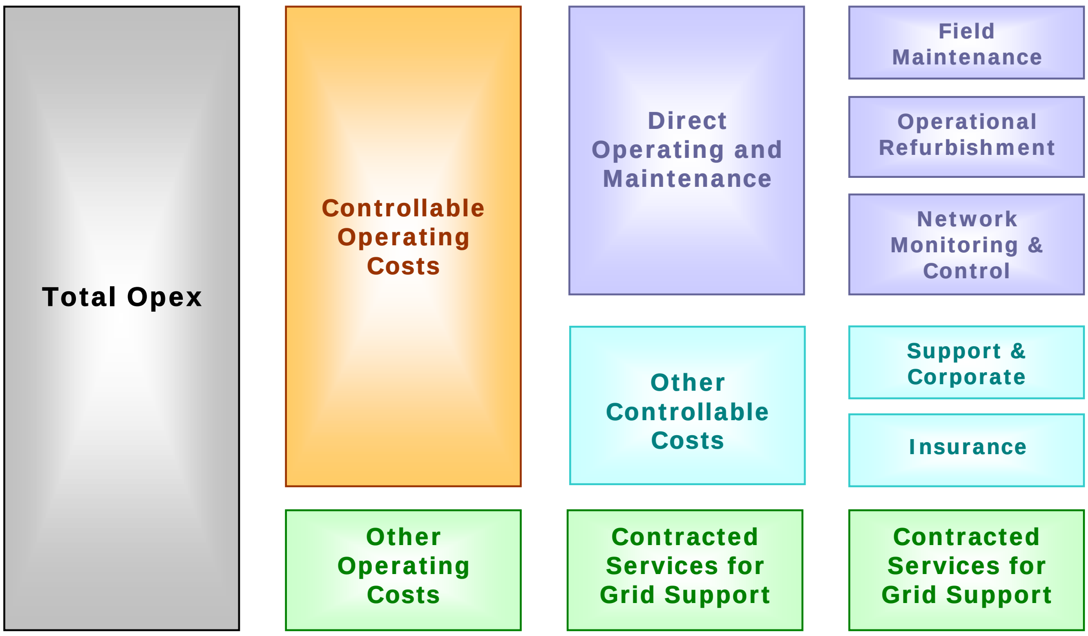
The AO/AM/SP business model has been pivotal in ensuring Powerlink retains its leadership as the most cost-effective transmission entity in the NEM.

7.2.2 Opex components

Total opex is grouped into 3 major components: Direct Operating and Maintenance, Other Controllable Costs and Grid Support. The first two of these can be categorised as Powerlink's "controllable" operating costs, whereas grid support costs are the outcome of factors (such as weather) outside Powerlink's control, which can be volatile. These opex components have remained unchanged since 1999 as the underlying concepts behind them continue to consistently deliver effective opex outcomes. These components are categorised by the nature of their cost drivers and are therefore considered separately:

- o Direct Operating & Maintenance – costs directly attributable to maintaining and operating the transmission network.
- o Other Controllable Costs – costs that include planning, engineering and asset manager support, and corporate costs, including insurance.
- o Grid Support – costs associated with paying for non-network alternatives to network augmentations.

Figure 7.1: Powerlink's Opex Framework



7.2.2.1 Direct operating and maintenance

Powerlink has a geographically dispersed and technically diverse transmission network, which requires the application of consistent and effective operating and maintenance strategies. To ensure the network continues to deliver required performance, Powerlink uses two strategic frameworks within its AO/AM/SP business model – plant management strategy ("doing the right thing" – with accountability resting with the asset manager) and Work Management Strategy ("doing the thing right" – with resourcing accountability resting with service providers). The combination of the two frameworks enables Powerlink to be truly world-class.

- o Plant Management Strategies are developed and reviewed to obtain maximum **effectiveness** by setting maintenance and operating criteria to obtain best performance from the plant. Techniques such as Reliability Centred Maintenance, Whole of Life Cycle Costing and Quantitative Risk Assessment are used to develop these strategies.
- o Work Management Strategies are developed and regularly reviewed to obtain maximum **efficiency** in the implementation of the Plant Management Strategy. Service Level Agreements with service providers are performance-based and new maintenance techniques (eg. the use of helicopters and live substation work) are introduced when appropriate.

The effectiveness of these strategies is monitored by participation in benchmarking studies. The maintenance and operation of Powerlink's assets is managed under the AM/SP model where the asset manager sets the strategy and requirements of performance and service providers manage delivery of these requirements. The asset manager has established long-term service level agreements (SLAs) with field maintenance and operations service providers from which work plans and performance targets are developed and managed.

Due to the size and geography of Powerlink's network, a maintenance service provider regime that meets the expectations of responsiveness and capability throughout the entire length and breadth of the network is required. Three service delivery regions (southern, central and northern) are in place with a service provider responsible for maintenance services within each region. This established service delivery structure has a three-fold benefit of:

(a) Commercially-competitive environment – the asset manager has three sources of maintenance delivery to compare performance, and to leverage a "best practice" approach;

(b) Responsiveness - having initial response teams within 2 hours drive from 95% of Powerlink's substation sites; and

(c) Technical depth – throughout Queensland the accumulated "mass" of technical field knowledge ensures that all maintenance challenges can be dealt with.

Maintenance services for these regions are provided by one internal and two external maintenance service providers. More than 60% of field maintenance is outsourced.

In addition to the three regional maintenance service providers, Powerlink utilises other specialised services:

(a) Aerial inspection and maintenance services; and

(b) Live line and substation services.

Both functions were introduced, in conjunction with other initiatives (eg. night/weekend outages), to ensure that Powerlink meets the increasingly complex task of undertaking its required maintenance in an environment where market participants seek network outages to be minimised.

The first, and largest, opex category - Direct Operating and Maintenance – has three key elements:

- Field Maintenance;
- Operational refurbishment; and
- Network monitoring and control.

(a) **Field maintenance**

This includes all field-based costs from the time the asset is commissioned to when it is decommissioned (excluding any capital or operational refurbishment expenditure). These works consist of preventative maintenance (routine and condition-based activities) and corrective maintenance (deferred and emergency), encompassing all field-based activities performed by maintenance service providers.

Field maintenance 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. Underlying cost drivers for field maintenance costs are:

- the size and geographical dispersion of the network (a growing network requires more maintenance activities), changes in legal obligations such as vegetation and safety management (both of which increase the labour-intensity of maintenance work and the amount of work required);
- increasing labour costs (driven by skills shortages and competition for scarce resources);

- o the rising cost of maintenance techniques such as live line and live substation techniques; and
- o the rising costs of maintenance materials and parts (which have a significant component of metals), as well as a fuel cost (transportation) component. One of Powerlink's major suppliers has advised that electrical equipment prices are forecast to increase by between 1 and 10% per annum going forward.

(b) **Operational refurbishment**

Operational refurbishment involves activities that return an asset to its pre-existing condition or function, or activities undertaken on part of an asset to return that specific component to its pre-existing condition or function. Specifically, these refurbishment activities do not involve increasing the capacity or capability of the plant, or extending its working life beyond original design (that would be capital replacement).

Operational refurbishments are typically quite extensive works performed only once or twice over an asset's life. Such work is preventative in nature, but is more extensive than maintenance which is frequently performed as part of ongoing condition-based maintenance. A project management approach is applied to operational refurbishments for both delivery effectiveness and cost efficiency.

Cost drivers for operational refurbishments are the age profile of assets, (current and future), and design parameters of the plant and its sub-components. Assets nearing the end of their technical and economic life are assessed for replacement instead of refurbishment. As these works are predominately labour and materials intensive, both labour and maintenance materials (many of which are metals-based) costs are significant drivers.

(c) **Network monitoring and control**

There are four main functions carried out within Network Monitoring and Control:

- o *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;

- o *Off-line system security support* – this function involves security analysis, including an ongoing need to perform contingency planning;
- o *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
- o *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 amount of switching, analysis, support and monitoring work drives the need for additional resources and capability in the network operations area. These activities are predominantly labour-based, therefore labour cost increases have a significant impact upon them.

7.2.2.2 Other controllable costs

Other controllable costs encompass activities and services not directly related to maintaining or operating the network, but are necessary support roles and activities integral to managing the network business.

These support functions are divided into 2 main areas:

(a) **Asset Manager Support** – operational activities to support strategic development and ongoing asset management of the network. AM Support has 4 major sub-elements: Grid Planning, Network Support, Network Customer & Regulatory Support and IT Support.

(b) **Corporate Support** – support activities required to ensure adequate and effective corporate governance and business administration. This has two sub-elements:

- o **Corporate Costs** – including finance, accounting, administration, employee relations, statutory and corporate governance, etc; and.
- o **Insurance** – Powerlink purchases insurance for its assets where insurance is available and appropriate. However, insurance cover is not available for some major sections of Powerlink's assets, notably

transmission lines. Insurance costs therefore include both insurance premiums and self insurance allowances for uninsurable items and non cost effective elements.

These support functions are inherently labour intensive (insurance being an exception). Consequently, labour costs are a primary cost driver. The insurance component of support costs is driven by world trends and market drivers in the insurance sector.

7.2.2.3 Grid support costs

Powerlink is required under the NER and the Regulatory Test to consider non-network alternatives to network augmentation. There are costs associated with provision of these non-network solutions which are referred to as grid support costs – typically payments to local generators or local loads. Where the Regulatory Test shows that a non-network solution can economically defer network investment, the cost of this grid support can be recovered via regulated transmission charges.

As grid support is not a capital investment which can be recouped over many years, the costs associated with grid support are operating in nature. However, the nature of grid support is significantly different to other (controllable) components of operating expenditure, and it is therefore dealt with separately in section 7.5 of this Chapter.

7.3 Historical opex

7.3.1 Overview

Powerlink's philosophy for managing its opex has been consistently applied since the mid 1990s when the fundamental components of the operating expenditure were identified as separable activities. Powerlink has continued to develop use of its single corporate financial management (SAP) to enable a more comprehensive understanding of opex performance. This has improved cost management, data/information recording, and analysis and reporting, which assists business decision-making and opex strategy development.

Powerlink's corporate strategies continue to include a goal of being the most cost-effective transmission entity in the NEM, and one of the most cost-effective in the world. This requires finding the optimum balance between cost efficiencies and maintaining appropriate standards of network performance.

7.3.2 Actual expenditure

In the early part of the current regulatory period, there has been close alignment between actual and allowed controllable operating expenditure and the allowances for controllable opex in the 2001 revenue determination (controllable operating expenditure excludes grid support and certain other allowances). In the latter part of this current period, increased input cost drivers (labour, maintenance materials, legislative imposts, etc.) have increased actual expenditure above the ACCC allowances, notwithstanding Powerlink's efforts to harness operational efficiencies. Significant input cost drivers which have had the greatest impact are labour costs due to wage parity increases, additional legislative obligations (eg. Electrical Safety Act and the Vegetation Management Act) and a larger network as a result of higher demand than forecast (more assets to maintain and operate).

A comparison between actual and allowed controllable opex is shown in Table 7.1.

Table 7.1: Controllable operating expenditure comparison of 2001 decision and actual

Total Opex $m nominal	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
Decision*	65.64	71.97	76.43	80.40	84.51	89.43
Decision - CPI adjusted	65.64	72.41	77.72	81.49	85.69**	90.84**
Actual	69.66	73.20	78.31	87.50	94.81**	107.01**

* Decision opex does not include grid support or the QNI capex efficiencies included in the opex allowance in the 2001 revenue determination.

** Forecast.

Powerlink has experienced significantly higher than forecast demand over the regulatory period which has resulted in additional assets required to provide transmission services to meet this higher demand. Powerlink's larger network has driven an increase in the quantum of work (and hence costs) for operation and maintenance.

7.3.3 Major impacts

During the current regulatory period, controllable operating expenditure has been significantly influenced by a number of factors. The type and magnitude of the change is summarised in Table 7.2.

Table 7.2: Impact of opex drivers during current regulatory period

Drivers	Impact	Type of change
Larger network to be operated and maintained	1.4%	Trend
Wage Parity-based labour costs	3.4%	Trend then step
Vegetation Management Act obligations	0.7%	Trend
Safety obligations	$2.0 m	Step
Restricted ability to obtain network outages	$0.8 m	Step

Apart from a larger network that requires additional operating and maintenance activities and additional support functions, the three most significant drivers are: compliance with the Vegetation Management Act and the Electrical Safety Act; labour costs increases to provide wage parity; and outage management to minimise the impact of Powerlink's activities on both reliability of supply to consumers and the impact of outages on the electricity market. Outages can be reduced by the use of live working techniques. However, these are more labour-intensive and require more highly skilled workers than traditional work methods.

Powerlink remains focused on seeking ways to maintain efficient levels of operational expenditure and good performance outcomes, despite this upward pressure from a number of areas.

The Asset Monitoring Team (established in 2002) is realising the benefits of its formation. Its primary role of remotely managing faults and monitoring asset performance has meant that elements of Powerlink's network can be diagnosed and re-configured remotely, which reduces the need for crews to be dispatched to site. Given the success of this strategy, Powerlink has expanded the role of this team from the southern maintenance region to statewide.

Powerlink previously centralised its network switching centre to a single location (formerly 3 locations), and introduced new work practices to deliver more effective services.

Powerlink has contracted for helicopter services at Townsville, to more effectively service the (remote) northern end of the transmission network. The northern end of its transmission network is farther from Brisbane than Melbourne is. The service is available for general maintenance activities which can be performed by helicopter, and also provides a 24 by 7 service for emergency line patrolling. This was introduced to provide an improved and higher level of responsiveness in the challenging terrain and environment of North Queensland. This has been a substantial factor in rapidly restoring supply to North Queensland towns following severe Cyclone Larry which severely damaged Powerlink's network on 20 March 2006.

Powerlink's technology vision recognises the high rate of change in digital technology and identifies opportunities for the business to take advantage of these changes. This is balanced by the potential downside of adopting new technologies early. Powerlink is concerned about the ongoing degradation in the quality of new equipment being delivered from suppliers, which appears to be due to a combination of record production volumes and skills shortages being faced by suppliers worldwide. This results in additional opex costs for "early-life" rectification and maintenance – a trend which shows no signs of abating. In addition, some new digital technologies which could be expected to reduce future maintenance costs have configuration management requirements which increase the operating costs of these assets. In practice, the above factors tend to offset the efficiencies expected from the adoption of new digital technologies.

7.3.4 Benchmarking

Powerlink continues to participate in benchmarking exercises to assess its performance against similar transmission businesses worldwide.

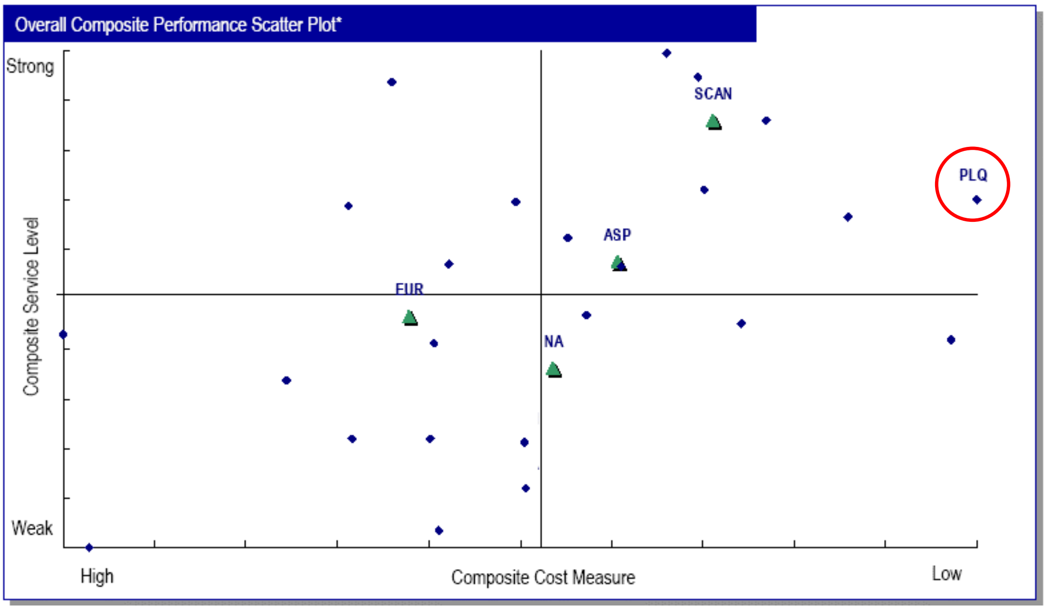
Powerlink participated in the very latest round of international benchmarking - International Transmission Operations and Maintenance Study (ITOMS 2005). The results of this study were released in early February 2006 and show that Powerlink remains the most cost-efficient transmission entity not only in Australia, but also internationally.

The study involves companies from the Asia Pacific, Europe, Scandinavia and North America. It focuses on competing indicators of cost (operations and maintenance) and service performance (network reliability). This benchmarking recognises that cost and reliability cannot be considered in isolation – it would be easy to have a low cost network if reliability was of no consequence; likewise it would be easy to have a high reliability network if cost was no object. The real challenge (and one at which the results demonstrate that Powerlink excels) is to have a network which consistently delivers network reliability above the average of its peers for below average cost. Benchmarking results are presented as a cross plot of reliability and cost.

As can be seen in Figure 7.2 for the overall benchmark, Powerlink is well positioned in the "best performer" quartile of lower than average cost and above average reliability (the upper right quartile) with outstanding (lowest of the cohort) cost performance and good service level.

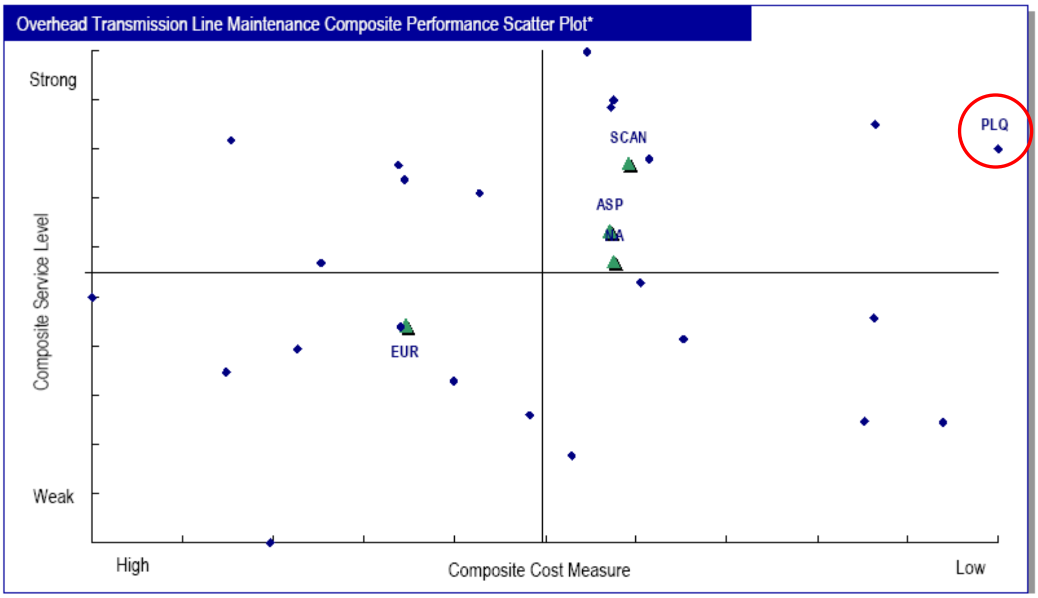
The average result for transmission entities in the Asia Pacific region is shown by the "ASP" triangular mark. Powerlink's network performance is above the regional average, with costs substantially lower than the regional average.

Figure 7.2: ITOMS 2005 – Overall Composite Benchmark



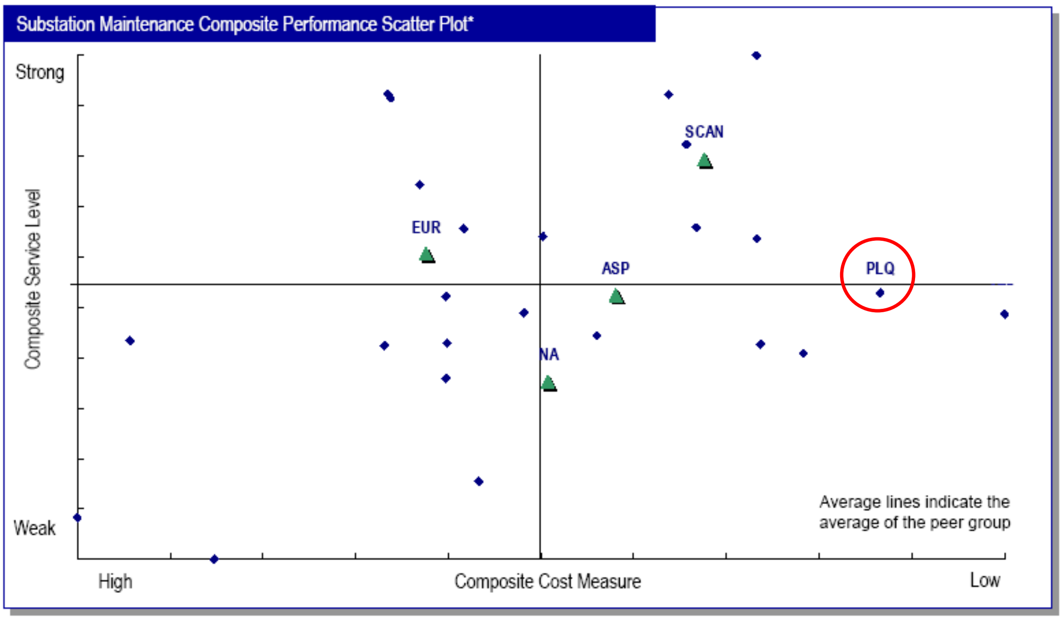
To enable a more detailed analysis, the ITOMS study further breaks down these results into the main asset categories of substations and transmission lines. The result for transmission lines is shown in Figure 7.3. Again Powerlink's performance is in the top quartile, displaying excellent cost performance with high service level.

Figure 7.3: ITOMS 2005 – Transmission Line Maintenance Benchmark



Results for substation performance are shown in Figure 7.4 which shows that Powerlink's cost performance is very good compared to other entities. However, service level performance is slightly below the average, indicating an improvement opportunity.

Figure 7.4: ITOMS 2005 – Substation Maintenance Benchmark

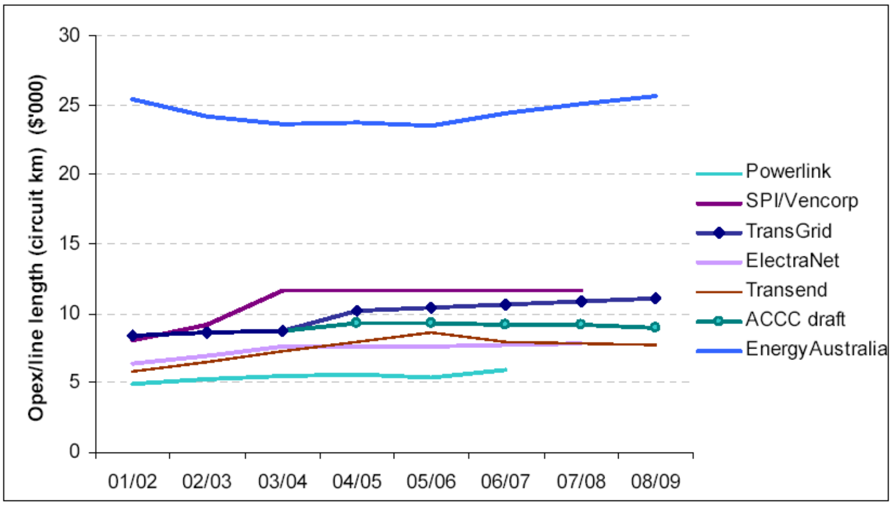


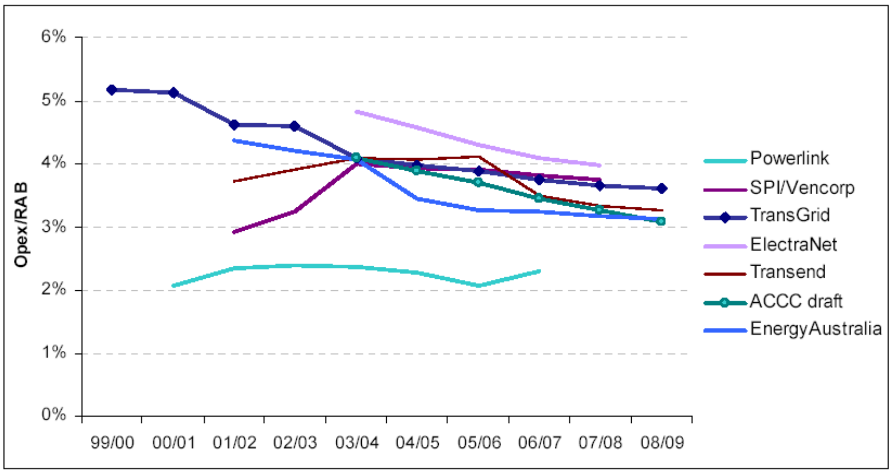
These international benchmarking results align with comparisons of operational expenditure undertaken by the economic regulator (ACCC) for transmission businesses in the NEM. The most recent comparisons were published during the revenue cap decision for TransGrid in 2004. The ACCC recognised that[52]:

> *"some ratios provide a more useful insight into relative performances. The Commission considers that opex/line length and opex/asset base, while having some limitations, are more useful than the others"*

Figure 7.5[53] shows these comparisons. Powerlink's operational expenses are clearly the lowest in both key measures.

Figure 7.5: ACCC comparison of opex performance





52 South Australian Transmission Network Revenue Cap 2003-2007/08 Decision (page 6)

53 The NSW and ACT Transmission Revenue Cap TransGrid 2004/05 to 2008/09: Draft Decision (page 40)

Both the international benchmarking study (ITOMS) and the ACCC's comparisons clearly show Powerlink's opex performance is at the best practice frontier.

7.3.5 Partial indicator ratio analysis

Appendix A of the SRP includes information requirements. The data requested in relation to operating expenditure for partial ratio analysis of opex is provided in Table 7.3.

Table 7.3: Operating expenditure analysis data

Measure	2002/03	2003/04	2004/05
Controllable Opex ($ nominal)	73.20	78.31	87.50
Line length (circuit km)	11,442	11,575	11,887
Number of substations	92	96	98
Energy delivered (GWh)	41,264	43,270	44,357
Energy Demand (MW)	7,081	7,934	8,232

7.4 Future opex

7.4.1 Opex forecast overview

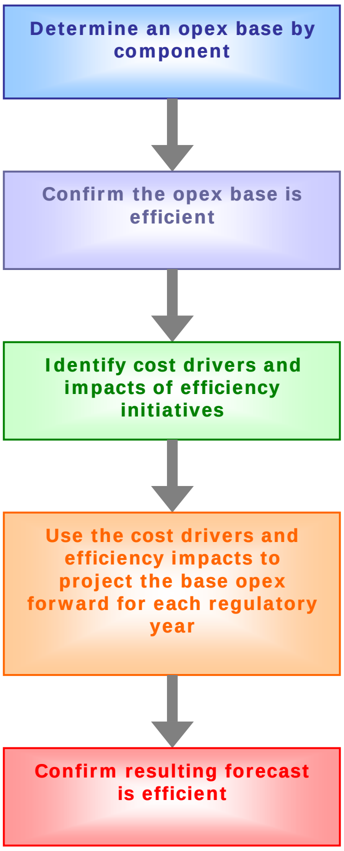
Powerlink's established opex forecasting process is based on management accounting principles, with clear identification of the underlying drivers of future costs. This is the ACCC's preferred approach[54]:

> *"The ACCC favours an approach that distinguishes between controllable and uncontrollable operating expenditure and draws on management accounting best practice to deliver insights into cost drivers, the likely evolution of costs over the course of the regulatory period".*

The methodology used to prepare Powerlink's opex forecast is shown in Figure 7.6.

[54] The NSW and ACT Transmission Revenue Cap TransGrid 2004/5 to 2008/9: Final Decision (page40)

Figure 7.6: Methodology behind Powerlink's opex forecast



The forecast opex is based on Powerlink's approach to work management. The key concepts used include:

(a) **Work Units** – Work units are used to manage routine maintenance. A work unit represents the comparative effort of work that is required to perform a particular routine maintenance task. A work unit resembles a "standard job" (approximately 8 hours of chargeable work), as it normalises an amount of effort, irrespective of the type or location of the asset being maintained. Across the whole network asset set, each routine maintenance task is assigned a maintenance strategy, based on a reliability centred maintenance philosophy. The amount of routine maintenance required for a specific type and/or volume of assets is generated from the maintenance strategy, expressed as a number of work units. As such, the work unit is both a measure of work effort required (which can be readily forecast) and, subsequently, a measure of work completed.

(b) **Network Growth** – there is a causal relationship between the size of the network and size of the overall maintenance workload. As the network grows, more maintenance work is needed. Opex is therefore either directly (field maintenance) or indirectly (support roles) related to the size of the transmission network. This relationship is not linear – there are some economies of scale in maintenance supervision and in support activities. When forecasting opex, Powerlink applies an asset growth escalator, which reflects the growing size of the network.

(c) **Input costs** – Powerlink's business is subject to variations in key inputs such as labour, maintenance materials (which are typically metals-based) and other materials and non-labour costs. The opex forecast was derived using three escalators to reflect these categories: labour cost (applied to the labour component), maintenance materials (applied to field maintenance materials) and other costs (based on CPI). Due to the specific labour conditions being experienced in electricity networks, the generic Wage Cost Index is not a good fit for labour cost forecasting.

(d) **Efficiency factors** – There are two sources of cost efficiencies in the business: targeted efficiency initiatives in specific activities and economies of scale. Economies of scale are more evident in corporate and support activities than in direct maintenance activities. The upshot of incorporating these efficiency factors into the opex forecast is that not all opex components increase at the same rate as network asset growth. Offsetting these efficiency initiatives is the additional cost imposts which arise from increasing legislative and regulatory obligations.

7.4.2 Current opex base

Fiscal year 2004/05 has been used as the base reference year from which all forecasting is projected (efficient starting point). The 2004/05 year was selected as it is the most recent full year of actual costs available and the data is verifiable and auditable. The breakdown for this base year is shown in Table 7.4.

Table 7.4: Controllable operating expenditure for 2004/05 year (excluding grid support)

Opex Components	Opex Line Items	Opex Base (2004/05) $m
Direct Operating & Maintenance	Field Maintenance	24.51
	Refurbishment	14.22
	Maintenance Support	7.20
	Network Operations	7.99
	Direct Controllable	**53.91**
Other Controllable Costs	Asset Manager Support	20.79
	Corporate Support	10.45
	Insurance Premiums	2.35
	Asset Manager/Corporate Support	**33.59**
Total Controllable Opex		**87.50**

7.4.3 Opex forecast building blocks

Powerlink's management of future opex remains in line with its demonstrably successful approach of identifying and managing the major cost drivers. Forecast opex is classified into three major classes of Direct Operating & Maintenance, Other Controllable Costs, and Grid Support. As noted, the first two classes are "controllable" opex, whilst grid support is driven by external factors outside Powerlink's control (eg. rainfall patterns).

7.4.3.1 Input cost drivers

Input cost drivers for operating expenditure can be considered as either asset dependent or non-asset dependent. Asset dependent cost drivers include the number of assets and equipment to be maintained, their age and condition, the technology, and geographic dispersion. Non asset dependent cost drivers include external factors such as labour rates, material costs, compliance obligations, and NEM related factors such as transmission network topology and network access regime.

Additional assets to be maintained

Powerlink's projected capital program indicates that the volume of assets that require maintenance continues to increase significantly into the future. Even with the addition of many new assets arising from the capital works forecast for the next regulatory period, Powerlink's network assets will, on average, become older. In addition, the asset age profile shows a greater number of assets will enter the age profile where operational refurbishment activities will be required. These two age-related aspects indicate there will be a significant requirement for refurbishment costs in the coming years.

Labour cost increases

The impact of shortages of skilled resources and competition for these has emerged in the latter years of the current regulatory period, and manifests itself in labour cost increases well above CPI and the Wage Cost Index. Significant increases in labour costs in the fiscal year 2005/06 were driven by the need to close the "wage parity gap" with other States in order to retain and attract workers to undertake the large program of work in the networks. Whilst labour cost increases are large, it is apparent that Queensland customers have previously benefited over many years from labour costs that were lower than other States. Labour cost increases in the Queensland electricity supply industry are expected to remain above average levels. The need to maintain wage parity with other States continues and there is heightened competition from the coal/minerals-driven construction boom in Queensland (major expansions of mines, rail, ports, townships, etc). This compounds the skilled resource shortage. In its final determination for Energex, the QCA confirmed pressure on the labour market:

> *"The Authority believes that the cost of the new Enterprise Bargaining Agreement reflects the tightness of the market for certain types of skilled electrical workers in Australia at the present time."*[55]

Powerlink actively recruits additional skilled workers, and provides additional places for development of skilled workers, via apprenticeships and traineeships.

Increased legislative obligations

Powerlink is committed to complying with its legislative obligations and implements programs to achieve this. This has been a significant impost during the current regulatory period due to material changes in three main areas - safety, environment and Rules compliance (especially for network access).

Electrical Safety Act

The Queensland Electrical Safety Act was materially amended in 2002. Significant changes included: revision of safe approach distances to live exposed parts, which required a review of all work practices and made it more onerous to work on the high voltage network; prescribed development of an electrical safety management system; and obligations on Powerlink to approve and provide safety advice to third parties working near powerlines (which required the establishment of new roles of Regional Contact Representatives).

Vegetation Management Policy/Guidelines

Introduction of the Vegetation Management Policy/Guidelines in 2004[56] resulted in significant changes to the allowable vegetation control practices both during construction and over the life of the asset. Prior to the introduction of the Policy, vegetation clearing was significantly less restrictive with full-width, mechanised clearing being a common approach. However, this new Policy places severe limitations on vegetation and easement maintenance practices. In many instances, vegetation along the easement can now only be minimally trimmed and "sculpted". This involves very labour-intensive, high cost methods which result in higher operating expenditure requirements. Managing these requirements over thousands of kilometres of transmission line in vastly differing vegetation and urbanisation environments is a major new challenge for linear infrastructure providers such as Powerlink. The upshot is that easement maintenance costs have increased significantly.

Network access

Queensland's vast geography, dispersed population and resultant electricity network topology means the network is "long and thin". It is essentially unmeshed, with few alternative flow paths if a network element needs to be taken out of service. Gaining de-energised access to plant through outages is very challenging, and becomes more so as load grows. Network access difficulties mean that increased volumes of work need to be done outside normal working hours (i.e. at night and on weekends). This results in higher labour costs.

The Queensland demand profile is also very flat compared to other Australian states resulting in heavier utilisation of the network. This further limits opportunities for network outages without placing customer reliability of supply at risk. To manage this difficulty and maintain the network effectively, Powerlink uses live work methods extensively rather than conventional de-energised access to plant. Powerlink now uses live work for both transmission lines and in substations[57]. Live work requires

[55] Final determination – Regulation of Electricity Distribution, April 2005

[56] Under the Vegetation Management Act 1999.

[57] Powerlink is the only Australian transmission business using live substation techniques.

more extensive safety management and monitoring, training, evaluation of work techniques, accreditation, and evaluation of plant and equipment. Consequently, live work is more costly than conventional techniques, but is unavoidable if network outages are to be minimised, in line with the oft-stated expectations of NEM participants.

Table 7.5 shows the major drivers for operating expenditure anticipated over the next regulatory period and the anticipated impact on opex requirements.

Table 7.5: Impact of opex drivers during next regulatory period

Drivers	Impact	Type of change
Network growth	2.6%	Trend
Wage Parity	2.0%	Trend
Materials	0.6%	Trend
Vegetation Management	0.2%	Trend
Network access	$0.8 m	Step

7.4.3.2 Direct operating and maintenance costs

Each component of direct operating and maintenance costs is forecast separately taking into account drivers associated with each component.

(a) **Field maintenance** – Field maintenance costs are built up from work unit forecasts required to perform routine maintenance on the quantum of assets which will exist in each year. Costs are separately forecast for the main asset classes of substations, transmission lines, secondary systems, telecommunications and easements. As the quantum of assets increases, so too does the amount of maintenance required. The forecast includes dissection into labour costs and maintenance materials costs.

(b) **Operational refurbishment** – The operational refurbishment program is primarily derived from the age profile of existing assets. Age and condition are triggers which initiate refurbishment works. Refurbishments are often related to particular types of equipment, where that equipment exhibits a condition that needs rectifying. Forecast is dissected into labour costs and maintenance materials costs.

(c) **Network Operations** – Network operations costs are driven by the size and complexity of the network to be monitored and managed. The off-line system security role also has to manage Powerlink's network with its limited opportunities for outages. This dictates a high level of contingency planning. Network operations costs are predominantly labour related.

7.4.3.3 Other controllable costs

Each component of other controllable costs is forecast separately, taking account of its associated drivers.

(a) **Asset Manager Support** – The significant driver for these operational activities to support the strategic development and ongoing asset management of the network is a larger, more complex network which will place added pressure on asset management support functions. This cost component is predominantly labour related.

(b) **Corporate Support**

- o *Corporate Costs* – including finance, accounting, administration, employee relations, corporate governance, etc.
- o *Insurance* – Powerlink secures insurance from both domestic and internationally based organisations to cover, where applicable, risks associated with its business operations. However, Powerlink faces risks for which insurance is either not available (eg. transmission lines) or is uneconomic to acquire. The risks therefore remain with Powerlink. Insurance costs comprise two components – insurance premiums and self insurance.

Insurance premiums

The insurance premium forecast provided by Powerlink's brokers is based on actual history, recent trends in insurance markets, and forecast increases in Powerlink's asset base. Powerlink takes insurance where it is available and where premiums are considered to be cost effective. The insurance premiums forecast is shown in Table 7.6.

Table 7.6: Forecast insurance premiums

Insurance $m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Forecast	3.67	3.82	3.99	4.15	4.29

Self insurance

Large sections of Powerlink's network are not insurable, in particular transmission lines, and in some other cases, insurance cover is not considered cost effective. Section 6.5 of the SRP outlines the AER requirements for recognition of a self insurance allowance.

Powerlink engaged an independent actuary to assess the risks and notional premiums applicable to uninsurable risks associated with Powerlink's network. Powerlink has also valued the notional costs of insurance cover for those areas not yet considered cost effective. The total self insurance forecast for the Powerlink network has been estimated in Table 7.7.

Table 7.7: Self insurance forecast

Self insurance $m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Forecast	1.26	1.28	1.30	1.30	1.31

Self insurance reserve

Section 6.5 of the SRP requires a self insurance reserve to be established in the audited and published balance sheet. Administrative requirements and resulting costs of doing this in accordance with Australian Accounting Standards are prohibitive and uneconomic. Powerlink therefore proposes an alternative approach that will deliver an equivalent outcome.

Proposed reporting requirements for the self-insurance allowance are:

- the annual regulatory accounts will record the cost of self insurance as an operating expense, and will establish a self insurance reserve for regulatory reporting purposes;
- where a claim against self insurance is made, an appropriate deduction to the self insurance reserve will be recorded; and
- the arrangement will be independently verified and Powerlink will provide a duly certified formal statement that figures provided to the AER are an accurate representation of Powerlink's situation.

Pass through arrangement

Powerlink proposes pass through be provided for:

(i) any material[58] increase or decrease in premiums compared to that provided for in the Revenue Cap in relation to that risk;

(ii) any material deductible incurred by Powerlink, as no allowances for deductibles are included either in the insurance premiums or the self insurance allowance; and

(iii) changes in the insurance market such as, but not limited to, insurance becoming unavailable or becoming available on terms materially different from those at the time of this Proposal.

7.4.4 Summary of controllable opex forecast

The opex forecast continues Powerlink's world's best practice performance. As such, in conjunction with regular asset management review processes, the forecast is the result of confirming the efficiency of the current opex situation, reviewing known requirements and drivers (i.e. escalations and efficiencies), determining future changes to those requirements/drivers (internal & external) and projecting impacts of those cost drivers across the coming regulatory period.

Table 7.8: Controllable operating expenditure forecast

Controllable Opex $m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Field Maintenance	34.81	38.04	41.08	44.11	47.63
Refurbishment	18.60	19.60	20.65	21.76	22.93
New Requirements	1.87	1.94	2.01	2.08	2.15
Maintenance Support	9.05	9.50	9.93	10.36	10.82
Network Operations	10.11	10.53	10.95	11.38	11.84
Direct Controllable	**74.43**	**79.60**	**84.61**	**89.68**	**95.37**
Asset Manager Support	25.00	25.78	27.38	30.97	29.36
Corporate Support	8.24	8.41	8.58	8.75	8.93
Insurance Premiums	4.93	5.10	5.28	5.45	5.60
Asset Manager/Corporate Support	**38.17**	**39.29**	**41.24**	**45.17**	**43.89**
Total Controllable Opex	**112.60**	**118.89**	**125.85**	**134.85**	**139.26**

The impact of the various drivers on operating expenditure is shown in Figure 7.7. The underlying opex for the current asset base is increasing due to the input cost increases (labour, maintenance materials, legislation, etc.) identified above.

[58] Powerlink considers materiality should be assessed cumulatively over the regulatory period.

Figure 7.7: Impact of major opex drivers

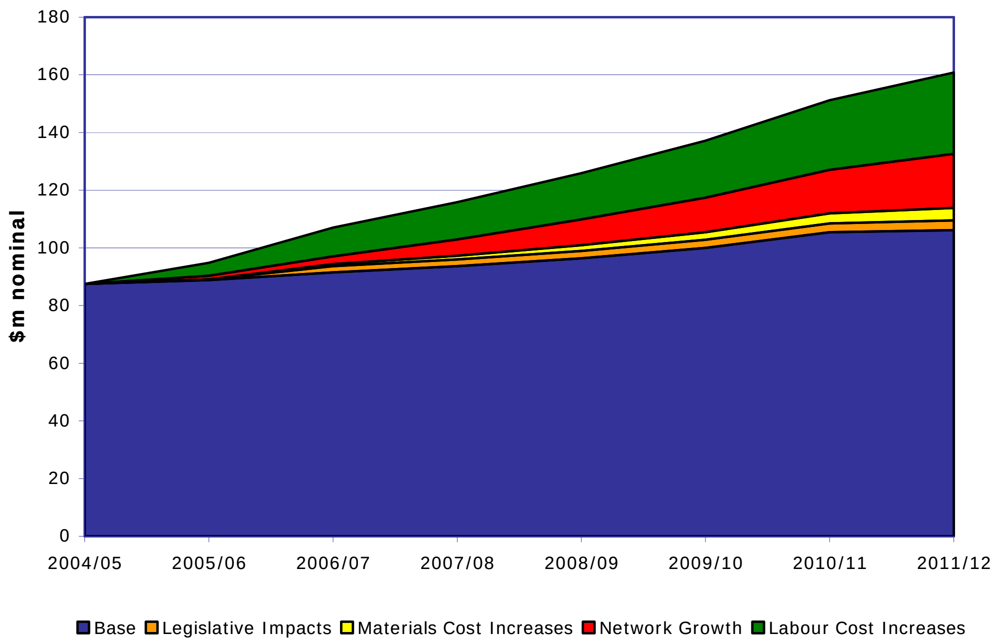
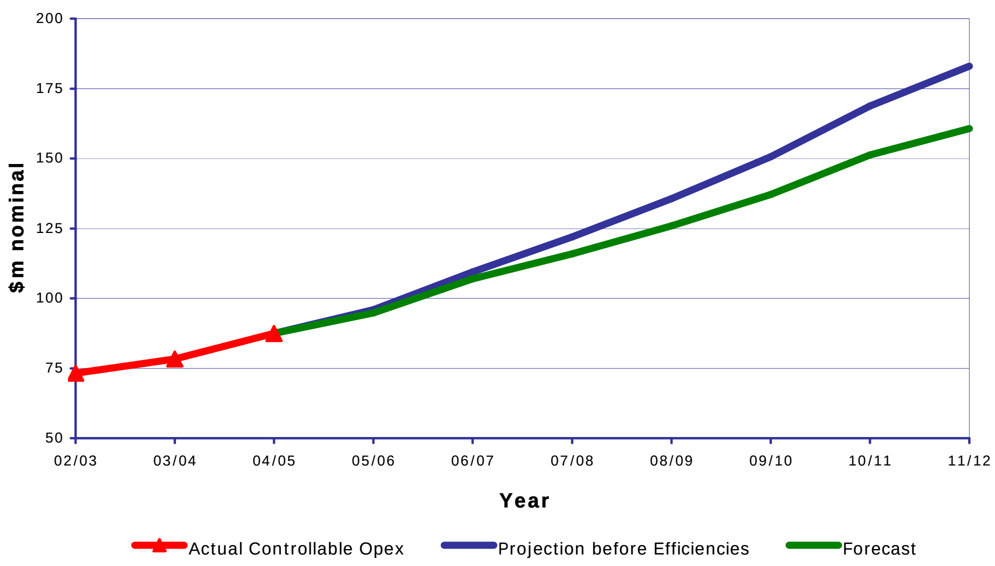


Figure 7.8 shows the opex path both before and after the application of efficiency initiatives and economies of scale. The upshot is that operating costs are forecast to increase at a slower rate than the rate of growth of the network being managed.

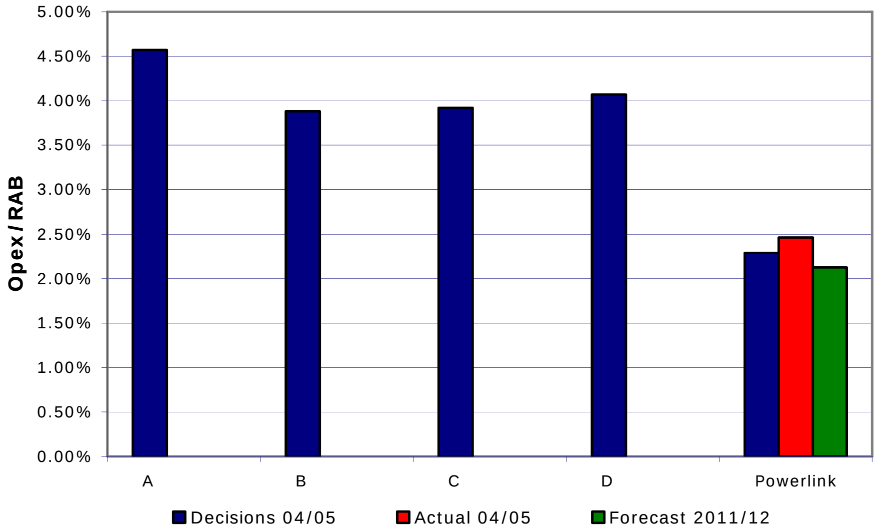
Figure 7.8: Effect of efficiency initiatives on opex path



7.4.5 Benchmarking – future opex

Notwithstanding the increasing opex costs, Powerlink will continue to be the most cost-effective transmission entity in the NEM, by some margin. Figure 7.9 shows the opex/RAB comparisons for Powerlink against other regulated transmission businesses in the base reference year of 2004/05 as well as Powerlink's forecast opex/RAB at the end of the coming regulatory period (2011/12). In short, Powerlink's opex costs will continue to represent the efficient frontier in the coming period.

Figure 7.9: Normalised Opex/RAB for NEM transmission businesses



7.5 Grid support

Grid support refers to costs associated with non-network solutions used by a TNSP as a cost-effective alternative to network augmentation. The AER's Regulatory Test and consultation processes in the National Electricity Rules (NER) associated with the application of the Regulatory Test require TNSPs to identify and evaluate both network and non-network solutions to emerging network limitations. Potential non-network solutions can include local generation, co-generation, demand side response and services from a Market Network Service Provider.

Powerlink is by far the largest acquirer of grid support services in the NEM. Powerlink's grid support portfolio includes all four possible forms – local generation, co-generation (sugar mill), DSM (curtailable major load) and MNSP (Directlink)[59].

Acquiring grid support

Powerlink applies the existing regulatory arrangements, in which the open and transparent consultation process and Regulatory Test evaluation is applied to

[59] Directlink has converted to regulated status as of 21 March 2006.

ascertain whether a non-network solution is appropriate, and therefore whether regulated revenue should be made available to fund the non-network solution.

There are some inherent challenges in acquiring non-network solutions to meet reliability needs. Powerlink's mandated reliability obligations mean that proposed non-network solutions must be aligned with those mandated obligations. In practice, this means that a non-network solution must be either existing or committed, willing to be available on demand by Powerlink and not participate in the market during those "called" periods. The non-network solution proponent must also accept a proportionate exposure to the reliability obligations, penalties and sanctions to which Powerlink is exposed.

Clearly, the grid support provider must be paid for services provided. The upshot is a contract between Powerlink and the grid support provider, with clearly defined obligations, pricing structure and prices, liability provisions and damages clauses.

Powerlink has implemented operational arrangements in conjunction with NEMMCO to ensure that grid support is only "called into action" when required. This both minimises the costs of grid support, and ensures the impact of grid support solutions on the spot market is minimised. All market participants have multiple opportunities to propose non-network solutions and provide comments to the open, transparent process which surround procurement of grid support under the consultation procedures which are an integral part of Regulatory Test evaluations.

North Queensland

Most grid support procured by Powerlink is in North Queensland, which is characterised by long transmission distances, and therefore favours the economics of non-network solutions compared with major transmission line augmentations. Due to the plant mix which provides this service and exogenous elements (eg. weather patterns) which impact on both the requirement for grid support and therefore the cost, grid support costs for North Queensland are inherently very difficult to forecast with accuracy.

Grid support requirements in North Queensland are primarily driven by:

- demand levels which in turn depend on temperatures, and rainfall – low rainfall triggers greater use of irrigation pumps;

- o hydro generation levels which depend on spot market prices and rainfall – low rainfall periods can reduce the output of hydro generation; and
- o base level generation from Collinsville and Townsville power stations which depend on spot market prices and power purchase agreements between owners of these power stations and Enertrade.

All these aspects – rainfall patterns, demand, hydro generation and base load generation are outside of Powerlink's control. Powerlink has sought to put flexible grid support arrangements in place which ensure reliability of supply obligations to consumers in North Queensland are satisfied while grid support is procured (and paid for) only when necessary.

Powerlink has attempted to establish forecasting mechanisms linked to major input variables[60]. However, a recent investigation by a specialist consultant concluded that the statistical correlation is not sufficient for formularisation to provide the accuracy required. Alternative mechanisms are therefore required to manage volatility and uncertainty.

In evaluating the cost of grid support in the Regulatory Test process, there is considerable uncertainty regarding volume requirements and therefore cost, due to the exogenous factors outlined above. Powerlink accounts for these uncertainties in two ways:

- o During the evaluation of network and non-network solutions under the Regulatory Test, these uncertainties are factored into the evaluation by using scenarios which include a range of plausible values for exogenous factors, and the resultant impacts on grid support volume requirements and therefore costs. The Regulatory Test is well suited to this kind of scenario analysis as it is structured to do this. The solution which satisfies the regulatory test is the best ranked option "in the majority of but not necessarily all scenarios".
- o Powerlink has taken account of the potential variability in grid support costs as part of this Revenue Proposal by forecasting grid support based on average conditions. Variability in actual grid support costs need to be managed through a combination of "unders and overs" adjustments and pass through

[60] Powerlink engaged SAHA International to undertake statistical analysis of historic and forecast grid support requirements and costs in North Queensland. SAHA found there was insufficient correlation to forecast grid support from input variables with any accuracy.

arrangements. The ACCC/AER recognises this potential variability, and the fact that it is driven by factors exogenous to Powerlink[61].

South East Queensland Reactive

Powerlink has identified other emerging situations where grid support arrangements have the potential to economically defer possible future transmission investment. None of these situations has yet reached the stage where the Regulatory Test has been formally applied. Therefore, Powerlink has prepared preliminary cost estimates for inclusion in this Revenue Proposal. Again, it is proposed that pass through arrangements will apply to manage the eventual actual grid support expenditure.

The South East Queensland region is a net importer of electricity, as the amount of electricity used in the region significantly exceeds the amount generated locally. Only about 30% of energy consumed in South East Queensland during peak demand periods can be produced by power stations within the area, such as Swanbank and Wivenhoe.

Significant quantities of reactive power are required within South East Queensland to ensure transmission voltages remain stable when the network is heavily loaded at times of peak demand. The majority of this reactive power is provided by capacitors and static var compensators within the Powerlink and Energex networks. A relatively small amount of reactive power is provided by Swanbank and Wivenhoe generators.

NEMMCO currently contracts with Swanbank and Wivenhoe generators for provision of reactive power capability. These contracts expire on 30 June 2007, from which date there is no certainty that this reactive power will continue to be available to support power flows on the transmission network.

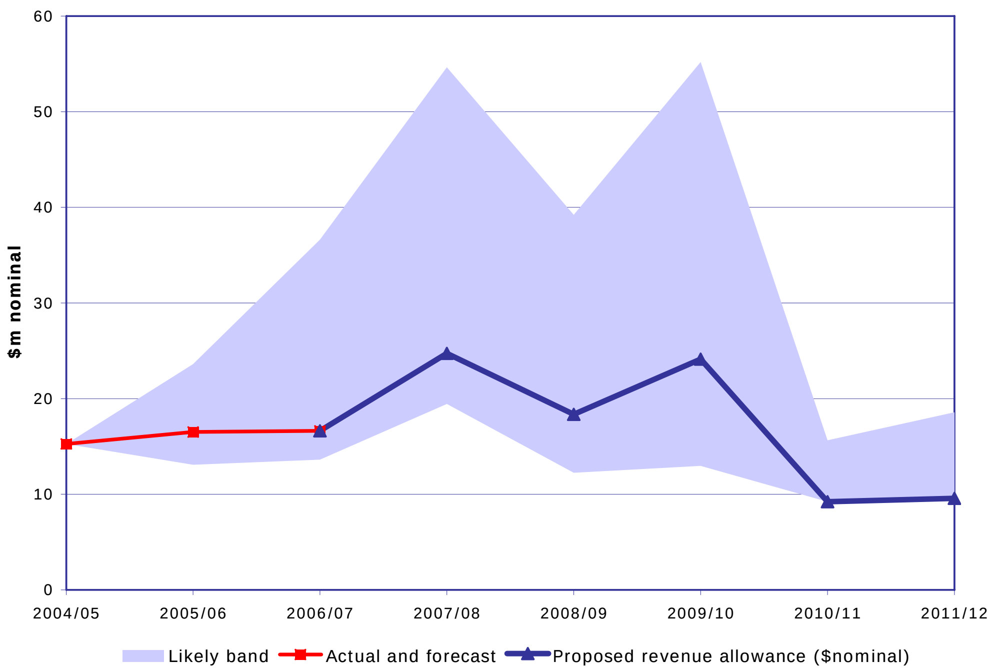
Powerlink is required to ensure that required levels of reactive support continue beyond the mid 2007 expiry of these current (non-market) ancillary services arrangements with NEMMCO. Powerlink could achieve this either via direct commercial arrangements with local generators and/or via installation of additional reactive support equipment in its network. Powerlink is currently negotiating contracts with the relevant generators to ensure that, to the extent it is economic, reactive power is provided to support the transmission network.

[61] Pass through arrangements were provided in Powerlink's 2001 revenue determination to manage these uncertainties.

Grid support revenue arrangements

A characteristic of the impacts of the exogenous factors which affect grid support requirements is that resultant cost volatility is asymmetric, i.e. the reduction in costs arising from milder-than-average conditions is much smaller than the increase in costs arising from hot and dry conditions. Figure 7.10 shows forecast grid support expenditure based on average conditions and the likely range of expenditure which could arise under different weather conditions.

Figure 7.10: Actual and forecast grid support costs



As a result of the difficulty in accurately forecasting grid support requirements and the asymmetric nature of the cost distribution, Powerlink proposes its grid support forecast be included as an additional element of operating expenditure, with a pass through arrangement to manage differences (both "unders" and "overs") between the allowance and actual grid support expenditure. The grid support forecast is based on estimated outcomes for average conditions. Powerlink's experience is that grid support expenditure actually required in each year will vary from the allowance for that year. However, with a two way pass through arrangement, customers only pay for the grid support that is actually required.

Grid support forecast

The grid support forecast to be included as an operating expenditure item is in Table 7.9. In preparing these forecasts, Powerlink has ensured that no "double dipping" has occurred between the capital expenditure and grid support forecasts. The decrease in the grid support forecast in the later years of the period is due to mooted network and local generation developments in that timeframe.

Table 7.9: Grid support forecast

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Grid support	24.03	17.34	22.15	8.22	8.30

7.6 Capex efficiencies

The SRP provides for identification of management induced capex efficiencies in the current regulatory period. As noted in section 3.8, Powerlink identified one investment, supply reinforcement to the Gold Coast area, which it believes qualifies for this treatment. These efficiencies are proposed to be shared 50/50 with customers, with Powerlink's share of these efficiencies being $19.2 million ($05/06). It is proposed that these efficiencies be included as an opex allowance spread evenly over the next regulatory period. In addition, Powerlink's November 2001 revenue decision included a carryover allowance of $8.2 million to be included in the coming period for demonstrated efficiency savings on the development of QNI. These are in Table 7.10.

Table 7.10: Capital efficiencies to be included in operating expenditure

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Gold Coast supply	4.85	4.85	4.85	4.85	4.85
QNI efficiency (carryover)	2.85	2.85	2.85	2.85	2.85
Total efficiencies allowance	7.70	7.70	7.70	7.70	7.70

7.7 Total operating expenditure allowance

Table 7.11 summarises the total opex forecast for the next regulatory period. In order to undertake "apples vs apples" comparisons with other entities or with historic trends, it is necessary to consider the "controllable" opex portion of the total opex. The controllable opex subtotal is provided for that purpose.

Table 7.11: Total operating expenditure forecast

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Network Maintenance	64.32	69.07	73.66	78.30	83.54
Network Operations	10.11	10.53	10.95	11.38	11.84
Corporate/Business Support	33.24	34.19	35.96	39.72	38.29
Insurance	4.93	5.10	5.28	5.45	5.60
Subtotal: Controllable Opex	**112.60**	**118.89**	**125.85**	**134.85**	**139.26**
Grid Support	24.03	17.34	22.15	8.22	8.30
Capex Efficiencies	7.70	7.70	7.70	7.70	7.70
Debt Management Costs	4.89	4.20	4.28	4.40	3.79
Equity Raising Costs	2.47	2.47	2.47	2.47	2.47
Total Opex	**151.69**	**150.59**	**162.44**	**157.65**	**161.52**

Note - Numbers may not add due to rounding.

Chapter 8 – Depreciation

8.1 Nature of depreciation

Australian Accounting Standards characterise depreciation as the recognition of the reduction of economic benefits embodied in depreciable assets (assets of physical substance expected to be used for more than one financial period) that are consumed or lost in a financial period. Australian Accounting Standard AASB 116 requires that: "***Depreciation*** is the systematic allocation of the depreciable amount of an asset over its useful life."

Australian Accounting Standards recognise that the reduction of economic benefits embodied in a depreciable asset commences "when it is available for use, that is, when it is in the location and condition necessary for it to be capable of operating in the manner intended". Depreciation is therefore systematically allocated against an asset according to a method over the useful life of the asset from the time it is available for use.

8.2 Assessment of useful lives

Accounting standards recognise that a characteristic common to all physical assets held on a long-term basis, with the exception generally of land, 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;

- o 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;
- o 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;
- o the expected commercial life of the asset, corresponding to the commercial life of its product or output (the possibility of an alternative use for the asset by the entity needs to be kept in mind); and
- o 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.

Accounting standards require that the useful life of assets must be reviewed "at least at the end of each annual reporting period".

Powerlink has used a "roll forward" process to determine the remaining useful lives of assets in service. The remaining useful life of each asset class has been reduced by one year for each year 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.

For the opening RAB, the "rolled forward" remaining useful life at the commencement of the next regulatory period has been used for depreciation in this Revenue Proposal.

8.3 Depreciation methods

Several methods are available for allocating the depreciable amount where the useful life is estimated on a time basis, according to whether it is considered that the pattern will remain constant across reporting periods, or will increase or decrease over time. The straight-line method is a means of determining systematic allocations which are constant across reporting periods. The reducing-balance method is one of several methods yielding allocations which decrease across reporting periods. Such decreasing allocations would be justified where an asset can be expected to yield more service in the earlier reporting periods than in the later.

Australian Accounting Standards require that "the Depreciation method shall reflect the pattern in which the asset's future economic benefits are expected to be consumed by the entity." Powerlink has adopted the straight-line method of depreciation as this is considered to provide the best approximation of the depreciable amount consistent with utilisation patterns and service potential of assets. Powerlink applies no depreciation to land and easement assets.

Changes to taxation over recent years has resulted in depreciation rates being calculated in a manner similar to accounting methods, with the requirement to determine the useful life of the asset over which the deductions are claimed. However, unlike accounting depreciation, tax depreciation is based on the as constructed value of an asset and is not escalated each year to reflect changes in monetary values.

8.4 Depreciation forecast

The depreciation forecast (for Powerlink's regulated assets) for the 2008 –2012 period, used to calculate the return of capital component of Powerlink's revenue is as follows:

Table 8.1: Depreciation forecast

Depreciation $m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Forecast	154.12	171.62	173.99	183.30	192.58

The taxation depreciation forecast for the period 2008 to 2012 is as follows:

Table 8.2: Taxation depreciation forecast

Depreciation $m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Forecast	106.41	123.11	132.63	141.51	149.22

8.5 Summary

Powerlink utilises the "straight-line from useful life" method to calculate depreciation for accounting purposes (except in the case of non-depreciable assets). This is considered to provide the best approximation of depreciation consistent with the expected use of Powerlink's assets for regulatory purposes.

Some assets will require changes to depreciation rates to recognise changes in the pattern of reduction in economic benefits. Specific depreciation rates can be attributed to individual assets in these instances.

Powerlink has calculated useful lives for the tax inputs of the AER's revenue model on the basis of tax law, where assets are recognised when commissioned (i.e. available for use), and useful lives are initially calculated from the commissioning date.

Chapter 9 – Taxes

9.1 Tax treatment

Under the SRP, the tax amount in the building block calculation of revenue is based on a benchmark business structure. The AER's revenue model utilises this benchmark as one component in estimating the tax payable by the benchmark entity. Another component in the revenue model is the estimated tax depreciation of the actual asset base.

9.2 Asset lives for tax

In recent years, the Ralph Tax Reforms have introduced changes to the way in which tax deductions are calculated for depreciation. Powerlink assets are generally not eligible for the concessional tax depreciation rates. Tax depreciation deductions are based on straight line depreciation reflecting the remaining useful lives of the assets.

In accordance with taxation laws, Powerlink has calculated tax depreciation on the value of commissioned assets from the time they are expected to be installed ready for use[62].

In summary, tax deductions for tax depreciation are reducing as a proportion of the RAB because tax depreciation deductions are not escalated for changes in CPI.

9.3 GST

All amounts in this Proposal are exclusive of GST. Therefore, for Powerlink to receive the revenue determined from this Proposal, GST must be added to the network charges (TUOS) derived from the revenue caps (where appropriate).

9.4 Effective tax rate

The revenue model performs calculations to determine a notional "taxable income" and "tax payable" for the business. Influencing these calculations are the tax deductions for depreciation that are available to the business.

[62] This has necessitated a change to the PTRM published by the AER.

Chapter 10 – Total Revenue

10.1 Introduction

Powerlink's Proposal for revenue is based on the post-tax building block approach outlined in the SRP. The components for each building block were proposed in the preceding chapters of this Revenue Proposal.

The building block formula to be applied in each year of the regulatory period is:

MAR	=	return on capital + return of capital + opex + tax
	=	(WACC * RAB) + D + opex + tax

where:

MAR	=	maximum allowable revenue
WACC	=	post-tax nominal weighted average cost of capital ("vanilla" WACC);
RAB	=	Regulatory Asset Base;
D	=	depreciation;
opex	=	operating and maintenance expenditure;
tax	=	regulated business income tax allowance.

10.2 Building block components

10.2.1 Asset base

Powerlink has modelled its regulatory asset base over the current regulatory period. The estimated 1 July 2007 opening asset value of $3,796.48 million was established in Chapter 4.

Asset values are rolled forward by taking the closing asset value and using it as the opening value for the next year, converting it to a nominal figure by adding an inflation adjustment, adding in any capital expenditure and subtracting depreciation for that year.

10.2.1.1 Capex

A forecast of capital expenditure is detailed in Chapter 6. As the revenue calculation model[63] calculates return on assets using the opening asset balance, an additional

[63] The post tax revenue model from the AER.

financing cost is applied to new capex to take account of its progressive incidence throughout the previous year.

A summary roll-in of capital, excluding financing costs, is given in Table 10.1.

Table 10.1: Summary of capital expenditure

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Total Capex	546.31	543.02	456.10	466.49	437.32

10.2.1.2 Inflation

An inflation rate of **2.91%** per annum has been assumed for each year of the next regulatory period.

10.2.1.3 Depreciation

Depreciation for the regulatory asset base has been derived and detailed in Chapter 8 of this Proposal. A summary of the depreciation allowance proposed in given in Table 10.2.

Table 10.2: Summary of depreciation allowance

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Depreciation	154.12	171.62	174.00	183.30	192.58

The AER modelling approach uses economic depreciation. This approach combines both the straight line depreciation and inflation component, and is summarised in Table 10.3.

Table 10.3: Summary of economic depreciation

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Economic depreciation	48.02	55.51	47.56	49.83	52.09

10.2.2 Weighted Average Cost of Capital

In order to calculate a forecast value for annual revenues, Powerlink has assumed a post-tax nominal WACC of 8.34%, assuming a risk-free rate of 5.28%, and the WACC parameters outlined in Chapter 5. The WACC will need to be calculated by the AER at the time of its Final Decision.

10.2.3 Asset base roll forward

The estimated asset roll forward, commencing 1 July 2007, is summarised in Table 10.4.

Table 10.4: Summary of Regulatory Asset Base roll forward

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Opening asset value	3,796.48	4,334.13	4,877.72	5,348.03	5,843.30
Capital additions*	585.67	599.10	517.87	545.09	525.89
Economic depreciation	48.02	55.51	47.56	49.83	52.09
Closing asset base	4,334.13	4,877.72	5,348.03	5,843.30	6,317.10

* Includes FDC2
Note - Numbers may not add due to rounding.

10.2.4 Return on capital

Return on capital has been calculated by applying a post-tax nominal vanilla WACC to the opening regulatory asset base. Powerlink has based the return on capital on opening asset values in line with the AER post tax revenue model approach.

Table 10.5: Summary of return on capital forecast

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Opening asset value	3,796.48	4,334.13	4,877.72	5,348.03	5,843.30
Return on capital	316.69	361.54	406.88	446.11	487.43

10.2.5 Opex

Chapter 7 of this Proposal details Powerlink's requirement for operating and maintenance expenses for each year of the regulatory period. This total opex requirement, including grid support and other allowances, in nominal price levels, is summarised in Table 10.6.

Table 10.6: Summary of forecast operating and maintenance expenses

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Controllable opex	115.88	125.91	137.16	151.25	160.75
Other opex allowances	40.23	33.57	39.89	25.58	25.70
Total opex	**156.11**	**159.49**	**177.05**	**176.83**	**186.45**

Note - Numbers may not add due to rounding.

10.2.6 Income tax payable

Tax depreciation associated with the regulatory asset base is outlined in Chapter 9. Based on this tax depreciation, and the calculated revenue estimates and operating costs (including benchmark debt costs) in this Proposal, tax payable has been determined. Estimated tax payable is summarised in Table 10.7.

Table 10.7: Summary of income tax payable

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Tax payable	38.76	42.60	43.44	46.74	50.65

10.3 Total building block revenue

Based on the revenue parameters outlined in this Chapter of the Revenue Proposal and applying the building block approach, the following unsmoothed revenue requirements have been calculated.

Table 10.8: Summary of regulated revenue calculation

$m nominal	2007/08	2008/09	2009/10	2010/11	2011/12
Return on capital (assets under construction roll in)*	44.20				
Return on capital (other)	272.49	361.54	406.88	446.11	487.43
Return of capital	48.02	55.51	47.56	49.83	52.09
Operating expenses	156.11	159.49	177.05	176.83	186.45
Net Taxes payable	19.38	21.30	21.72	23.37	25.33
Unadjusted revenue	540.20	597.84	653.22	696.14	751.30

* For change to "as incurred" capex recognition

10.4 Revenue cap adjustments

10.4.1 Adjustment for actual CPI

The derivation of revenue caps is based on a CPI annual movement of 2.91% over the next regulatory period. As the impacts of variations in actual CPI compared with the pre-estimated value compounds over time, an automatic adjustment will be allowed to take account of actual (historic) CPI. The actual revenue caps to apply will be based on real revenue caps (in 2006/07 price levels) adjusted for the historic movement in CPI.

10.4.2 Adjustment for grid support costs

As outlined in Chapter 7 of the Proposal, a pass through is proposed to cover actual expenditure associated with grid support costs. An adjustment will be made to the revenue cap in each year based on the difference between actual and forecast expenditure, including reasonable administrative and overhead costs, and the allowance provided in the operating expenditure. This Revenue Proposal includes the following allowance for grid support costs.

Table 10.9: Summary of included grid support costs

$m 06/07	2007/08	2008/09	2009/10	2010/11	2011/12
Grid support costs	24.03	17.34	22.15	8.22	8.30

10.4.3 Adjustment for insurance

Arrangements for insurance have been outlined in Chapter 7 of this Proposal. Those arrangements include a pass through arrangement to cover changes in the actual cost of insurance premiums, changes to available insurance and deductibles on insurance claims.

10.4.4 Other adjustments

Within the revenue arrangements, there is also a need to consider the impact of exogenous events for which the cost impact cannot be reasonably forecast at the time of the revenue reset. Adjustments to the revenue allowance may be required for such exogenous events.

The AER commenced a consultation[64] in relation to pass throughs and revenue cap re-openers in December 2005 outlining a change in approach, from the revenue cap reopened approach outlined in the SRP, to an approach based on pass-throughs for a list of pre determined classes of exogenous events. The AEMC has issued a Rules Proposal[65] in accordance with their review of electricity transmission revenue and pricing rules which includes pass through arrangements substantially the same as proposed by the AER in its position paper. The AER has now suspended its consideration of this matter, subject to any variation in the Final Amendment Rule from the AEMC.

The exogenous events for which a pass through would be considered are therefore:

- a Change in Taxes Event;
- an Insurance Event;
- a Service Standards Event;
- a Terrorism Event, and
- a Grid Support Event.

[64] AER position paper, Pass throughs and revenue cap re-openers, December 2005

[65] AEMC, Draft National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006, 16 February 2006.

Insurance events and grid support events are known exogenous events which have been discussed above. Powerlink will, if necessary, make application for an adjustment of revenue allowance for the other exogenous events listed for which a pass through allowance may be provided during the next regulatory period should any of those events arise.

10.5 Smoothed total revenue

Clause 6.2.4 of the NER provides that economic regulation is to be of the CPI – X form. An NPV neutral smoothing process is applied to the building block revenue allowance to derive a revenue path for Powerlink over the next regulatory period.

Because of the AER's requirement that Powerlink change its capex from an "as commissioned" basis to an "as incurred" basis, there is a step increase in the return on capital component of MAR in the initial year (2007/08), as the "work in progress" is rolled into the RAB.

The AER will need to decide whether to reflect this as a step increase in MAR in 2007/08, or to smooth it over the whole regulatory period. Powerlink's smoothed MAR will depend upon the AER's decision on this matter.

10.6 Price impact

Powerlink has determined the average price impact of this revenue outcome on its customers. Customer transmission use of system (TUOS) charges are anticipated to increase by 10% (step change) as a result of the AER required change in treatment of capital expenditure (from "as commissioned" to "as incurred"), and 5.5% per annum as a result of Powerlink's costs in meeting our mandated obligations. The latter component is directly attributable to the higher input cost drivers outlined previously.

Since transmission charges represents about 8% of the total delivered price of electricity for most customers, then the impact on the average total delivered electricity price is only about 0.5% per annum.

10.7 Contingent projects

Contingent projects have been listed in section 6.11. These contingent projects will be individually assessed under the regulatory test, as and when the trigger arises. Powerlink proposes that contingent projects be assessed by the AER to provide a revenue stream within the coming period. As these contingent projects are required either to meet Powerlink's mandated reliability of supply obligations or to deliver net market benefits, the assessment of contingent projects by the AER and determination of the revenue allowance to be provided to Powerlink must be timely. Powerlink has proposed a mechanism for the treatment of contingent projects in Appendix A.

10.8 Recovery of discounted TUOS

Clause 6.5.8 of the Code allows TNSPs to recover from other customers the amount of any discount on TUOS charges (general and common service charges), subject to AER approval in accordance with the discount recovery guidelines[66].

Where applications for approval of a discount recovery have been made after 3 May 2003, the NER requires that these discount recoveries must be approved at each revenue reset. In these cases, the AER must include its assessment of the discount recovery application in its revenue decision.

Powerlink requests the AER formally consider the discount recovery made by Powerlink over the current regulatory period.

[66] The AER Discount Recovery guidelines dated 3 May 2003.

Chapter 11 – Service Standards

11.1 Introduction

Service standards are a performance incentive arrangement linked to the Revenue Cap. They are intended to provide economic incentives for TNSPs to deliver transmission services. Service Standards Guidelines were developed by the ACCC in 2003 and have been adopted by the AER[67].

Service standards should meet the following principles:

- Only apply for factors within Powerlink's control or which Powerlink is best placed to manage, and conversely, standards cannot be set based on things which are outside of Powerlink's control;
- Be consistent with planning and network development standards;
- Not impose a "one size fits all" approach on Powerlink as there are significant differences in responsibility, operating environment, etc. between TNSPs;
- That network performance be consistent with standards and criteria set for operation of the network. Specifically, Powerlink cannot be accountable for achieving a standard which exceeds the criteria used by NEMMCO to operate the power system in accordance with the NEL; and
- Be consistent with the capex and opex allowed by the AER.

The service standards proposed in this Revenue Proposal were developed in accordance with the principles listed above and the AER Service Standard Guidelines.

Powerlink is committed to the development of a performance incentive (PI) scheme based on measures that TNSPs control and/or manage and that rewards TNSPs for above benchmark performance whilst providing penalties for performance below an "acceptable" level.

The PI scheme does not apply financially to Powerlink during the current regulatory period as it did not commence until after Powerlink's 2001 revenue decision. Despite Powerlink's willingness to participate in the PI scheme during this regulatory period,

[67] Compendium of Electricity Transmission Regulatory Guidelines August 2005.

the ACCC considered that the Code[68] did not allow Powerlink's revenue cap to be reopened such that the scheme could be applied. Powerlink therefore proposes that the scheme developed in 2003 should now be applied to Powerlink.

11.2 AER service standards

The Service Standards Guidelines provide for five core performance measures to be incorporated into the revenue cap framework:

- Transmission circuit availability;
- Average outage duration;
- Frequency of "off-supply" events;
- Inter-regional constraints; and
- Intra-regional constraints.

The ACCC engaged Sinclair Knight Merz (SKM) to analyse the historic performance of TNSPs to develop suitable targets and incentive arrangements for each measure. SKM found only the first three measures could be developed into a PI scheme as there was insufficient data across the NEM for the last two measures. The results of this analysis were published[69] and used in setting targets for several transmission businesses.

The AER has an ongoing work program to monitor possible measures for the inter and intra regional constraints and to develop an incentive arrangement around market impacts. It should be noted that positive performance on some Powerlink measures (eg. circuit availability) will also deliver positive outcomes for market participants.

11.3 Powerlink characteristics

Powerlink's network is significantly different to other Australian transmission networks, with two particularly distinguishing characteristics. First, it is very "long and thin", with minimal meshing and alternative flow paths. Second, the high-growth driven large capital program means that more outages are required than in other networks to connect new lines and substation elements. This means a lower circuit

[68] The National Electricity Code at that time.

[69] Transmission Network Service Provider Service Standards November 2002.

availability than other networks. It is therefore inappropriate to apply performance targets of less linear, lower growth/capex networks to Powerlink.

There are inherent differences in the base level performance required of any network. This performance depends on, among other things:

- the current structure of the network (geographically dispersed and extended versus more compact and meshed);
- the nature of the load to be met (sustained loads versus "peaky" load curves); and
- the amount of capital works (more capital works requires more outages for connecting new works and construction of new works in proximity to existing equipment).

Powerlink's extensive capital program forecast for the upcoming regulatory period will have a considerable impact on the measured performance of the transmission network. Given this additional impediment, Powerlink considers it will become even more difficult to meet the service targets.

In response to feedback from market participants, Powerlink has already implemented a series of initiatives to ensure network performance is operated and managed as effectively as possible. These initiatives include the introduction of live substation work (unique in Australia), ongoing live line work, flexible work arrangements (including 7-day work rosters for field staff), and improved outage coordination processes (such as the establishment of an outage coordination team).

11.4 Market impact performance measures

At the time of this Revenue Proposal, the AER had not proposed market impact measures.

11.5 Proposed service standards

The proposed service standards for Powerlink's PI scheme include transmission circuit availability, loss of supply events frequency, and forced outage duration. The proposal is in accordance with the scheme developed by SKM for the ACCC in 2002.

11.5.1 Transmission circuit availability

Transmission circuit availability is the percentage of time that each transmission element is available during the year. Transmission elements can be unavailable due to either planned outages (eg. for necessary maintenance work, or connecting and commissioning new works) or unplanned (forced) outages. Planned outages represent the majority of time that transmission elements are unavailable. As forced outages occur infrequently and usually last for short periods, they have little impact on overall availability.

The objective of this measure is to provide incentives for TNSPs to minimise planned outages on all network elements, particularly critical circuits during peak hours. This measure therefore includes market impacts by incentivising Powerlink to take planned outages away from peak times (when price is expected to be higher than average) and to maximise availability of critical network elements.

Powerlink therefore proposes separate sub-measures on availability during peak hours (7am to 10pm weekdays) as well as availability of critical (primarily 275/330kV network) and non-critical network (132/110kV network and below). These sub-measures take account of periods when the transmission network is of most value to customers (peak times) and when the most critical parts of the transmission network would have the greatest customer impact.

The proposed sub-measures are to have separate threshold values and financial incentives as shown in Table 11.1 and Figures 11.1(a), (b) and (c). Circuit availability is proposed to represent 39.5% of the total financial incentive. Calculation of availability is in accordance with the AER's Service Standards Guidelines.

Powerlink recognises its proposed targets are lower than for other TNSPs. This reflects the larger number of planned outages required to implement Powerlink's large capex program, and the long, thin nature of the network.

It should be noted that Powerlink's capex and opex forecasts include overtime labour costs and higher live working costs to support these targets. Any reduction of these costs in the revenue decision must be accompanied by a corresponding reduction in the performance targets.

Table 11.1: Proposed transmission circuit availability measures

Transmission circuit availability	Unit	Weighting %	Max Penalty	Start Penalty	Target	Start bonus	Max Bonus
1a.Availabilty – Critical Elements	%	15.5	96.55	97.15	97.15	97.15	97.65
1b. Availability - Non-critical Elements	%	8.5	96.33	97.98	97.98	97.98	98.33
1c. Availability Peak Hours	%	15.5	96.65	97.45	97.45	97.45	98.15
Total Weighting		39.5					

Figure 11.1(a) – Measure 1a. Circuit Availability (critical elements)

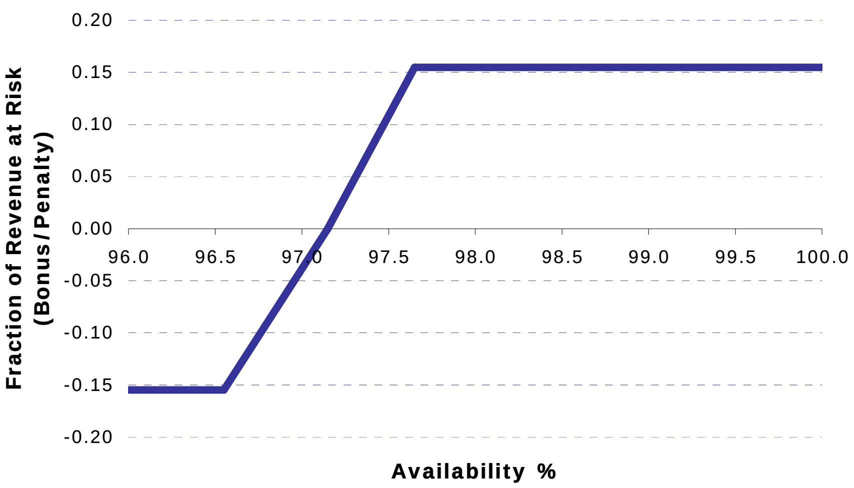


Figure 11.1(b) – Measure 1b. Circuit Availability (non-critical elements)

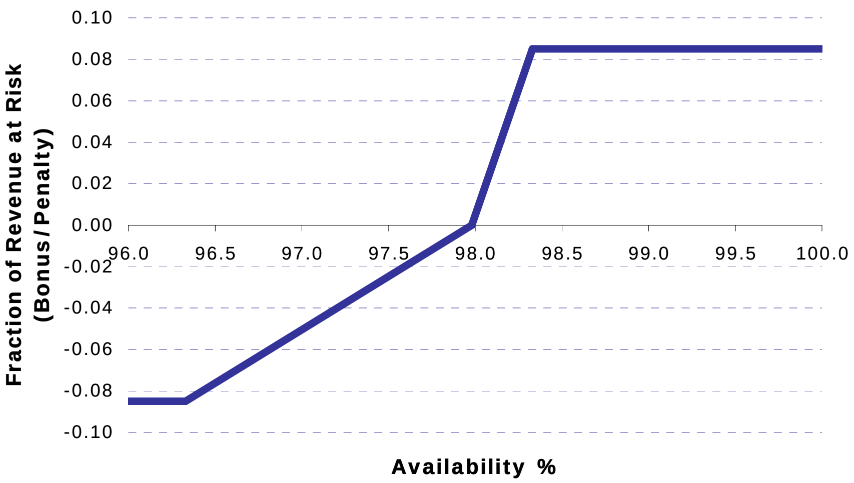
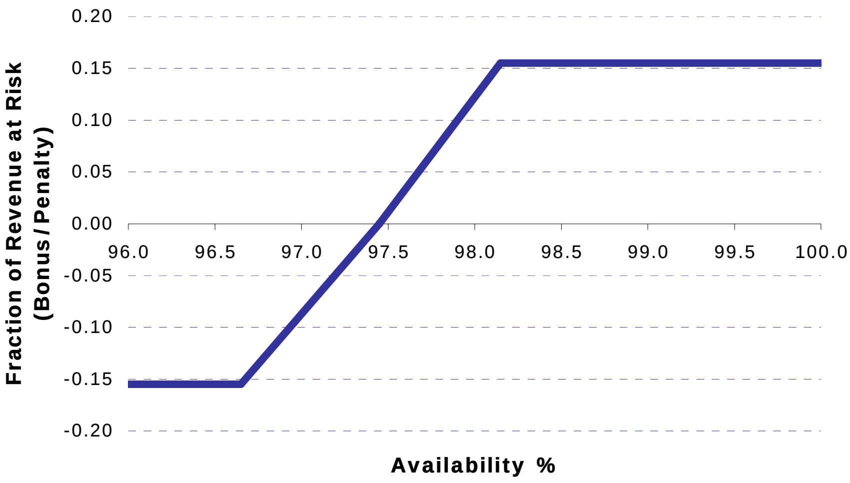


Figure 11.1(c) – Measure 1c. Circuit Availability (peak time)



11.5.2 Number of loss of supply events

This performance measure is the number of events that result in a moderate loss of supply (events exceeding 0.2 system minutes) and a large loss of supply (events exceeding 1.0 system minute). A loss of supply event of one system minute is equivalent to the loss of the maximum recorded state demand (currently about 8300MW) for one minute. Powerlink proposes two thresholds for loss of supply events in recognition of the fact that a large event has a greater impact on consumers.

This measure provides incentives to minimise the number of these loss of supply events. The two event sizes are proposed to have separate threshold values and financial incentives shown in Table 11.2 and Figures 11.2(a) and (b). At 45.5%, loss of supply events represent the largest proportion of the total financial incentive. Calculation of loss of supply levels is in accordance with the AER's Service Standards Guidelines.

Table 11.2: Proposed loss of supply event measures

Number of loss of supply events	Unit	Weighting %	Max Penalty	Start Penalty	Target	Start bonus	Max Bonus
2a. Loss of Supply > 0.2 sys mins	No.	15.5	6	4	4	3	1
2b. Loss of Supply > 1.0 sys mins	No.	30.0	3	2	1	0	0
TOTAL WEIGHTING		45.5					

Figure 11.2(a) – Measure 2a. Loss of Supply events > 0.2 system minutes

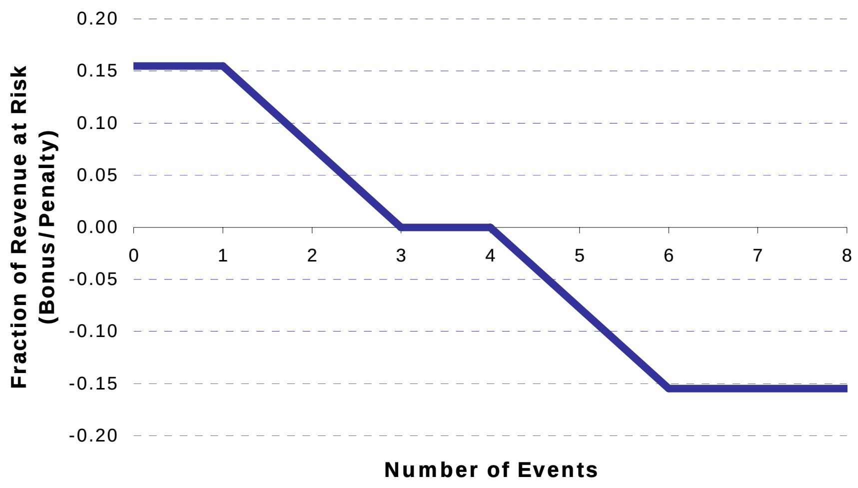
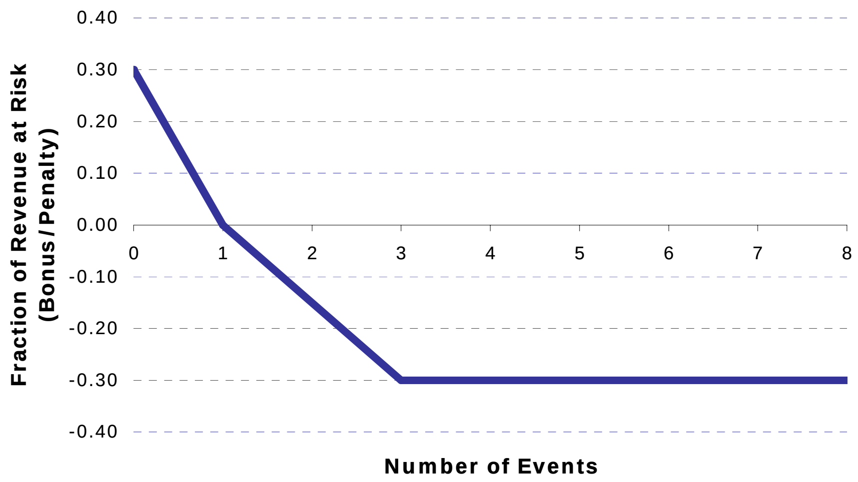


Figure 11.2(b) – Measure 2b. Loss of Supply events > 1.0 system minutes



11.5.3 Forced outage restoration time

This measure is the average time taken to restore an unplanned network outage, with the longest outage time for any single event capped at 7 days. Capping the duration of any single outage event overcomes the incorrect signal of any one event (if large enough) dominating measured performance. Such events could be catastrophic failure of a transformer or static VAr compensator, which takes in excess of 7 days to replace even if a suitable spare is available.

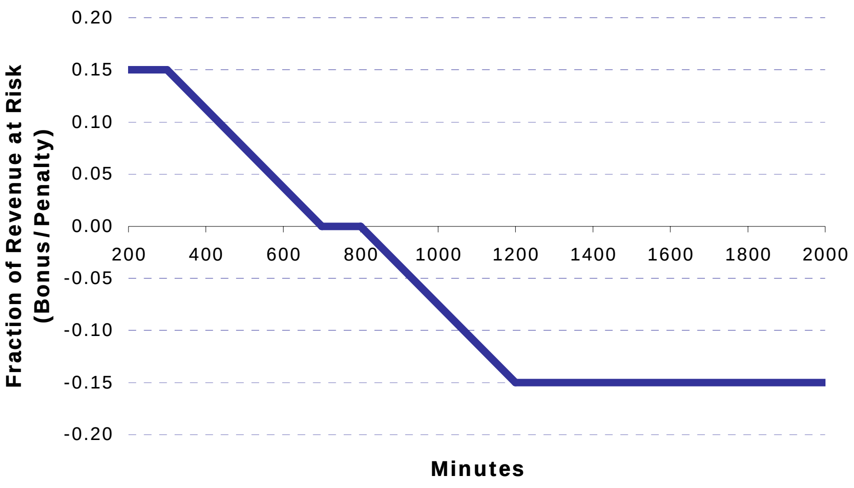
The objective is to encourage Powerlink, following an unplanned outage, to restore the system to a good operating state in an appropriate time.

It is proposed that this measure represent 15% of the total financial incentive. Calculation of forced outage duration is in accordance with the AER's Service Standards Guidelines, with the maximum level capped at 10,080 minutes (7 days). The proposed measure is in Table 11.3 and Figure 11.3.

Table 11.3: Proposed average forced outage restoration time measure

Forced outage restoration time	Unit	Weighting %	Max Penalty	Start Penalty	Target	Start bonus	Max Bonus
3. Average Outage Duration (capped 7 days)	Min	15.0	1200	800	800	700	300

Figure 11.3 – Measure 3. Average Forced outage restoration time



11.5.4 Summary

Table 11.4 summarises the proposed service standards scheme for Powerlink.

Table 11.4: Powerlink's proposed service standards measures

Measure	Unit	Weighting %	Max Penalty	Start Penalty	Target	Start bonus	Max Bonus
1a.Availabilty – Critical Elements	%	15.5	96.55	97.15	97.15	97.15	97.65
1b. Availability - Non-critical Elements	%	8.5	96.33	97.98	97.98	97.98	98.33
1c. Availability Peak Hours	%	15.5	96.65	97.45	97.45	97.45	98.15
2a. Loss of Supply > 0.2 sys mins	No.	15.5	6	5	4	3	1
2b. Loss of Supply > 1.0 sys mins	No.	30.0	3	2	1	0	0
3. Average Outage Duration (capped 7 days)	Min	15.0	1200	800	800	700	300

11.6 Application to Powerlink

It is proposed that the total financial incentive available from the service standards be capped at ± 1% in accordance with the AER's Service Standards Guidelines. Powerlink notes that 1% of revenue is equivalent to about 5% of controllable opex, which is a substantial incentive.

The first year incentives can be applied to Powerlink is from commencement of the next regulatory period (1 July 2007). In line with the arrangements established for other TNSPs, calendar year 2006 performance would be used to apply the financial incentive in the first year of the next regulatory period.

Appendix A – Contingent projects: proposed arrangements

Powerlink proposes the following arrangements for managing contingent projects. These projects are pre-identified, and may be triggered such that expenditure is required during the next regulatory period (1 July 2007 to 30 June 2012).

Step 1 – Defining contingent projects

Powerlink has prepared a list of contingent projects in this Revenue Proposal. These are large projects, which are not included in the main ex ante allowance. The need for these projects is foreseeable, but the timing is uncertain and is determined by someone other than Powerlink, eg. the proponent of a new major point load which would impact the shared grid. Powerlink has also identified the “trigger” for these projects.

During the assessment of this Revenue Proposal, the AER should consider these contingent projects and confirm they have not been included in the main ex ante capital expenditure forecast.

The AER’s decision should include a list of contingent projects and triggers.

Step 2 – Trigger occurs

When the trigger associated with a listed contingent project arises, Powerlink will evaluate options (both network and non-network) which would satisfy the resultant new need. This would normally involve evaluating solutions in accordance with the Regulatory Test and the associated consultation with market participants and interested parties.

Powerlink will keep the AER informed throughout this evaluation, to ensure the AER can process subsequent steps in a timely manner.

Step 3 – Application to the regulator

Following evaluation of options and publication of the recommended solution[70], Powerlink will make application to the AER for adjustment to the Maximum Allowable Revenue. The adjustment will reflect capital and operating expenditure associated with the contingent project which has been recommended for implementation. The application will include details of the capital and operating expenditure adjustments requested.

[70] Normally this would be the Final Report for a New Large Network Asset published in accordance with Clause 5.6.6 of the NER.

The AER will assess the revenue adjustment within 30 business days of receipt of the application from Powerlink. The AER may only make adjustments to the MAR to accommodate the additional capital and operating expenditure associated with the contingent project. The AER will determine a revised MAR for each remaining year of the regulatory period.

Powerlink may make application to the AER at any time. The MAR will only be adjusted in full financial years, commencing with the first full financial year which is no less than 3 months after the application from Powerlink.

Should the triggers for more than one project arise at around the same time, Powerlink would use its best endeavours to make its application to the AER simultaneously, so as to minimise the number of revenue cap adjustments needed.

Approval of the adjustment will be assumed if the AER does not respond within 30 business days. This is necessary to ensure reliability of supply obligations can be satisfied.

Step 4 – Adjusted revenue

Powerlink will use the adjusted revenue amounts in determining TUOS in the year to which the adjustments apply.

Step 5 – Adjusted capex and opex allowances

For the purposes of the incentive arrangements, the adjusted capex and opex allowances will replace the allowances provided in the original decision for the regulatory period.

Appendix B – Advice from Westpac

Queensland Treasury Corporation Issuing Spread Analysis

Background

The Queensland Treasury Corporation ("QTC") has a client who is preparing a submission to its industry regulator. In that paper, the client would like to allow for the additional cost of issuing a substantial amount of debt in the capital markets. The additional cost has been assessed as the additional margin required to issue an amount over and above the amount regarded as the optimal deal size for a particular credit rating.

Generally with a task such as this, market experience intuition could be utilised to arrive at a possible answer. QTC has asked whether Westpac could provide our thoughts, but have some rigour and analysis around the conclusion we have drawn.

Assumptions

The following assumptions were provided by QTC and/or derived intuitively by Westpac about QTC's client. We have assumed that the client is:-

- a regulated utility,
- a well recognised name,
- has a single A credit rating and
- is looking at a five year maturity.

Based on these assumptions we believe the Optimal Deal size is A$500ml to A$750ml. It has been indicated that the actual amount looking to be raised is A$1.5bln, in one hit.

Methodology

When Westpac lead manages an issue, it undertakes a book build based on a spread range. We have maintained records of those book builds and have analysed 59 book builds undertaken between 2002 and 2005.

We collected all available data relating to the 59 book builds including maturity dates, ratings at issue, value of issues and coupon rates as well as the recorded spreads and the associated book sizes. Of those 59 books, where available, we took three basis points either side of the clearing spread and calculated the percentage increase in the value of the book from basis point to basis point as the spread increased. The average of these values was determined using the total sample and was also refined by various criteria. These averages can be found in the Appendix at the end of this document.

Data Limitations

Unfortunately there were a limited number of single A book build records so we used all book builds as a proxy. Also the spread range within the book build data was sometimes limited, relative to what was required for this exercise.

Conclusions from Data Analysis

The data showed that there was a relatively consistent percentage increase after the clearing spread was reached with the book growing by 16-18% for a 1 basis point increase in the spread. For the next basis point jump (from +1bp over the clearing to +2bp) the increase in book size was 10-16%. For the third basis point jump the book size increased by only around 7%. Extrapolating this it would seem that further increases in the book value as the spread increased would be exponentially smaller. Using these figures as a base, an A-rated A$500ml optimum deal would have a book of approximately A$850ml at 5 basis points above clearing spread, while a A$750ml deal's book would reach approximately A$1.25bln.

Book size percentage increase diminishes as the spread increases which makes achieving substantial volume in one hit difficult. It is therefore debatable, based on the data, whether the total A$1.5bln could be achieved by continual widening of the spread. As stated above a 5 basis point move from the clearing spread of an Optimal Deal is likely to result in a deal size of A$850ml to A$1.25bln. Our best estimate suggests a spread move of between 5 and 10 basis points from the clearing spread could potentially achieve a deal size of A$1.5bln (more likely to the upper end of that range). This is consistent with our market expert's intuitive estimate. The conclusions are based on the assumptions, qualification and disclaimer contained within this paper.

Appendix – Data Summary

	Increase in value of book					
	-3bp to -2bp	-2bp to -1bp	-1bp to Issue	Issue to +1bp	+1bp to +2bp	+2bp to +3bp
Total						
Average		(161.74)%	(237.01)%	17.44%	15.92%	6.92%
Median		(46.19)%	(80.62)%	16.00%	10.45%	5.96%
A Rated						
Average		(320.36)%	963.44)%	21.32%		
Median		(462.50)%	(77.90)%	21.32%		
A- Rated						
Average			(132.36)%	31.06%		
Median			(112.49)%	12.54%		
A+ Rated						
Average		(39.47)%	(96.86)%	10.59%	18.69%	
Median		(36.16)%	(66.67)%	10.93%	5.07%	
AA- Rated						
Average		(247.66)%	(171.70)%			
Median		(62.50)%	(187.83)%			
BBB+ Rated						
Average			(219.20)%	25.04%		
Median			(145.95)%	25.04%		
> $200m Issue						
Average		(40.08)%	(481.69)%	19.22%	8.69%	
Median		(29.60)%	(86.07)%	7.33%	5.07%	
Floating Rate						
Average		(390.77)%	(409.58)%	13.37%		
Median		(500.00)%	(78.57)%	16.00%		
Not Floating Rate						
Average		(85.39)%	(142.09)%	19.14%	11.13%	7.12%
Median		(44.10)%	(82.62)%	14.72%	10.45%	5.76%
Maturity > Jan 08						
Average		(173.17)%	(119.64)%	15.72%	15.92%	6.92%
Median		(48.28)%	(80.47)%	17.65%	10.45%	5.96%

Disclaimer:

The projections given and the conclusions derived within this paper are predictive in character. While every effort has been taken to ensure that the assumptions on which the projections and conclusions are based are reasonable, the projections and conclusions may be affected by incorrect assumptions or by known or unknown risks and uncertainties. The results ultimately achieved may differ substantially from these projections and conclusions.

Westpac requires that in the event that these projections and conclusions are passed onto third parties, that these third parties be made aware of the terms under which these projections and conclusions have been provided.

POWERLINK QUEENSLAND
ABN 82 078 849 233

33 Harold Street Virginia
Queensland Australia
PO Box 1193 Virginia
Queensland Australia 4014

Telephone +61 7 3860 2111
Facsimile +61 7 3860 2100
Email website.enquiries@powerlink.com.au
Website www.powerlink.com.au