AUSTRALIAN ENERGY REGULATOR

Draft Decision

Powerlink Queensland transmission network revenue cap 2007–08 to 2011–12

8 December 2006

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Request for submissions

This document sets out the Australian Energy Regulator's (AER) draft decision on the maximum allowed revenues that Powerlink Queensland is entitled to recover for the period 1 July 2007 to 30 June 2012.

The AER does not propose to hold a public forum on this draft decision because issues can be addressed in written submissions. Interested parties are invited to make written submissions to the AER by the closing date **Friday 9 February 2007**.

Submissions can be sent electronically to powerlinkreset@aer.gov.au

Alternatively, submissions can be sent to:

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The AER prefers that all submissions be publicly available, to facilitate an informed and transparent consultative process. Submissions will therefore be treated as public documents unless otherwise requested. Parties wishing to submit confidential information are requested to:

- clearly identify the information that is the subject of the confidentiality claim
- provide a non-confidential version of the submission, in addition to a confidential one.

All non-confidential submissions will be placed on the AER's website at http://www.aer.gov.au

A copy of Powerlink's application and additional submissions, consultancy reports and submissions from interested parties are available on the AER's website.

Any enquiries about the draft decision, or about lodging submissions, should be directed to the Network Regulation North Branch on (02) 6243 1233.

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Glossary

ACCC	Australian Competition and Consumer Commission
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
APR	Annual planning report
AR	allowed revenue
capex	capital expenditure
CHC	CHC Associates
CPI	consumer price index
CQ	Central Queensland
DCST	double circuit steel tower
DNSP	distribution network service provider
DRP	*Draft statement of principles for the regulation of transmission revenues*, 27 May 1999
EAG	Energy Action Group
EBA	enterprise bargaining agreement
ENA	Energy Networks Association
Ergon	Ergon Energy
ESAA	Energy Supply Association of Australia
EUAA	Energy Users Association of Australia
FDC	finance during construction
GWh	gigawatt hour
kV	kilovolt, (one thousand volts)
MAR	maximum allowed revenue
MEU	Major Energy Users
MVAr	megavar, megavolt amperes reactive, (one thousand kilovolt amperes reactive)
MW	megawatt, (one thousand kilowatts)
MWh	megawatt hour
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
NIEIR	National Institute of Economic and Industrial Research
NPV	net present value
opex	operating and maintenance expenditure

PB	Parsons Brinckerhoff Associates
PoE	probability of exceedance
PTRM	post-tax revenue model
QNI	Queensland–New South Wales Interconnector
RAB	regulated asset base
rules	National Electricity Rules
SCST	single circuit steel tower
SEQ	South East Queensland
SRP	*Statement of principles for the regulation of electricity transmission revenues*, 8 December 2004
the current regulatory period	1 January 2002 to 30 June 2007
the new rules	National Electricity Rules, chapter 6A, 16 November 2006
the next regulatory period	1 July 2007 to 30 June 2012
the old rules	National Electricity Rules, chapter 6, 3 April 2006
TNSP	transmission network service provider
WACC	weighted average cost of capital

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Summary

Overview

The Australian Energy Regulator (AER) is responsible for regulating the revenues associated with the non-contestable elements of the electricity transmission services provided by transmission network service providers (TNSP) in the National Electricity Market (NEM). The AER has had this role since 1 July 2005 when these functions were conferred by the National Electricity Law and the National Electricity Rules (rules).

On 3 April 2006, Powerlink Queensland (Powerlink) submitted an application for the AER to determine its revenue cap for the period 1 July 2007 to 30 June 2012. Powerlink is a Queensland government owned corporation. It owns, develops, operates and maintains Queensland's only high voltage electricity transmission network. The network is used to transport electricity from generators to electricity distribution networks and directly to large industrial customers in Queensland.

Powerlink is subject to regulation of its revenues because it is a monopoly service provider. The AER's role as a regulator is to ensure that the claims and assumptions made by a TNSP are supported by evidence. If the AER is reasonably satisfied that the TNSP's claims are valid, its proposal is generally accepted.

In assessing Powerlink's revenue cap application, the AER looked beyond the information provided by Powerlink. Other material was reviewed and the assessments of experts were considered in testing Powerlink's application. The process is essentially aimed at determining the efficiency of the TNSP's proposed allowances.

The AER's draft decision approved revenues for Powerlink that increase from $536 million in 2007–08 to $736 million in 2011–12. On average, this allowed revenue is around 3 per cent less than Powerlink's requested revenue of $540 million in 2007–08 to $751 million in 2011–12. Overall, the AER considered that the allowed revenues provided to Powerlink are sufficient to develop and maintain its network and meet its obligations over the regulatory period. The main areas of difference between Powerlink's application and the AER's draft decision are:

- Forecast capital expenditure (capex)—Powerlink's forecast capex proposal was reduced from $2449 million ($2006–07) to $2032 million. This reduction is primarily due to adjustments to: load driven capex ($127 million); replacement capex ($111); security and non-network capex ($17 million); the cost accumulation process ($61 million); and the transfer of some projects from the ex ante allowance to contingent projects ($101 million).

- Forecast operating and maintenance expenditure (opex)—Powerlink's forecast opex proposal was reduced from $787 million ($2006–07) to $713 million. The reduction largely ($46 million) results from the AER not allowing Powerlink's claims for equity raising costs, a capex efficiency claim, debt refinancing costs, and interest rate hedging costs. Approximately $29 million of the reduction in opex relates to adjustments made to conditioned based maintenance as well as labour, materials and vegetation management escalation factors.

- Weighted average cost of capital (WACC)—Powerlink proposed a nominal vanilla WACC of 8.34 per cent, however, the AER has determined for Powerlink a nominal vanilla WACC of 8.76 per cent. The AER's WACC is greater than that proposed by Powerlink, primarily because of higher bond yields since Powerlink submitted its application. This results in increase in revenues of $61 million over the next regulatory period compared with the case if the WACC had remained unchanged from that proposed by Powerlink.

Powerlink determines its transmission charges, based on the AER's approved revenues and the pricing principles contained in the rules. The effect of the AER's draft decision on average transmission charges can be estimated by taking the allowed revenues and dividing them by forecast energy delivered in Queensland. Based on this approach, the AER has estimated that its draft decision results in an increase of around 2 per cent (nominal) in average transmission charges in 2007–08, and an average 5 per cent per annum (nominal) increase for the remainder of the regulatory period. Transmission charges represent approximately 8 per cent on average of end user electricity charges in Queensland.

Under this draft decision, average transmission charges will increase from around $10.90 per MWh to $13.40 per MWh by the end of the regulatory period. This increase is primarily due to: increased investment associated with high levels of forecast demand and ageing assets; increased opex due to a growing asset base and increased labour costs; and a higher rate of return (i.e. WACC).

In reaching this draft decision, the AER considers that the allowed revenue it has provided for Powerlink is consistent with the rules, in that it provides a fair and reasonable risk-adjusted cash flow rate of return on efficient investment. The draft decision also provides an acceptable balancing of the interests of Powerlink and users in accordance with the objectives of the rules.

Introduction

In 2001 the Australian Competition and Consumer Commission (ACCC) determined Powerlink's revenue cap for a five and a half year period from 1 January 2002 to 30 June 2007 (the current regulatory period). The AER assumed responsibility for the regulation of electricity transmission services provided by Powerlink on 1 July 2005.

On 3 April 2006, Powerlink submitted its revenue application for the AER to determine its revenue cap for the period 1 July 2007 to 30 June 2012 (the next regulatory period). The AER is required to provide Powerlink with sufficient revenues to meet the efficient costs of maintaining and developing its network, given the forecast growth in demand for electricity transmission services.

The Australian Energy Market Commission (AEMC) commenced a review of the rules for regulating electricity transmission networks in the NEM in mid 2005. During the preparation of Powerlink's application, it was recognised that there was a need to provide certainty to Powerlink as to the basis on which the application would be assessed. Powerlink, the AER and the AEMC agreed to transitional arrangements largely based on the rules in place in April 2006 for the consideration of the revenue cap application.

The new chapter 6A rules (new rules), which were gazetted on 16 November 2006, include transitional provisions for assessing Powerlink's revenue cap application (clause 11.6.12).[1] In general, the Powerlink transitional provisions require the AER to set Powerlink's revenue cap for the next regulatory period substantially (but not entirely) in accordance with the chapter 6 rules that existed at 3 April 2006 (the old rules) and the AER's *Statement of principles for the regulation of electricity transmission revenues* (SRP).[2] This draft decision has been prepared in accordance with clause 11.6.12 of the new rules.

Powerlink's application was published by the AER on 3 April 2006 and interested parties were invited to make submissions on it. Five submissions were received.[3] A public forum on Powerlink's application was held in Brisbane on 20 April 2006.

The AER engaged Parsons Brinckerhoff Associates (PB) as a technical expert to advise it in relation to a number of key aspects of Powerlink's application, including past and forecast capex, opex, and service standards. The AER also engaged CHC Associates (CHC) to provide advice to the AER on technical issues that arose during the review and Access Economics to provide advice on wage growth forecasts in the utilities sector. The AER has released PB's report and Access Economics' report and they should be read in conjunction with the AER's draft decision.

The SRP states that the AER will use the building block approach to set revenue caps. The AER's draft decision has considered each element of the building blocks, including the following matters:

- the prudence of capex undertaken by Powerlink during the current regulatory period
- an opening value of Powerlink's regulated asset base (RAB) as at 1 July 2007
- Powerlink's capex allowance for the next regulatory period
- Powerlink's opex allowance for the next regulatory period
- an appropriate WACC for Powerlink.

Each of these matters is summarised below and discussed in detail in the relevant chapters. Service standards and pass through arrangements are also summarised below and discussed in detail in the relevant chapters.

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1 AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006.

2 AER, *Compendium of electricity transmission regulatory guidelines*, 22 August 2005.

3 The following interested parties provided submissions on Powerlink's application: SP AusNet; Energy Users Association of Australia; Ergon Energy; Major Energy Users and Energy Action Group.

Opening RAB and past capex

AER's approach

The old rules require the AER to determine an opening value of Powerlink's RAB for the next regulatory period. As such, the AER must first determine a valuation for assets that existed at the time of the last revenue reset, and then roll in prudent capex undertaken during the current regulatory period. A key element of the ACCC's 2001 revenue cap decision for Powerlink is that it requires an ex post prudency assessment of capex undertaken in the current regulatory period before the capex is to be included in Powerlink's RAB.

The ACCC's 2001 revenue cap decision for Powerlink approved a capex allowance of $1043 million ($nominal). Powerlink anticipated actual capitalisations of $1274 million ($nominal) during the current regulatory period. In comparison with the 2001 decision allowance of $1055 million (adjusted for actual CPI), this is $219 million or 21 per cent greater than the allowance provided by the ACCC.

The AER has assessed Powerlink's past capex based on the application of the prudency test set out in appendix B of the SRP. This requires the AER to form a view about the prudence of the capex undertaken during the current regulatory period.

Valuation of existing assets

Consistent with the old rules and the SRP, Powerlink has proposed to lock-in and roll forward its 2001 RAB to determine the opening RAB for its next regulatory period. The AER has rolled forward Powerlink's 2001 RAB to determine its opening RAB for the next regulatory period.

Past capex

Prudence of commissioned projects

Powerlink's past capex program consists of 346 projects with a total value of $1274 million (or $1143 million exclusive of finance during construction (FDC)) to be commissioned during the current regulatory period.

PB applied the prudency test to several of Powerlink's commissioned projects and as a result of this review it recommended a prudency adjustment of $6.1 million. PB's overall assessment was that Powerlink's project evaluation and implementation procedures were generally well followed and consistent with good industry practice. It recommended that $1137 million (exclusive of FDC) of commissioned projects be considered prudent and therefore included in Powerlink's RAB.

The AER considered PB's recommendations and is of the view that the ex post assessment of Powerlink's commissioned projects provides sufficient evidence that the capex undertaken during the current regulatory period was prudent. The assessment confirmed that Powerlink had sound management practices that were generally applied. The AER accepted that PB has identified some issues with Powerlink's oversight of certain projects. However, the identified issues are not a consequence of systematic failings and the recommended prudency adjustment was not significant. In this instance,

seeking a prudency adjustment was not viewed by the AER as being consistent with the broader regulatory objectives, including the need to provide certainty in order to maintain an environment that is conducive to efficient investment. For these reasons, the AER has not adopted the recommended prudency adjustment and has allowed an amount of $1165 million (exclusive of FDC) for projects commissioned during the current regulatory period to be rolled into Powerlink's RAB.[4]

Prudence of assets under construction projects

Powerlink stated that, in addition to commissioned works, its works-in-progress (assets under construction) as at 30 June 2007 are estimated to be $530 million. This amount needs to be included in the RAB to align with proposed changes to the regulatory accounting methodology for recognising capex.[5] Exclusive of FDC, Powerlink is seeking to roll into its RAB $480 million at the end of the current regulatory period.

PB applied the prudency test to a sample of projects under construction which would not be commissioned before the end of the current regulatory period. It recommended that a prudency adjustment of $2.4 million be made to one project it assessed was not the least-cost alternative. Following further advice from CHC in relation to the application of prudent avoidance, the AER concluded that Powerlink had followed good industry practice and therefore that the project was prudent.

PB also recommended that an amount of $118 million in relation to several of Powerlink's assets under construction projects should not be included in the assets under construction component of the RAB. This was because it considered that it was unlikely that Powerlink would be able to undertake all of the proposed expenditure on these projects during the remainder of the current regulatory period. PB noted, however, that it might be possible for the AER and Powerlink to revisit the estimate of these expenditures closer to the end of the current regulatory period so that it reflected a more accurate estimate of the expenditures to be incurred. Powerlink has since provided an updated value of $99 million to be incurred in the current regulatory period. The AER considered it was reasonable to accept this updated value. Therefore, it has included an amount of $489 million (exclusive of FDC) in the assets under construction component of Powerlink's RAB.[6]

Finance during construction

Based on the regulatory rate of return specified in the ACCC's 2001 revenue cap decision, the AER has provided Powerlink with allowances for FDC of $119 million for its commissioned assets and $24 million for its assets under construction.

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4 This figure has been adjusted for an identified spreadsheet error, and updated for actual 2005–06 and forecast 2006–07 capitalisations.

5 Powerlink's application recognises forecast capex under the hybrid approach (i.e. return on capital is modelled using the as-incurred approach and return of capital is modelled using the as-commissioned approach).

6 This value is based on updated expenditure forecasts for prudent assets under construction by Powerlink.

Capex efficiencies

In its 2001 revenue cap decision, the ACCC considered that Powerlink demonstrated a sufficiently innovative approach in its construction of the Queensland–NSW Interconnector (QNI) that resulted in management induced capex savings. The ACCC agreed to glide path these efficiency savings over the current and next regulatory periods. Based on the remaining allowance for the QNI capex efficiency, as specified in the ACCC's 2001 revenue cap decision, the AER has provided Powerlink with an annual allowance of $3.2 million ($2006–07) during the next regulatory period (see table 4).

Powerlink also claimed that it had achieved significant management induced efficiencies through the early acquisition and preservation of an easement for the construction of an overhead transmission line. The easement was acquired in the 1980s and is located in the corridor between south Brisbane and the Gold Coast. The AER has not accepted Powerlink's capex efficiency claim in relation to this project.

Review of factors affecting past capex

Powerlink stated that the following factors have contributed to the higher than forecast capex during the current regulatory period:

- actual demand growth is significantly higher than the forecast on which the ACCC's 2001 revenue cap decision was based
- increased input costs associated with labour rates and construction materials in the latter years of the current regulatory period.

The AER has analysed information on Queensland's peak summer demand growth and input costs. It found that peak summer demand has increased significantly in the mid to latter years of the current regulatory period and has substantially exceeded the 2000 demand forecasts that were used by Powerlink to develop its capex requirements for the current regulatory period. Several large augmentation projects have been advanced as a result of this higher than forecast demand growth. The AER accepted that higher than expected demand growth has been a key reason for the higher than forecast capex during the current regulatory period.

PB's review identified some projects that were affected by higher input costs. The AER noted that labour costs and materials prices have increased in the current regulatory period and appeared to have affected Powerlink's inputs costs. However, Powerlink has not provided evidence that quantifies the specific impact of rising labour and material costs and their contribution to its higher than forecast capex during the current regulatory period.

Conclusion

The AER has determined that Powerlink's expenditure of $1165 million on commissioned projects during the current regulatory period is prudent and has included this amount in its RAB. It has also determined that $489 million of Powerlink's assets

under construction at the end of the current regulatory period is prudent and has rolled this amount into Powerlink's RAB.

In accordance with its roll forward methodology, the AER has determined Powerlink's opening RAB to be $3781 million for the next regulatory period (as at 1 July 2007). The RAB roll forward calculations are set out in table 1.

Powerlink's opening RAB for the next regulatory period is about 66 per cent higher (in nominal terms) than its opening RAB at the start of the current regulatory period. This increase largely results from:

- a higher than forecast amount of commissioned assets ($1283 million, inclusive of FDC) compared with the 2001 revenue cap decision
- the inclusion of an assets under construction component of $513 million (inclusive of FDC) for the current regulatory period to allow for a transitioning to the proposed regulatory accounting arrangements.

Table 1 Powerlink's opening RAB for the next regulatory period ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07[1]
Opening RAB	2276.87	2394.51	2553.16	2680.32	2852.56	3007.53
2001 decision capex (adjusted for actual CPI)	155.24	180.12	190.79	233.26	202.37	93.35
CPI adjustment on opening RAB	66.92	82.39	50.59	63.24	85.09	81.20
Straight-line depreciation (adjusted for actual CPI)	–104.53	–103.85	–114.23	–124.26	– 132.50	–140.36
Closing RAB	2394.51	2553.16	2680.32	2852.56	3007.53	3041.72
Add: prudent capex over the 2001 decision allowance[2]						226.93
Add: prudent assets under construction at 30 June 2007						512.73
Opening RAB at 1 July 2007						3781.37

[1] Forecast.
[2] The cash values for disposals of assets have been deducted from capex.

Forecast capex

AER's approach

Clause 11.6.12(c)(2) of the Powerlink transitional provisions requires the AER to set Powerlink's revenue cap for the next regulatory period substantially in accordance with the SRP, including the ex ante approach to setting the forecast capex allowance. Under this approach, the capex allowance for a regulatory period is established at the start of the period based on the AER's assessment of the efficiency and appropriateness of the TNSP's capex proposal.

The AER reviewed Powerlink's forecast capex proposal to assess its efficiency and appropriateness. This included a review of: Powerlink's governance framework; capex policies and procedures; probabilistic planning approach (including demand forecasts

and network planning criteria); a sample of proposed projects; cost accumulation processes, contingent projects and the deliverability of its forecast capex program. The AER's conclusion on each of these elements is summarised below.

Governance framework and capex policies and procedures

PB's findings on Powerlink's capex governance arrangements and capex policies and procedures were generally positive. It found that Powerlink's procedures for project development were robust, coordinated across the various business groups, consistent with its asset management strategies, and consistent with the rules. While PB did find areas where improvements to Powerlink's capex policies and procedures could be made, it did not recommend any adjustments to Powerlink's forecast capex based on these findings.

Overall, the AER accepted PB's advice that Powerlink's capex policies and procedures are robust and consistently applied, and provide a framework that should facilitate efficient investment outcomes.

Probabilistic planning approach

Powerlink developed its load driven forecast capex using a probabilistic planning approach. Deterministic transmission plans for 40 different scenarios were developed and costed to provide Powerlink's estimated capex requirement for the next regulatory period. Powerlink then weighted the deterministic capex for each transmission plan by its probability of occurrence and summed these to arrive at an aggregate probabilistic weighted forecast capex. The probability weighted capex sought by Powerlink for the next regulatory period is $2346 million. This excludes proposed non-network expenditure of $104 million.

The AER accepted PB's findings that Powerlink's planning processes for identifying load driven network expenditure were systematic, thorough and of a very high standard. The AER also accepted PB's findings that the themes and scenarios adopted by Powerlink were plausible and comprehensive, and that the weightings applied to the themes were reasonable.

Demand forecasts

PB reviewed the demand forecasts used by Powerlink in its probabilistic model to derive its capex requirements over the next regulatory period. It concluded that, at a high level, Powerlink's demand forecasting methodology was reasonable and could be relied on for forecasting its load driven capex. PB, however, recommended that the AER consider undertaking a backcasting review of Powerlink's peak demand forecasting outcomes because of the sensitivity of capex to demand forecasts and the large and increasing impact of Powerlink's temperature and diversity corrections.

The AER accepted PB's finding that Powerlink's demand forecasts could be relied on for forecasting its load driven capex requirements. However, in relation to PB's recommendation that the AER consider undertaking a backcasting review, the AER noted that this issue arose part way through the review process and that the provision of a backcasting review did not form part of the AER's information requirements. It is

considered that the inclusion of such a review as part of a TNSP's revenue cap application in the future would provide greater assurance that the demand forecasts underpinning capex proposals can be relied upon.

Network planning criteria

Network planning criteria forms the basis for assessing the requirement for and design of network augmentations. Powerlink's application stated that its mandated reliability obligations drive non-discretionary investment in its network as load grows.

The AER accepted PB's finding that Powerlink's network planning criteria were generally reasonable, given its obligation to comply with the rules and its Transmission Authority. However, it noted PB's advice that Powerlink should continue to pursue opportunities to implement lower cost arrangements such as load control schemes, particularly where a marginal overload results in the requirement for a large augmentation that could be deferred or would be mitigated by such means in the short term (e.g. commissioning of new generation).

Detailed review of selected projects

Powerlink's forecast capex program consists of a possible 424 projects that may be required during the next regulatory period. This includes a possible 286 load driven projects, 79 replacement projects, 18 security, compliance and 'other' projects, and 41 non-network projects. PB undertook a detailed review of a sample of projects from each of Powerlink's main capex categories to assess whether Powerlink was applying its capex policies and procedures and whether the scope, timing and cost of the projects were efficient. Based on its review, PB recommended that Powerlink's forecast capex be reduced by $312 million.

Load driven capex

Powerlink's load driven capex proposal is $1396 million ($2006–07) over the next regulatory period (57 per cent of its total forecast capex proposal). This compares with a total of $1037 million ($2006–07) during the last five years of the current regulatory period.

PB reviewed 18 load driven projects with a total value of $449 million (32 per cent of Powerlink's proposed load driven capex). PB's review confirmed the need for expenditure on the projects but recommended that Powerlink's load driven capex be reduced by $147 million. PB considered that in a small number of instances there were more efficient and optimally timed options that would allow Powerlink to achieve its reliability requirements.

Recognising that judgement is required, the AER sought advice from CHC on PB's recommended adjustments to load driven capex projects. Taking account of CHC's advice the AER has decided not to accept all of PB's recommendations. The AER considered that Powerlink's load driven capex should be reduced by $127 million.

Replacement capex

Powerlink's forecast proposal for replacement expenditure is $813 million ($2006–07) during the next regulatory period (33 per cent of its forecast capex proposal). This represents a very significant increase in expenditure compared with the current regulatory period where Powerlink has incurred approximately $249 million ($2006–07) in replacement expenditures. Powerlink stated that the main factors driving this increase were the age of its assets.

PB undertook a detailed review of 13 replacement projects. These projects had a total value of $364 million (45 per cent of the total value of replacement projects). PB found that Powerlink's current level of replacement expenditure was not sufficient to sustain the network going forward and that a significant increase in replacement expenditure was required. It considered that there was a need for all of the replacement projects reviewed but that in many cases the project scope was greater than that justified by condition assessments. PB used a top-down approach to determine an appropriate level of replacement expenditure for Powerlink and recommended that Powerlink's replacement allowance be reduced from $813 million to $702 million (i.e. a reduction of $111 million).

The AER has reviewed PB's top-down analysis. It considered that the methodology and the assumptions were reasonable, and the outcome provides Powerlink with an appropriate replacement capex allowance during the next regulatory period.

Security, compliance and 'other' capex

Powerlink's proposed security, compliance and other capex totals $137 million during the next regulatory period (5.6 per cent of its forecast capex proposal). The AER accepted PB's advice that Powerlink had taken reasonable steps to identify project alternatives and that the cost estimates were reasonable and efficient. It also accepted PB's finding that the timing of the security projects could be modified without considerably increasing risks, resulted in a $13 million reduction to Powerlink's forecast capex during the next regulatory period.

Non-network capex

Powerlink's proposed non-network capex for the next regulatory period totals $104 million (4.2 per cent of its forecast capex proposal). PB found that there was a genuine need for the majority of the proposed work and that Powerlink had considered other alternatives in developing its forecast. Based on its review of Powerlink's business information technology capex forecast, PB recommended that Powerlink's non-network capex proposal be reduced by $4.1 million. The AER accepted this recommendation and has provided Powerlink with a non-network capex allowance of approximately $100 million.

Review of cost accumulation process

PB confirmed that Powerlink had applied a systematic process to translate its individual project cost estimates into an annual profile of capex for the next regulatory period. In particular it stated that: unit rates were reasonable; locality factors were suitable; short

line adjustment factors had been appropriately applied; and S-curves were representative and reasonable.[7] However, PB also found that:

- the labour escalation factors used by Powerlink were too high
- adjustments to four S-curves should be removed
- the application of a general 2.6 per cent cost estimation risk factor was not sufficiently justified
- the application of a generic locality factor to capacitor bank projects was unnecessary given that the final sites had been established.

The AER accepted PB's recommendations in relation to the adjustments to S-curves, the application of the cost estimation risk factor, and the application of a generic locality factor to capacitor bank projects. In relation to the labour cost escalation factors, the AER sought advice from Access Economics on the wage growth forecasts for the utilities sector in Queensland and other Australian States and Territories.[8] The AER accepted this advice and has adopted the wage growth forecasts as the appropriate labour escalation factors to be used in estimating the efficient cost of Powerlink's proposed forecast capex. Overall, the AER's adjustments to Powerlink's cost accumulation process results in a reduction in forecast capex of $61 million.

Contingent projects

Powerlink proposed that 10 projects be treated as contingent projects. PB reviewed the projects and found that none of them met the SRP's materiality threshold. PB recommended that five of the projects be treated as contingent projects, given the cumulative risk that Powerlink could face if these projects did proceed. PB also recommended that eight projects associated with a large industrial development in the Gladstone area be removed from the ex ante allowance and treated as a single contingent project.

The SRP provides the AER with discretion as to whether a project should be classified as a contingent project. The AER has used this discretion in adopting the materiality threshold for contingent projects contained in clause 6A.8.2 of the new rules. This clause requires that a project meet a materiality threshold of the greater of $10 million or 5 per cent of a TNSP's maximum allowed revenue (MAR) in the first year of the regulatory period. The AER considered that seven of Powerlink's proposed projects met the materiality threshold, were uncertain and had unique investment drivers. These projects include the five recommended by PB as contingent projects. The AER also accepted PB's recommendation to include eight projects associated with a large potential industrial development in the Gladstone area as a single contingent project. This recommendation resulted in a reduction to the ex ante allowance of approximately $14 million.

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7 These S-curves allow Powerlink to estimate the amount of expenditure that will be incurred on projects in the current, next and 2012–2017 regulatory periods.

8 Access Economics, *Wage growth forecasts in the utilities sector*, 17 November 2006.

Given the significant cost associated with undergrounding of transmission cables and uncertainty over what amount of undergrounding will be necessary during the next regulatory period, the AER considered that the additional costs associated with undergrounding should be included as a category of contingent project. The AER's proposed ex ante allowance therefore includes the efficient costs of overhead construction, with undergrounding costs treated as contingent projects. The treatment of undergrounding costs as a contingent project has the effect of reducing the ex ante allowance by around $87 million.

In summary, the AER has approved contingent projects for Powerlink with a total indicative cost of $890 million. This compares with Powerlink's contingent project proposal of $564 million.

Deliverability of the amended forecast capex program

Forecast capex is primarily determined on the basis of expected demand and the need for replacement assets. Whether this capex program can be delivered depends upon supply side conditions over the next five years. Powerlink acknowledged that its proposal involves a material increase in forecast capex (from around $1.5 billion in the current regulatory period to $2.5 billion in the next regulatory period). It stated that a number of initiatives have been implemented to ensure that its capex program can be delivered and that a significant proportion of the program was attributable to higher input costs rather than increased physical work. An assessment of deliverability is needed because under the capex incentive framework a TNSP is able to retain, within the regulatory period, the excess return on and of capital associated with a lower than approved capex allowance.

Overall, the AER considered that Powerlink has the potential to be able to deliver its amended forecast capex program for the following reasons: it is delivering significantly higher levels of capex in the latter years of the current regulatory period; the initiatives undertaken by Powerlink to ensure it can deliver the increased capex appear to be working; PB stated that its recommended capex program was achievable (the AER's amended forecast capex program is similar to PB's); and a significant proportion of the higher capex is due to higher costs as opposed to increased physical work.

Conclusion

The AER has determined a forecast capex allowance for Powerlink of $2032 million, with the indicative cost of approved contingent projects totalling $890 million. This compares with Powerlink's forecast capex proposal of $2449 million and contingent projects totalling $564 million. The AER has determined the forecast capex allowance for Powerlink based on the adjustments shown in table 2. It should be noted that probability weighted expenditure of approximately $101 million has been removed from the ex ante allowance and the associated projects treated as contingent projects.

Table 2 AER's conclusion on forecast ex ante allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's capex proposal	546.31	543.02	456.10	466.49	437.32	2449.24
Adjustments resulting from detailed project reviews[1]	–27.82	–74.89	–5.98	–2.36	–33.43	–144.45
Adjustment to replacement expenditure	–	–	–53.10	–31.40	–26.10	–110.60
Adjustment to undergrounding costs[2]	–5.47	–14.2	–13.46	–4.37	–49.38	–86.89
Transfer of M50++ to contingent projects[2]	–1.24	–13.53	–3.25	2.52	1.44	–14.05
Adjustments to cost accumulation factors	–9.66	–14.86	–11.76	–6.70	–18.11	–61.09
AER's total adjustments	–44.18	–117.48	–87.54	–42.30	–125.58	–417.07
AER's forecast capex allowance	502.12	425.55	368.56	424.19	311.74	2032.16

[1] Includes adjustments made to load driven, security and compliance, and non-network projects.
[2] These adjustments involve the removal of probability weighted expenditure from the ex ante allowance and the associated projects being treated as contingent projects.

Cost of capital

AER's approach

The cost of capital for Powerlink is the weighted average of returns on its equity and debt financing (known as the WACC). The AER uses the WACC in conjunction with the RAB to determine the return on capital component of Powerlink's revenue cap.

Clause 11.6.12(d) of the Powerlink transitional provisions requires the AER to determine the WACC by reference to the values, methodologies and benchmarks prescribed in the new chapter 6A rules. Clause 6A.6.2 of the new rules sets out how the WACC must be calculated.

Conclusion

Consistent with the Powerlink transitional provisions, the AER has determined a nominal vanilla WACC of 8.76 per cent for Powerlink, comprising a post-tax nominal return on equity of 11.68 per cent and a pre-tax cost of debt of 6.82 per cent. The parameter values adopted for this decision are shown in table 3. The AER will not update the WACC for the final decision because the averaging period for the bond rates was fixed and the other parameters are prescribed by the new rules.

Table 3 Comparison of cost of capital parameters

Parameter	AER's conclusion	Powerlink's proposal
Nominal risk-free rate	5.68 %	5.28 %
Real risk-free rate	2.45 %	–
Expected inflation rate	3.15 %	2.91 %
Debt margin	1.14 %	1.10 %
Cost of debt	6.82 %	6.38 %
Market risk premium	6.00 %	6.00 %
Gearing	60 %	60 %
Value of imputation credits (gamma)	0.50	0.50
Equity beta	1.00	1.00
Nominal post-tax return on equity	11.68 %	–
Post-tax nominal WACC	7.01 %	–
Pre-tax real WACC	5.95 %	–
Nominal vanilla WACC	8.76 %	8.34 %

Operating and maintenance expenditure

AER's approach

The old rules require the AER, when setting a revenue cap, to take into account the TNSP's revenue requirements having regard for, among other things, the potential for efficiency gains in expected operating, maintenance and capital costs. The SRP outlines an approach for setting an opex allowance with the following key features:

- the opex allowance for the regulatory period is established at the start of the period based on the AER's assessment of the TNSP's proposal
- the opex allowance is reset taking into account the actual expenditure from the previous regulatory period and other information about likely future expenditure.

The AER has reviewed Powerlink's opex proposal in order to determine an efficient level of opex for the next regulatory period. This included reviewing Powerlink's base year opex (i.e. actual opex in 2004–05), its opex forecasting model, proposed cost drivers and expenditure line items.

Conclusion

Powerlink developed its forecast controllable opex requirements by determining an efficient base year level of opex, then modelling the impact of future cost drivers (such as input cost increases and network growth) and efficiency factors on each of the components of its base year opex.[9] To its controllable opex, Powerlink added a number

[9] Controllable opex includes costs that are directly attributable to maintaining and operating the network. These include costs associated with planning, engineering and asset manager support, and corporate costs.

of non-controllable operating costs such as allowances for network support and financing costs. Overall, Powerlink proposed an opex allowance of $152 million in 2007–08 increasing to $162 million in 2011–12, that is, a total of $787 million ($2006–07) over the next regulatory period.

PB reviewed Powerlink's business model, maintenance policies and processes, and the data and assumptions underpinning Powerlink's opex forecasting model. Although it found that Powerlink was a relatively efficient TNSP, PB recommended adjustments to Powerlink's forecast opex in the following areas:

- labour and materials escalation factors
- vegetation management escalation factors
- operational refurbishment
- the condition-based maintenance cost driver.

The AER has considered Powerlink's proposal and its consultants' recommendations. Taking into account its consultants' advice, the AER has made adjustments to labour, materials and vegetation management escalation factors, and to the condition based maintenance cost driver. An adjustment was also made to asset base growth to reflect the AER's forecast capex allowance.

Powerlink proposed several financing costs be allowed, including debt management and equity raising costs. The AER has provided Powerlink with an adjusted benchmark allowance for debt raising cost but has not provided allowances for debt refinancing, interest rate risk hedging and equity raising costs.

Based on the above adjustments, the AER has determined a total opex allowance increasing from $141 million in 2007–08 to $143 million in 2011–12. This represents a total of $713 million ($2006–07) during the next regulatory period as shown in table 4. This amount is $75 million less than Powerlink's proposed opex allowance for the next regulatory period. The AER's conclusion results in an average annual opex allowance of $143 million, compared with Powerlink's proposed average annual opex of $157 million.

Table 4 AER's conclusion on opex allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's controllable opex	113.11	119.48	126.52	135.61	140.12	634.85
Capex efficiencies	7.70	7.70	7.70	7.70	7.70	38.50
Debt management costs	4.89	4.20	4.28	4.40	3.79	21.56
Equity raising costs	2.47	2.47	2.47	2.47	2.47	12.35
Network support costs[1]	24.03	17.34	22.15	8.22	8.30	80.04
Powerlink's total opex	152.20	151.19	163.12	158.40	162.38	787.30
AER's controllable opex allowance	112.04	117.01	121.20	127.12	128.94	606.32
Capex efficiencies	3.19	3.19	3.19	3.19	3.19	15.94
Debt raising costs	1.78	1.95	2.08	2.17	2.29	10.27
Equity raising costs	–	–	–	–	–	–
Network support costs[1]	24.03	17.34	22.15	8.22	8.30	80.04
AER's total opex allowance	141.04	139.49	148.61	140.70	142.72	712.56

[1] The network support costs are forecasts. Network support costs may be subject to additional pass through during the next regulatory period.

Service standards

AER's approach

Clause 6.2.4(a) of the old rules provides that the form of economic regulation to be applied to transmission services may take into account the performance of a TNSP under service standards imposed by the rules or by the AER. In addition, in setting a revenue cap, the AER is required by the old rules to have regard to the potential for a TNSP to realise efficiency gains.

The service standards incentive scheme aims to encourage TNSPs to maintain or improve the quality of service provided to customers while achieving efficiency gains. The AER's service standards guidelines outline the approach to determining the appropriate performance measures, measure weightings and values to be applied to TNSPs.

Each performance measure has performance targets against which a TNSP's annual performance is measured. TNSPs receive financial rewards for improvements in service standards above the performance targets and are penalised for deteriorations in service standards below the targets.

Conclusion

Consistent with the old rules and the service standards guidelines, the AER has determined a service standards incentive scheme (scheme) to be applied to Powerlink. In determining this scheme, the AER accepted the performance measures and weightings proposed by Powerlink. The AER did not accept Powerlink's proposed targets, caps and collars as they were based on data that Powerlink had low confidence in and which would not result in a revenue neutral outcome. Instead, based on PB's

recommendations, the AER has set targets, caps and collars that will encourage Powerlink to maintain or improve its service standards consistent with the intent of the scheme.

The scheme included six performance measures and limits the revenue at risk to 1 per cent of Powerlink's allowed revenue. The performance weightings and values determined by the AER are set out in table 5.

Table 5 AER's service standards incentive weightings and values for Powerlink

Measure	Unit	Weighting (%)	Max. penalty	Target	Max. bonus
Circuit availability—critical elements	%	15.5	97.92	99.12	99.71
Circuit availability—non-critical elements	%	8.5	98.19	98.52	98.85
Circuit availability–peak hours	%	15.5	97.93	98.29	98.65
Loss of supply > 0.2 system minutes	Number	15.5	7.5	5.0	2.5
Loss of supply > 1.0 system minutes	Number	30	2.9	0.9	0
Average outage duration (capped at 7 days)	Minutes	15	1520	939	358

Pass through mechanism

AER's approach

A cost pass through mechanism provides some protection for TNSPs from the effect of unforseeable changes in costs by enabling the adjustment of the TNSP's MAR during a regulatory period. Previous revenue cap decisions made by the ACCC have included cost pass through mechanisms.

Clause 11.6.12(j)(3) of the Powerlink transitional provisions requires the AER to apply the cost pass through mechanism set out in the new chapter 6A rules, with any modifications that are necessary to apply the relevant provisions to this decision.

Conclusion

Clause 6A.7.3 of the new rules outlines the criteria for cost pass through. The range of events encompassed by the pass through mechanism contained in the new rules is similar to that contained in pass through arrangements adopted in previous revenue cap decisions by the ACCC. Consistent with the Powerlink transitional provisions, the AER has adopted the cost pass through mechanism set out in the new rules without modification.

Maximum allowed revenue

AER's approach

The rules require the AER to determine a TNSP's maximum allowed revenue (MAR). In determining the revenue for each year of the regulatory period, the AER adopts the accrual building block approach:

Revenue = return on capital + return of capital + opex + tax

The MAR is determined annually by adding to (or deducting from) the allowed revenue, the service standards incentive (or penalty) and any allowed pass through amounts.

Draft decision

Powerlink's MAR for 2006–07 is $508 million. In its application, Powerlink proposed unsmoothed revenues of $540 million in 2007–08, increasing to $751 million in 2011–12. The AER has determined a nominal unsmoothed revenue allowance for Powerlink that increases from $536 million in 2007–08 to $720 million in 2011–12 as shown in table 6.

Table 6 AER's draft decision on allowed revenue ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Return on capital	331.40	374.49	410.94	443.58	482.76	2043.17
Return of capital	40.22	49.01	42.95	46.11	46.38	224.72
Operational expenditure	145.46	148.33	162.93	158.99	166.21	781.93
Net taxes payable	18.95	20.68	20.59	21.95	23.75	105.92
Unsmoothed revenue	536.05	592.59	637.59	670.95	719.58	3156.77
Smoothed revenue	536.05	580.33	628.27	680.17	736.35	3161.18

The net present value (NPV) of unsmoothed revenue for the next regulatory period was calculated to be $2442 million. Based on this NPV amount, the AER has determined a nominal smoothed revenue allowance for Powerlink that increases from $536 million in 2007–08 to $736 million in 2011–12 (see table 6).

As required by clause 11.6.12(m) of the Powerlink transitional provisions, the AER will apply the revenue re-opener mechanism contained in the new chapter 6A rules to Powerlink during the next regulatory period. This mechanism provides for the re-opening of a revenue cap during a regulatory period where an event occurs that sufficiently impacts on the financial viability of the TNSP or its scope to respond to unforeseeable circumstances.

1 Introduction

1.1 Background

The Australian Energy Regulator (AER) is responsible for regulating the revenues associated with the non-contestable elements of the electricity transmission services provided by transmission network service providers (TNSP) in the National Electricity Market (NEM). The AER has had this role since 1 July 2005 when these functions were conferred by the National Electricity Law and the National Electricity Rules (rules).

On 3 April 2006, Powerlink Queensland (Powerlink) submitted an application for the AER to determine its revenue cap for the period 1 July 2007 to 30 June 2012 (the next regulatory period). The AER is required to provide Powerlink with sufficient revenues to meet the efficient costs of maintaining and developing its network, given the forecast growth in demand for electricity transmission services.

The Australian Competition and Consumer Commission (ACCC) determined Powerlink's revenue cap for a five and a half year period from 1 January 2002 to 30 June 2007 (the current regulatory period).[10]

Powerlink is a Queensland government owned corporation. It owns, develops, operates and maintains Queensland's only high voltage electricity transmission network. This network is used to transport electricity from generators to electricity distribution networks and directly to large industrial customers in Queensland.

Powerlink's high voltage transmission network spans more than 1700 kilometres from Cairns in far north Queensland to the New South Wales border in the south. Its network includes 12 013 circuit kilometres of transmission lines and cables, as well as 98 substations throughout Queensland.[11] Powerlink's transmission network connects to 11 generators, 3 distribution businesses and 7 directly connected industrial customers.

1.2 Transitional arrangements

In 2005 the Commonwealth, State and Territory governments agreed to review arrangements for the economic regulation of the energy sector, including the economic regulation of electricity transmission services. These arrangements established the Australian Energy Market Commission (AEMC) as a new rule making body.

The AEMC commenced a review of the rules for regulating electricity transmission networks in the NEM in mid 2005. Powerlink's application was lodged in April 2006. During the preparation of the application, it was recognised that there was a need to provide certainty to Powerlink as to the basis on which the application would be assessed. Powerlink, the AER and the AEMC agreed to transitional arrangements largely based on the rules in place in April 2006 for the consideration of the revenue cap application.

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10 ACCC, *Queensland transmission network revenue cap 2002—2006/07: decision*, 1 November 2001.

11 Powerlink, *Annual report 2005/06*, 122-24.

The AEMC's new chapter 6A rules (new rules) were gazetted on 16 November 2006. These rules include transitional provisions for assessing Powerlink's revenue cap application (clause 11.6.12).[12] In general, the Powerlink transitional provisions require the AER to set Powerlink's revenue cap for the next regulatory period substantially in accordance with the chapter 6 rules that existed at 3 April 2006 (the old rules) and the AER's *Statement of principles for the regulation of electricity transmission revenues* (SRP). However, they also include a number of exceptions to the old rules. These exceptions are that:

- The weighted average cost of capital (WACC) is to be determined by reference to the values, methodologies and benchmarks contained in the new rules.
- Pass through of network support costs and positive or negative change events are to be undertaken in accordance with the new rules, subject to the AER's revenue cap decision.
- The maximum allowed revenue (MAR) is to be adjusted should a trigger event related to an approved contingent project occur during the next regulatory period.
- The revenue cap re-opening provision and the efficiency benefit sharing scheme outlined in the new rules are to be applied to Powerlink.

The new rules commenced operation on 16 November 2006 and this draft decision has been prepared in accordance with clause 11.6.12 of the new rules. Further details on the application of the transitional provisions are provided in the relevant chapters. A copy of clause 11.6.12 can be found in appendix A.

1.3 Regulatory requirements

The Powerlink transitional provisions require the AER to set Powerlink's revenue cap for the next regulatory period substantially in accordance with the SRP and the old rules. The old rules establish a regulatory framework that requires the AER to set the MAR a TNSP can recover from its network customers. In undertaking this responsibility, the rules require the AER to:

- achieve the objectives of the transmission revenue regulatory regime set out in clause 6.2.2
- apply the principles for regulating transmission revenues set out in clause 6.2.3
- apply the form of regulation set out in clause 6.2.4.

1.3.1 Objectives of transmission revenue regulatory regime

Clause 6.2.2 of the old rules sets out the objectives of the transmission revenue regulatory regime to be administered by the AER and the need to achieve the following:

[12] AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006.

(a) an efficient and cost-effective regulatory environment;

(b) an incentive-based regulatory regime which:

(1) provides an equitable allocation between Transmission Network Users and Transmission Network Service Providers of efficiency gains reasonably expected by the AER to be achievable by the Transmission Network Service Providers; and

(2) provides for, on a prospective basis, a sustainable commercial revenue stream which includes a fair and reasonable rate of return to Transmission Network Service Providers on efficient investment, given efficient operating and maintenance practices of the Transmission Network Service Providers;

(c) prevention of monopoly rent extraction by Transmission Network Service Providers;

(d) an environment which fosters an efficient level of investment within the transmission sector, and upstream and downstream of the transmission sector;

(e) an environment which fosters efficient operating and maintenance practices within the transmission sector;

(f) an environment which fosters efficient use of existing infrastructure;

(g) reasonable recognition of pre-existing policies of governments regarding transmission asset values, revenue paths and prices;

(h) promotion of competition in upstream and downstream markets and promotion of competition in the provision of transmission services where economically feasible;

(i) reasonable regulatory accountability through transparency and public disclosure of regulatory processes and the basis of regulatory decisions;

(j) reasonable certainty and consistency over time of the outcomes of regulatory processes, recognising the adaptive capacities of Registered Participants in the provision and use of transmission system assets; and

(k) reasonable and well defined regulatory discretion which permits an acceptable balancing of the interests of Transmission Network Service Providers and Transmission Network Users and the long term interests of consumers of electricity.

1.3.2 Guiding principles for regulating transmission revenues

Clause 6.2.3 of the old rules sets out the principles that guide the AER in regulating transmission revenues. Sub-paragraph 6.2.3(d)(5) states that:

(d) The regulatory regime to be administered by the AER must be consistent with the objectives outlined in clause 6.2.2 and must also have regard to the need to:

…

(5) provide reasonable certainty and consistency over time of the outcomes of regulatory processes having regard for:

(i) the need to balance the interests of Transmission Network Users and Transmission Network Service Providers;

(ii) the capital intensive nature of the transmission sector, the relatively long lives of transmission assets, and the large and relatively infrequent augmentation of transmission networks;

(iii) the need to minimise the economic cost of regulatory actions and uncertainty; and

(iv) relevant previous regulatory decisions made by authorised persons including:

(A) the initial revenue setting and asset valuation decisions made by participating jurisdictions in the context of industry reform pursuant to the Competition Principles Agreement;

(B) decisions made by ministers under Commonwealth, State or Territory legislation;

(C) decisions made by Jurisdictional Regulators; and

(D) decisions made by the ACCC or AER and any regulatory intentions previously expressed.

1.3.3 Form of regulation

Clause 6.2.4 of the old rules sets out the prescribed form and mechanism of pricing regulation and states that:

- economic regulation is to be of the consumer price index (CPI) – X form (or some incentive based variant)
- in applying this form of economic regulation, the AER must set a revenue cap for each TNSP for a regulatory control period of not less than five years
- revenue caps are to apply only to those services that the AER does not reasonably expect to be offered on a contestable basis.[13]

Sub-paragraphs 6.2.4(c)(1)–(4) also provides that the AER, in setting a revenue cap for a TNSP, must account for the revenue requirements of the TNSP, with regard to (among other matters):

(1) the demand growth which the Transmission Network Service Provider is expected to service;

(2) any service standards imposed by the Rules which are applicable to the Transmission Network Service Provider, and any other standards imposed on the Transmission Network Service Provider by the AER in accordance with the Rules or by agreement between the Transmission Network Service Provider and the relevant Transmission Network Users;

(3) the AER's reasonable judgment of the potential for efficiency gains to be realised by the Transmission Network Service Provider in expected operating, maintenance and capital costs, taking into account the expected demand growth and service standards referred to in clauses 6.2.4(c)(1) and (2).

[13] *National Electricity Rules*, 3 April 2006, sub-paragraphs 6.2.4(a), (b) and (f).

(4) the weighted average cost of capital of the Transmission Network Service Provider applicable to the relevant transmission service, having regard to the risk adjusted cash flow rate of return required by investors in commercial enterprises facing similar business risks to those faced by the Transmission Network Service Provider in the provision of that transmission service.

1.3.4 Statement of regulatory principles

Powerlink's 2001 revenue cap decision was made under the the ACCC's 1999 *Draft Statement of principles for the regulation of transmission revenues* (DRP).[14] A key element of the capital expenditure (capex) regime for revenue caps determined under the DRP is that it requires an ex post prudency assessment to be undertaken. The AER has therefore undertaken an assessment of the prudence of Powerlink's past capex for this revenue cap decision.[15] This assessment is discussed further in chapter 2.

Subsequent to Powerlink's 2001 revenue cap decision, the ACCC finalised its regulatory principles and published the SRP in December 2004. The AER adopted the SRP in order to provide guidance for TNSPs and other stakeholders about how it intended to determine revenue caps.[16] As noted in section 1.2, the AER is required to set Powerlink's revenue cap for the next regulatory period substantially in accordance with the old rules and the SRP. The key features of the SRP that are relevant for this revenue cap decision are:

- the determination of Powerlink's opening regulated asset base
- the assessment of Powerlink's forecast capex in accordance with the ex ante capex arrangements
- the assessment of Powerlink's forecast operating and maintenance expenditure (opex)
- the setting of a service standards incentive scheme for Powerlink.

1.4 Review process

The AER's process for making revenue cap decisions is set out in chapter 3 of the SRP.[17] The assessment of Powerlink's application has been undertaken substantially in accordance with these arrangements. The process involved:

- Pre-consultation—Powerlink and the AER agreed to the scope and form of the data that would be required to assess the application.
- Application—Powerlink submitted its application to the AER on 3 April 2006, approximately fifteen months before the start of its next regulatory

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14 ACCC, *Draft statement of principles for the regulation of transmission revenues*, 27 May 1999.

15 Powerlink's capex will not be subject to an ex post prudency assessment at its next revenue reset.

16 AER, *Compendium of electricity transmission regulatory guidelines: statement of principles for the regulation of electricity transmission revenues*, 22 August 2005.

17 ACCC, *Statement of principles for the regulation of electricity transmission regulation–background paper*, 8 December, pp. 24-35.

period. Powerlink's application was assessed against the AER's *Information requirement guidelines* and found to be compliant.[18]

- Public consultation—Powerlink's application was published by the AER on 3 April 2006 and interested parties were invited to make submissions. Five submissions were received.[19] A public forum on Powerlink's application was held in Brisbane on 20 April 2006, and Powerlink and interested parties made presentations.

- Assessment by a technical expert—Parsons Brinckerhoff Associates (PB) was engaged as a technical expert to advise the AER in relation to a number of key aspects of Powerlink's application. Specifically, PB was required to provide its opinion on:

  - whether the investment processes and procedures adopted by Powerlink for capex are likely to result in efficient outcomes
  - the prudence of capex undertaken by Powerlink during the current regulatory period
  - the adequacy, efficiency and appropriateness of the capex projects planned by Powerlink to meet its present and future service requirements
  - the adequacy, efficiency and appropriateness of the opex forecast by Powerlink to meet its present and future service requirements
  - the appropriate performance incentive scheme for service standards.

  PB has provided its opinion to the AER on these matters. PB's advice represents its independent views based on its review. The AER has taken this advice into consideration in making its draft decision. The terms of reference guiding PB's review are set out in appendix A of its report.[20]

- Additional technical/specialist advice—CHC Associates (CHC) was engaged to provide the AER with technical and engineering advice throughout the review process. CHC assisted the AER in reviewing the technical aspects of material contained in Powerlink's application, submissions and PB's report. The AER also engaged Access Economics to provide wage growth forecasts in the utilities sector.[21]

The AER is releasing the PB and Access Economics reports at the same time as this draft decision for public consultation. The AER's draft decision should be read in conjunction with these reports.

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18 AER, *Compendium of electricity transmission regulatory guidelines*, 22 August 2005, pp. 85-88.

19 Appendix B lists the interested parties who provided submissions.

20 PB Associates, *Powerlink revenue reset–review of capital expenditure, operating and maintenance expenditure and service standards*, December 2006.

21 Access Economics, *Wage growth forecasts in the utilities sector*, 17 November 2006.

1.5 AER's assessment approach

The regulatory framework for assessing Powerlink's revenue reset application is set out in section 1.3. The rules provide for an incentive based approach to regulation that establishes efficient costs and the provision of services on a commercially sustainable basis.

The AER's task is to establish a revenue cap for Powerlink based on its assessment of the efficient costs of providing electricity transmission services in Queensland consistent with the forecast demand for electricity in the state.

As indicated in section 1.3, the AER must take into consideration a broad range of principles and objectives when setting a revenue cap. These include:

- providing certainty to maintain an environment that is conducive to efficient investment
- providing a fair and reasonable rate of return to TNSPs on efficient investment
- fostering the efficient use of existing infrastructure
- balancing the interests of TNSPs, network users and the long-term interest of electricity consumers
- achieving reasonable consistency in the outcomes of regulatory processes.

The formal assessment process commenced with Powerlink's application lodged in April 2006. The business operator, Powerlink, is best placed to explain its operations and the options for the future development of its network. The AER accepts that the application is made in good faith.

Given the importance of reliable and efficiently priced energy to the Australian economy, other stakeholders have a direct interest in the outcome of this revenue cap decision. These stakeholders were invited to review Powerlink's application and to provide their comments on it. These comments have been considered by the AER in assessing Powerlink's application.

Powerlink is subject to regulation of its revenues because it is a monopoly service provider. For this reason, Powerlink does not face the full range of competitive pressures that challenge other businesses. Nonetheless, the AER does not adopt a pre-determined position that savings in the allowances proposed by the TNSP must be identified. The AER's role is to ensure that the claims and assumptions made by a TNSP are supported by evidence. If the AER is reasonably satisfied that the TNSP's claims are valid, its proposal is generally accepted.

The assessment process also recognises that there is an information asymmetry between Powerlink and the other stakeholders. The AER must therefore look beyond information provided by Powerlink. Other material was reviewed and the assessments of experts were considered in testing Powerlink's application. The process is essentially aimed at determining the efficiency of the TNSP's proposed allowances.

The AER sought more than one expert opinion on particular aspects of Powerlink's application, where it was considered that additional technical or specialist advice was required. For example, the AER sought advice from CHC Associates (CHC) on PB's findings in relation to the scope and timing of a number of Powerlink's load driven capex projects.

Notwithstanding that specific investment projects have been proposed by Powerlink and a sample of these assessed by the AER, this draft decision does not require Powerlink to undertake or not undertake any particular investment. Under the ex ante approach, Powerlink retains fully its operational discretion to allocate its expenditure allowances as it sees fit. It has an incentive to seek more efficient ways of delivering its services in order to maximise its profits while maintaining the service standards that have been set in the draft decision. These arrangements should provide benefits to users over the longer term.

1.6 Structure of the draft decision

The AER's consideration of Powerlink's application is set out as follows:

- chapter 2 determines the prudence of past capex
- chapter 3 determines the opening value of the regulated asset base
- chapter 4 determines the efficient forecast capex allowance
- chapter 5 determines the benchmark WACC
- chapter 6 determines the efficient forecast opex allowance
- chapter 7 determines the appropriate service standards
- chapter 8 determines the pass through mechanism
- chapter 9 determines the maximum allowed revenue.

Appendix A contains the Powerlink transitional provisions.

Appendix B outlines the review process and lists the submissions received by the AER.

Appendix C sets out the AER's considerations on those forecast capex projects where PB has recommended adjustments.

Appendix D sets out the projects that the AER will allow as contingent projects and their associated triggers.

Appendix E sets out the process for invoking undergrounding contingent projects.

Appendix F contains the details of the AER's conclusion on the appropriate service standards incentive scheme for Powerlink.

1.7 Map of Powerlink's transmission network

Figure 1.1 is a map of Powerlink's transmission network.

Figure 1.1 Powerlink's electricity transmission network

Source: Powerlink, *Annual Report 2005/2006*, p. 7.

2 Past capital expenditure

2.1 Introduction

When Powerlink's revenue cap was set in 2001, the regulatory arrangements provided for an ex post assessment of capital expenditure (capex) undertaken in the current regulatory period to determine if these expenditures were prudent. If found to be prudent, the capex would be included in Powerlink's regulated asset base (RAB) in order to establish its opening RAB for the next regulatory period.

The key issues reviewed in this chapter are the prudence of Powerlink's commissioned and assets under construction projects; the allowance for finance during construction (FDC); past capex efficiencies; demand growth during the current regulatory period; and changes in input costs.

2.2 Regulatory requirements

2.2.1 Rules requirements

Clause 6.2 of the old rules outlines the principles and objectives for regulating capex. In particular, sub-paragraph 6.2.3(d)(4) states that the AER must:

> … provide a fair and reasonable risk-adjusted cash flow rate of return to … Transmission Network Service Providers … on efficient investment given efficient operating and maintenance practices on the part of the Transmission Network Service Providers.

2.2.2 Statement of regulatory principles

The process for reviewing past capex is set out in the *Statement of principles for the regulation of electricity transmission revenues* (SRP)[22] and the ACCC's 2005 *NSW and ACT transmission network revenue cap* decisions.[23]

A key element of the ACCC's 2001 revenue cap decision for Powerlink is that it requires an ex post prudency assessment of capex undertaken in the current regulatory period before it is included in the RAB. That is, an assessment of the prudency of investments undertaken in the current regulatory period is to be made at the end of the regulatory period after the investments have been made. Only prudent expenditure is to be included in the RAB. Appendix B of the SRP sets out the prudency test for revenue caps that were determined under the ACCC's 1999 *Draft statement of principles for the regulation of transmission revenues* (DRP).

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22 AER, *Compendium of electricity transmission regulatory guidelines: statement of principles for the regulation of electricity transmission revenues*, 22 August 2005.

23 ACCC, *NSW and ACT transmission network revenue cap TransGrid 2004–05 to 2008–09: final decision*, 27 April 2005.
ACCC, *NSW and ACT transmission network revenue cap EnergyAustralia 2004–05 to 2008–09: decision*, 27 April 2005.

General principles for the assessment of prudency

Prudency can be defined in terms of a TNSP acting efficiently in accordance with good industry practice and to achieve the lowest sustainable cost of delivering services. An assessment of whether a TNSP developed a project in accordance with good industry practice necessarily requires the exercise of judgement, taking into account the specific engineering and economic facts, and circumstances of the investment.

In undertaking the ex post prudency assessment of projects, and having regard to the information available to the TNSP at the time it made the decisions to invest, the AER's task is to assess whether a prudent TNSP would have made the same decisions. If the AER determines that a prudent TNSP would have made different decisions to those that were actually made, then the task is to quantify the difference in investment under each set of decisions. By implication, this difference represents the cost of inefficiency and is excluded from the RAB.

The application of the prudency test to investments

The prudency test involves a systematic examination of a TNSP's decisions in selecting and delivering investments. The purpose of the examination is to establish whether the TNSP made decisions at each stage of the investment process that were consistent with good industry practice. The examination consists of three sequential stages and is applicable to projects regardless of whether or not they have undergone the regulatory test.[24] The three stages are:

1. Assess whether there is a justifiable need for the investment. This stage examines whether the TNSP correctly assessed the need for investment against its statutory and rules obligations. The assessment focuses on the need for investment, without specifically focussing on what the correct investment to meet that need is. An affirmation of the need for an investment does not imply acceptance of the specific project that was developed.

2. Assuming the need for an investment is recognised, assess whether the TNSP proposed the most efficient investment to meet that need. The assessment reviews whether the TSNP objectively and competently analysed the investment to a standard that is consistent with good industry practice.

3. Assess whether the project that was found to be the most efficient was developed, and if not, whether the difference reflects decisions that are consistent with good industry practice. This assessment examines the factors that caused changes in the project design and/or delivery and assesses how the TNSP responded to those factors relative to what could be expected of a prudent operator.

2.3 Powerlink's application

In the ACCC's 2001 decision, Powerlink's capex forecasts were based on the requirement for future transmission augmentations and replacement of aged assets on the basis of the load and generation forecasts applicable at that time, using a

[24] The regulatory test is an economic cost–benefit test used by transmission and distribution businesses in the National Electricity Market to assess the efficiency of network augmentations.

probabilistic approach. The probabilistic approach is described further in section 4.6.2. Capital development plans and expenditure forecasts for 72 scenarios were developed. The scenarios were derived from variations in key drivers such as load growth and generation patterns. The capex allowance of $1043 million ($nominal) approved by the ACCC was the probability weighted average of capex of the 72 scenarios.

In its revenue application, Powerlink stated that it anticipated actual capitalisation of investments to be $1274 million during the current regulatory period (on an as-commissioned basis). In comparison with the 2001 decision allowance of $1055 million (adjusted for actual CPI), this is $219 million or 21 per cent more than the allowance provided by the ACCC. Table 2.1 sets out the 2001 forecast capex allowance and the actual outcomes for the current regulatory period.

Table 2.1 2001 capex allowance and actual outcomes ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	Total
2001 allowed capex	155.24	179.04	187.59	230.11	199.56	91.46	1042.99
2001 allowed capex (CPI adjusted)	155.24	180.11	190.78	233.23	202.34[1]	93.25[1]	1054.96
Actual	143.26	198.27	162.98	209.39	278.72[2]	281.49[2]	1274.11[2]

Note: All figures are inclusive of FDC.
[1] Based on an estimated CPI of 2.9 per cent for 2005–06 and 2.7 per cent for 2006–07.
[2] Forecast.

Powerlink considered that all capex undertaken during the current regulatory period was prudent. It stated that the following factors have contributed to the higher than forecast capex during the current regulatory period:

- actual demand growth is significantly higher than the forecast on which the 2001 decision was based
- increased input costs associated with labour rates and construction materials in the latter years of the current regulatory period.

Powerlink stated that in addition to commissioned works, its works-in-progress (assets under construction) as at 30 June 2007 are estimated to be $530 million. It considered that these assets under construction would need to be recognised in its opening RAB at 1 July 2007 should the AER recognise capex on an as-incurred basis, rather than the current as-commissioned basis from the start of the next regulatory period.

2.4 Submissions

Submissions commenting on Powerlink's past capex and assets under construction were received from the following interested parties: the Energy Users Association of Australia (EUAA), the Major Energy Users (MEU), Energy Action Group (EAG), Ergon Energy (Ergon) and SP AusNet. The main concerns and issues raised were:

- Powerlink's claims are not always fully transparent and it does not appear to have justified all of the increases in costs

- whether labour and material costs should affect Powerlink more than other businesses

- Powerlink's additional capex occurs in the latter half of the current regulatory period, while in the ACCC's 2001 decision capex was expected to peak in 2004–05 and then decline. There is a need to investigate the reasons to ensure that the significant increase in capex is justified

- Powerlink did not appear to have been constrained in implementing additional capex, which suggests that it may not have experienced a shortage of skilled labour

- Queensland is currently experiencing high levels of demand growth which require significant levels of investment

- other TNSPs have experienced increases in costs and delivery charges, and difficulties obtaining fixed price contracts since 2005–06.

2.5 PB's review

PB was engaged to assist the AER with reviewing Powerlink's past capex proposal. The terms of reference required PB to undertake an ex post assessment and apply the prudency test to a sample of both commissioned and assets under construction projects during the current regulatory period. To this end, PB was required to:

- review the investment processes and procedures adopted by Powerlink for past capex and consider whether they have ensured that only prudent capex was undertaken

- comment on the prudency findings associated with its detailed review of projects, including any adjustments that it considers are justified

- provide its recommendation on the prudent amount of past capex that should be included in Powerlink's RAB.

Based on its review of past capex, PB found that:

- Powerlink's procedures for project development are generally robust and consistent with the regulatory test requirements and the rules.

- In its application of the regulatory test, Powerlink's transmission use of system (TUOS) net present value (NPV) methodology is appropriate for ranking different project alternatives and is particularly suited to the direct comparison of network and non-network options.

- Powerlink has a structured and systematic governance arrangement for its procurement processes. PB considered that Powerlink was achieving reasonable procurement efficiencies.

- Powerlink's project evaluation and implementation procedures for commissioned assets and assets under construction were consistent with good industry practice and generally well followed.

- The processes for identifying non-network project options to address network constraints were robust and well considered. The viability of non-network options in addressing network constraints has been limited and network augmentations remained the most cost effective approach to addressing the majority of constraints.

- Demand growth and input costs have been higher during the current regulatory period than assumed in 2001, although the impact of these factors was not overly significant. The fact that these cost increases are not reflected to the same extent in actual project costs indicates that they were largely absorbed by efficiency gains made by Powerlink.

- Project budget overruns were largely due to the cost of resolving legal disputes over the acquisition of easements and changes in project scope after initial approval has been obtained.

- There was limited documentation of the first stage of the project evaluation process, during which a list of project alternatives is culled on technical grounds. There appears to be no formally defined processes or criteria that determine whether a project is technically acceptable. This could lead to inconsistency in the decision process which may imply that the most economically efficient project alternative could be prematurely rejected.

- Easements were categorised separately from the primary assets they support, and in one project reviewed, easement related legal clearance costs were not included in the economic evaluation of project alternatives. PB considered that easement related and land purchase costs that are incurred after a firm need for a specific project is identified should be treated as projects costs and included in the economic evaluation, particularly when non-network alternatives are available. PB concluded that the reviewed project was prudent when the additional easement related legal cost was included in the economic analysis.

- The FDC factors require adjustment.

As part of its detailed review in applying the prudency test to a sample of commissioned projects and assets under construction projects, PB did not identify any systematic errors in Powerlink's approach to evaluating and implementing those projects. Any problems identified were specific to an individual project.

PB identified an inconsistency between Powerlink's information templates and project packs for two commissioned projects.[25] This results in an adjustment to Powerlink's proposed amount of commissioned assets from $1144 million to $1143 million (i.e. a reduction of $1.4 million).

[25] Powerlink provided project packs for each of the selected projects. The packs contained documents such as project summaries, board memorandums, business cases and regulatory tests.

PB recommended prudency adjustments be made to three commissioned projects and one project in relation to assets under construction. It also recommended eight assets under construction projects with a total value of $111 million not be included in the closing RAB, because they had not received approval from the Powerlink Board and were still in the planning stage.

PB found another 38 assets under construction projects, with a probability weighted value of $7 million, for which it stated that Powerlink had no plans for expenditure during the current regulatory period. PB recommended that this probability weighted expenditure not be included in Powerlink's closing RAB for the current regulatory period.

PB noted that, alternatively, it might be feasible for the AER and Powerlink to agree to use an updated estimate of the assets under construction expenditures to be rolled into the RAB closer to the end of the current regulatory period so that it reflected a more accurate estimate of the expenditures to be incurred.

In summary, PB recommended that $1137 million of commissioned assets and $360 million of assets under construction were prudent and should be included in Powerlink's RAB. Table 2.2 compares PB's recommendations with Powerlink's proposal.

Table 2.2 PB's recommendation on prudent past capex ($m, nominal)

	Commissioned assets	Assets under construction	Total
Powerlink's proposal	1144.30	480.41	1624.71
Adjustment for spreadsheet error	–1.42	–	–1.42
Adjustments to projects	–6.07	–120.42	–126.51
PB's recommendation	1136.81	359.99	1496.80

Note: All figures are exclusive of FDC.

2.6 Issues and AER's considerations

2.6.1 Prudence of commissioned projects

The application of the prudency test to Powerlink's commissioned projects is necessary to determine the appropriate amount of past capex that should be rolled into Powerlink's RAB.

Powerlink's application

Powerlink's past capex program consists of 346 projects to be commissioned during the current regulatory period. Table 2.7 provides an overview of Powerlink's total capitalisations in the current regulatory period listed by its key capex categories.

Table 2.7 Powerlink's total capitalisations split by investment category ($m, nominal)

Category	Total capitalisations
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	1052.35
Total non-network capex	91.95
Sub-total capex	1144.30
FDC	129.81
Total capex (including FDC)	1274.11

Submissions

The EUAA and MEU expressed concern with Powerlink's actual capex amount of $1274 million, noting that this amount is 21 per cent higher than the ACCC's 2001 capex allowance of $1043 million. They also noted that most of Powerlink's additional capex occurs in the latter half of the current regulatory period.

The EUAA considered that given Powerlink is capitalising a higher than forecast capex amount during the current regulatory period, the AER should investigate the reasons for this so users can be confident that Powerlink's capex is justified and is not an attempt to increase its opening RAB for the next regulatory period.

The MEU stated that nowhere in Powerlink's documentation on past capex does it draw attention to any efficiency and productivity savings (except one example) sought in the face of claimed significant cost increases and labour shortages.

PB's review

PB applied the prudency test to several of Powerlink's commissioned projects and based its assessment on the information that was available, or should have been available to Powerlink at the time the decision to proceed with the project was made. PB did not identify any consistent or systematic errors in Powerlink's procedures. Some issues with specific projects were identified. However, PB concluded that Powerlink's project evaluation and implementation procedures were generally well followed and consistent with good industry practice. It recommended that $1137 million (exclusive of FDC) of commissioned projects be considered prudent and that it should be included in Powerlink's RAB.

From the sample of projects reviewed, PB recommended prudency adjustments to three projects which will be commissioned in the current regulatory period:

- *Cairns 132 kV substation rebuild (CP.00836)*—Powerlink sought $12.8 million for this project (to be commissioned in October 2006) but PB recommended that $12.1 million was the prudent amount. PB considered that the most efficient long-term option was implemented. However, it found that the expected amount to be spent exceeded the amount approved by the Powerlink Board of $12.1 million (including a 10 per cent contingency). No approval was given for this additional expenditure. In this instance, PB considered that only the approved original project cost plus the contingent amount be rolled into the RAB (i.e. $12.1 million). This would result in a prudency adjustment of $0.7 million.

- *South Pine 275 kV substation refurbishment (CP.01092)*—Powerlink sought $15.9 million for this project (to be commissioned in August 2006) but PB recommended that $15.7 million was the prudent amount. PB considered that the most efficient long-term option had been implemented. However, PB found that the expected actual amount to be spent exceeded the amount approved by the Powerlink Board of $15.7 million (including 10 per cent contingency). No approval was given for this additional expenditure. PB considered that only the approved original project cost plus the contingent amount be rolled into the RAB (i.e. $15.7 million). This would result in a prudency adjustment of $0.2 million.

- *Virginia office complex (CP.98201)*—Powerlink sought $20.2 million for this project (to be commissioned in June 2006) but PB recommended that $15 million was the prudent amount. Additional information was provided but PB considered that it was unable to verify that the most efficient option was implemented and recommended the cost of the original project alternative of $15 million (including an amount for estimating errors) be rolled into the RAB. This would result in a prudency adjustment of $5.2 million.

AER's considerations

PB reviewed in detail a sample of 39 commissioned projects with a total value of $652 million. This equals about 11.5 per cent of the total number of projects to be commissioned by Powerlink in the current regulatory period (346 projects). As a proportion of the total value, the sample represents around 57 per cent of Powerlink's commissioned projects.

In consultation with the AER, PB's approach in conducting its detailed reviews involved selecting a sample of projects, which consisted of large and small commissioned projects from all of Powerlink's investment categories. These included projects that were commissioned either under or over the original budget. Several large augmentation projects were selected to assess whether Powerlink properly applied the regulatory test. Several small projects were also selected to assess the prudency of low value investments, since these projects comprise a significant proportion of Powerlink's commissioned projects. This approach also provided PB with the opportunity to review whether Powerlink was properly implementing its specified capex policies.

The AER has considered PB's recommendations and is of the view that the ex post assessment of Powerlink's commissioned projects provides sufficient evidence to show that the capex undertaken during the current regulatory period is prudent given that:

- Powerlink's stated project evaluation and implementation procedures were followed, consistent with good industry practice and the rules.

- Powerlink has well structured and systematic governance arrangements for its procurement process, and is achieving reasonable procurement efficiencies.

- Peak summer demand growth in Queensland particularly in the South East Queensland (SEQ) region, has increased substantially during the current regulatory period. The majority of Powerlink's projects to be commissioned in the current regulatory period were load driven and the bulk of these projects were located in the SEQ region. Several large augmentation projects have also been advanced as a result of higher demand growth. Section 2.6.6 discusses demand growth in greater detail.

While PB's recommendations are based on its technical judgement, it is noted that the proposed prudency adjustment of $6.1 million equals around 0.5 per cent of the value of Powerlink's commissioned projects. The assessment confirmed that Powerlink had sound management practices that were generally applied. The AER accepts that PB has identified some issues with Powerlink's oversight of certain projects. It notes, however, that the identified issues are not a consequence of systematic failings and the recommended prudency adjustment is not significant. In this instance, seeking a prudency adjustment is not viewed as being consistent with the broader regulatory objectives, including the need to provide certainty in order to maintain an environment that is conducive to efficient investment. For these reasons, the AER will not adopt the recommended prudency adjustment and instead will allow an amount of $1165 million (exclusive of FDC) for projects commissioned during the current regulatory period to be rolled into Powerlink's RAB.[26]

2.6.2 Prudence of assets under construction

The ACCC, in previous revenue cap decisions, recognised capex on an as-commissioned basis. Under this approach, capex is rolled into the RAB when the asset is commissioned (i.e. placed in service). However, in its 2005 NSW revenue cap decisions, at the request of the NSW TNSPs, the ACCC recognised capex on an as-incurred basis. Under this approach, capex is rolled into the RAB in the year in which it is incurred. It was noted in the SRP that the ACCC had not formed a view on when capex should be recognised and TNSPs were able to adopt either approach.

In its *Regulatory accounting methodologies* draft position paper (September 2005), the AER indicated a preference for recognising capex on an as-incurred basis which requires modelling the return on and return of capital in the year that expenditure is incurred. Under the ex ante capex framework the as-incurred approach provides stronger efficiency incentives than the as-commissioned approach because it allows the returns on and of capital associated with assets under construction to form part of the incentive when capex targets are established.

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[26] This figure has been adjusted for the identified spreadsheet error, and updated for actual 2005–06 and forecast 2006–07 capitalisations.

Powerlink's application

Powerlink stated that it has 113 projects under construction at the end of the current regulatory period.

It stated that the change to recognising capex on an as-incurred basis would result in a forecast one-off increase to its opening RAB of $480 million (exclusive of FDC) for assets under construction. While Powerlink has modelled the return on capital under the as-incurred approach for the purposes of its revenue cap application, it modelled the return of capital under the as-commissioned approach (referred to as the hybrid approach). Further discussion on the recognition of capex is set out in section 9.5.

Powerlink has also applied FDC to its assets under construction.[27] Further discussion on the application of FDC to assets under construction is set out in section 2.6.3.

Submissions

The EUAA, MEU and Ergon have expressed concern with the change in regulatory accounting methodology from an as-commissioned to an as-incurred basis.

The EUAA is concerned about the effect of adding $530 million (inclusive of FDC) worth of assets under construction to Powerlink's RAB. It stated that this accounts for 16 per cent of Powerlink's RAB and that this one-off addition will increase revenues (in 2007–08) by over $44 million.

PB's review

PB applied the prudency test to a sample of Powerlink's assets under construction projects. It recommended that $360 million of assets under construction be considered prudent and be included in Powerlink's RAB.

It recommended a prudency adjustment to one project:

- *Bohle River to Townsville GT 132 kV line (CP.01087)*—Powerlink estimated $18.1 million to be the cost at completion of the Bohle River to Townsville GT 132 kV line project. PB considered that the project option implemented was not the least-cost alternative due to Powerlink's decision to re-route parts of the line in order to follow the Electricity Supply Association of Australia (ESAA) policy on prudent avoidance by placing transmission lines a minimum safe distance from housing.[28] PB concluded that it was unable to establish whether this constituted good industry practice as its adoption varied across the industry. PB recommended that the value of the least-cost alternative of $15.7 million be allowed of which $13.7 million would be included in the assets under construction component of the RAB and $2 million in forecast capex. This would result in a prudency adjustment of $2.4 million.

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27 Inclusive of FDC, Powerlink is seeking to roll in $530 million for assets under construction to its opening RAB.

28 The Energy Supply Association of Australia has succeeded the Electricity Supply Association of Australia. In January 2004, the ESAA was re-formed to focus on strategic whole-of-industry issues, and provide a national forum and representation for energy supply companies in Australia. The industry's policy on prudent avoidance in relation to electric magnetic fields is now managed by the Energy Networks Association.

PB made two further recommendations on the amount of Powerlink's assets under construction to be rolled into its RAB:

- Eight reviewed projects with a total value of $111 million were identified as still requiring business cases to be finalised and for which the necessary approvals had not been provided by the Powerlink Board. Given the time remaining until the next regulatory period, PB considered it unlikely that Powerlink would be able to undertake all of the proposed expenditure on these projects during the remainder of the current regulatory period. Therefore, it recommended the amount of $111 million should not be included in the assets under construction component of the RAB and that the entire amount be included in forecast capex.

- 38 projects with a probability weighted value of $7 million were identified which should not be included in the assets under construction component of the RAB. Given the time remaining before the start of the next regulatory period, PB considered that Powerlink should have identified and developed business cases for projects that would incur expenditure in the current regulatory period.

Nevertheless, PB noted that some expenditure could occur on these projects during the remainder of the current regulatory period and should be included in Powerlink's RAB. It suggested that it might be possible for the AER and Powerlink to revisit the estimate of assets under construction expenditures closer to the end of the current regulatory period so that it reflected a more accurate estimate of the expenditures to be incurred.

AER's considerations

Powerlink's application recognises forecast capex under a hybrid approach.[29] That is, return on capital is modelled using the as-incurred approach and return of capital is modelled using the as-commissioned approach. To ensure a smooth transition to modelling the return on capital under the as-incurred approach, a prudent amount of capex incurred in the current regulatory period must be included in Powerlink's RAB to recognise assets that are under construction but will not be commissioned until the next regulatory period.

PB reviewed in detail a sample of 21 assets under construction projects with a total value of $386 million. This equals about 19 per cent of the total number of assets under construction projects undertaken by Powerlink (113 projects). As a proportion of the total value, the sample represents about 80 per cent of Powerlink's assets under construction program.

In consultation with the AER, PB selected a sample of projects, which consisted of both large and small assets under construction projects and represented the relevant major investment categories. Several large augmentation projects were selected to assess whether Powerlink properly applied the regulatory test, since these projects comprise a significant proportion of Powerlink's assets under construction program. Several small projects were also selected to assess the prudency of low value investment expenditure. The assessment of the sample projects provided a balanced assessment of the prudency

[29] The AER's consideration of this approach is set out in section 9.5.

of Powerlink's assets under construction as well as allowing PB to assess whether Powerlink was following its capex policies and processes.

Review of Bohle River project

PB reviewed the assets under construction projects, and recommended a prudency adjustment to the Bohle River to Townville GT 132 kV line project because it assessed the project as not being the least-cost alternative.

In considering this recommendation, the AER sought additional advice from CHC to understand the issue of electric magnetic fields (EMF) and the policy of prudent avoidance in Australia.

CHC advised that for several decades before January 2004 the issue of EMF was managed by the ESAA and this issue has subsequently been taken over by the Energy Networks Association (ENA). During its period of responsibility for the issue, the ESAA aimed to inform its members and the public more generally on the latest developments surrounding EMF. It sponsored research and coordinated a number of activities related to the development of a national 0–3 kHz EMF standard by the Australian Radiation Protection and Nuclear Safety Agency. However there are currently no Australian standards regulating exposure to these fields.[30]

The ENA has adopted the policy on EMF that had previously been approved by the ESAA. This policy states that:

> ENA recommends to members of the energy supply industry that, within Australian health guidelines, they design and operate their electricity generation, transmission and distribution systems prudently.[31]

It defines prudence as follows:

> Prudence embraces a range of actions which it is sensible to take, having regard to the current state of scientific uncertainty. Such actions could include monitoring research; sponsoring research; continually reviewing policies in the light of the most up to date research findings (with particular emphasis on the findings of scientific review panels); providing awareness training for electricity supply business employees and keeping them informed; sharing information freely with the community; measuring fields levels and practising prudent avoidance when designing and siting new transmission and distribution facilities.
>
> Prudent avoidance has been defined in an Australian context by the former Chief Justice of the High Court of Australia, Sir Harry Gibbs as "doing what can be done without undue inconvenience and at modest expense to avert the possible risk to health from exposure to new high voltage transmission facilities". In practical terms, this means designing new transmission and distribution facilities having regard to their capacity to produce EMFs, and siting them having regard to the proximity of houses, schools and the like.[32]

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30 The National Health and Medical Research Council has issued interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields. These guidelines are aimed at preventing immediate health effects resulting from short-term exposure to very high fields. These fields are associated with some heavy electrical equipment and are much higher than those associated with transmission lines.

31 ENA, *Policy statement on electric and magnetic fields (EMFs)*, March 2006.

32 CHC noted that Sir Harry Gibbs conducted an inquiry into Community needs and high voltage transmission line development for the New South Wales government in 1990–91 and the statement has been adopted as policy by transmission and distribution entities since then.

Given the strong policy focus of both the ESAA and the ENA, CHC advised that these bodies may be reasonably considered a reputable source for providing relevant information which a prudent TNSP would be expected to have regard to for the purposes of determining good industry practice.

Powerlink noted that the ESAA/ENA policy does not provide detailed guidance on actual clearance distances for prudent avoidance. Further, the AER notes that at the time Powerlink evaluated the project options, there were no national standards, specific guidelines or legislation that specifies clearance distances in order to minimise exposure to EMF.[33] However, Powerlink has selected a Bohle River project option with a clearance of 20 metres for prudent avoidance based on recommended buffer distances set out in a draft Queensland transmission code.[34] It assessed the project in accordance with the ESAA/ENA policy and relied on the draft transmission code, which appears to represent the best available information. In the absence of any definitive guidelines or standards on distances for prudent avoidance, the steps taken by Powerlink appear to be consistent with good industry practice.

CHC further advised the AER that significant resources have been devoted to research and management of this issue, both within Australia and worldwide. There can also be significant economic benefit as prudent avoidance acknowledges that with appropriate precautions TNSPs are able to construct overhead lines rather than being required to use much more expensive underground cables. Given the benefits of prudent avoidance, the additional expense of $2.4 million for constructing the project in accordance with the policy of prudent avoidance may be considered to be modest.

The AER agrees with CHC's advice that Powerlink has followed good industry practice and that it is reasonable to conclude that the Bohle River project is prudent. Consequently, $16.2 million will be included in Powerlink's assets under construction component of the RAB and $1.9 million will be included in its forecast capex.

Updated expenditures for reviewed and probability weighted projects

PB also made two other recommendations on Powerlink's assets under construction projects.

The AER agrees with PB's findings that Powerlink appears unlikely to incur the amount of $111 million for eight assets under construction projects given the time remaining before the end of the current regulatory period. However, between the period of releasing this decision and 30 June 2007, it is expected that project approvals may be obtained from the Powerlink Board and related expenditures incurred.[35] Powerlink has since provided an updated value of $92 million to be incurred in the current regulatory period. This value is considered to provide a better estimate of the amount of expenditure for these projects, which would be incurred before the end of the current regulatory period. Therefore, for this draft decision, the AER will include the amount of

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33 On 7 December 2006, the Australian Radiation Protection and Nuclear Safety Agency published its draft report on exposure limits for EMFs. (see ARPANSA, *Radiation protection standard—Exposure limits for electric & magnetic fields – 0 Hz to 3 kHz—Public consultation draft*, 7 December 2006).

34 This code is intended to be implemented as a regulation under the (Queensland) *Electricity Act 1994*.

35 Powerlink recently advised the AER that two assets under construction projects have since been approved by the Powerlink Board.

$92 million in the assets under construction component of Powerlink's RAB. As part of finalising its decision, the AER requires Powerlink to provide information on the Powerlink Board approval of these projects.

The probability weighted projects result from Powerlink's use of a probabilistic methodology to forecast its capex requirements during the next regulatory period. Under this method, the annual capex was derived by applying the relevant project S-curve expenditure profiles to the required commissioning dates for each project.[36] This approach indicated that some expenditure before the next regulatory period would be incurred. The $7 million represents the weighted average value to be incurred towards the end of the current regulatory period. Powerlink has provided an updated probability weighted value of $7.4 million. As no major concerns have been identified with the probabilistic methodology (see section 4.6.2), it is reasonable to include the amount of $7.4 million in the assets under construction component of Powerlink's RAB.

As part of finalising its decision on the amount of assets under construction (and commissioned assets) to be included in the RAB, the AER will adopt Powerlink's most recent estimates for the final year (2006–07) of the current regulatory period. Powerlink is therefore required to provide updated forecast expenditures to be incurred in 2006–07. To the extent that the actual values for assets under construction (and commissioned assets) differ from forecast values for the final year of the current regulatory period, a reconciliation would be undertaken using the actual values as part of the asset base roll forward process at the next revenue reset.[37]

Summary

The AER will allow $489 million (exclusive of FDC) of assets under construction during the current regulatory period to be rolled into Powerlink's RAB.[38]

2.6.3 Finance during construction

As indicated in section 2.6.2, the ACCC's 2001 revenue cap decision recognised Powerlink's capex on an as-commissioned basis. Consequently, the ACCC accepted that it would be appropriate for capex to include an FDC allowance to provide for the efficient cost of financing projects when they are under construction but not earning revenues. That is, the capitalised value of the project would be increased by an FDC factor.

In addition, when modelling the revenue requirement, a return on capital is calculated based on the opening RAB for each year and capex is not added to the RAB until the end of the financial year in which the asset is commissioned. To address this timing

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36 The S-curves are based on historical project expenditure profiles and have been normalised over a 24-month period, which is the typical construction period for transmission projects. Working back from the nominated commissioning date, applying the S-curve by project type will determine the annual expenditure to be incurred during the construction period. Powerlink has established 10 different S-curves that cover the majority of projects.

37 As required by the new chapter 6A rules, the reconciliation would include adjustments which remove any benefit or penalty on the returns associated with any difference between the forecast and actual values.

38 This value is based on updated expenditure forecasts for prudent assets under construction by Powerlink.

difference, a half-year rate of return is provided to compensate for the six-month period before capex is included in the RAB.[39]

Powerlink's application

Powerlink noted that in its application FDC is broken into two components and that this approach was accepted in the ACCC's 2001 decision. The first component (referred to as FDC1) is to compensate for the cost of financing a project during its construction to its commissioning date. The second component (referred to as FDC2) is to compensate for the average six-month period between the commissioning of assets and the point where a return on capital is allowed under the building block model.

In its application, Powerlink calculated its FDC allowance based on the FDC factors implied by the capex approved in the ACCC's 2001 decision.[40] This FDC allowance for commissioned assets during the current regulatory period is shown in table 2.8. Powerlink has also applied FDC factors to the value of its assets under construction, based on the proportion of project expenditure undertaken up to 30 June 2007.

Table 2.8 Powerlink's finance during construction costs ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	Total
Commissioned assets	14.89	20.22	17.36	22.10	26.67	28.57	129.81
Assets under construction	–	–	–	–	–	49.54	49.54

PB's review

PB noted that the high cost and length of construction times of many capex projects can result in the financing cost over the construction period being significant. It stated that, under the as-commissioned approach, it is appropriate to provide for this cost by adding an FDC factor to the actual cost of the project when determining the capitalised project cost to be added to the RAB.

For assets under construction in the current regulatory period, PB noted that FDC is applicable based on the period from the start of construction to the end of the current regulatory period. It stated that Powerlink had used a reasonable approach for estimating the number of months over the construction period of these assets until the end of the current regulatory period.

PB considered that the FDC factors applied by Powerlink were overstated and required adjustment. The FDC factors should be based on the cost of capital parameters determined in the ACCC's 2001 revenue cap decision. PB also considered that the FDC2 factor should not be applied to assets under construction since Powerlink's capex will earn an immediate return from the time that it is included in the RAB.

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39 Asset capitalisations can occur evenly throughout the financial year, so it is assumed that on average it takes place halfway through the year.

40 ACCC, *Queensland transmission network revenue cap 2002–2006/07: decision*, 1 November 2001, p. 79.

AER's considerations

PB's review found that the FDC factors applied to Powerlink's past capex were overstated and required adjustment.

Having reviewed the FDC calculations, the AER agrees with PB that there is an error with the FDC factors applied to capex by the ACCC in its 2001 decision. While the ACCC accepted that FDC should be allowed, it stated that the FDC allowance would be based on the regulatory rate of return at the time the decision was made.[41] This is also consistent with the DRP which suggests that the rate of return equal to that for operational assets (i.e. the regulatory rate of return established in the ACCC's 2001 decision) should be used in calculating the FDC allowance for capex.[42] Therefore, to maintain the intent of the 2001 decision the AER considers that the FDC factors need to be amended to reflect the appropriate rate of return.

Recognising the error made in the ACCC's 2001 decision, Powerlink has provided the AER with an amended allowance for FDC of $119 million for its commissioned assets. The AER considers that this allowance reflects the appropriate regulatory rate of return established in the 2001 decision.

For assets under construction, Powerlink has applied both FDC1 and FDC2 factors to the value of these assets set out in its spreadsheet calculations for FDC. Similar to commissioned projects, an amended FDC1 factor based on the appropriate rate of return should be applied to assets under construction. However, with regard to an FDC2 factor, the AER considers that this should not be applied. This is because the value of assets under construction has been increased by the appropriate FDC1 factor as at 30 June 2007 and is immediately added to the RAB, and starts earning a return. Therefore, there is no delay in rolling the assets under construction into the RAB and so no need to apply an FDC2 factor. Accordingly, the AER's FDC1 allowance for Powerlink's assets under construction is $24 million.

Table 2.9 shows the break down of the FDC allowance during the current regulatory period.

Table 2.9 Amended allowance for finance during construction cost ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	Total
Commissioned assets	13.25	17.93	15.06	19.61	24.14	28.63	118.61
Assets under construction	–	–	–	–	–	24.21	24.21

2.6.4 Gold Coast reinforcement capex efficiency claim

The ACCC's 1999 DRP establishes benefit sharing provisions which are designed to provide incentives for the TNSP to maximise efficiency. Proposed Statement 7.2 in the DRP discusses the benefit sharing arrangements. In relation to capex it states that:

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41 ACCC, *Queensland transmission network revenue cap 2002–2006/07: decision*, 1 November 2001, pp. 60-61.

42 ACCC, *Draft statement of principles for the regulation of transmission revenues*, 27 May 1999, p. 26.

> The TNSP is invited to demonstrate in its regulatory review application that any capital expenditure below forecast levels over the previous regulatory period has arisen because of management induced efficiency gains …
>
> … Where it is clearly demonstrated by the TNSP that capital expenditure shortfalls are the result of management efficiencies or innovation, the capital expenditure efficiency gains may be subject to glide path.[43]

The DRP indicates that efficiency gains will be glide pathed over a five-year period commencing at the start of each regulatory review.

Powerlink's application

Powerlink stated that, consistent with the DRP, it should be able to retain a share of capex efficiencies despite the capex being higher than forecast in the current regulatory period. It claimed that it has achieved significant management induced efficiencies through the early acquisition and preservation of an easement for the construction of an overhead transmission line. The easement was acquired in the late 1980s and is located in the corridor between south Brisbane and the Gold Coast, an area undergoing significant development.

In its 2001 revenue cap decision an allowance was included for the construction of an overhead transmission line to reinforce supply to the Gold Coast and the cost of the easement ($10 million) was included in Powerlink's RAB.[44] The reinforcement of the Gold Coast was conducted in two stages. The first stage included construction of a line between Maudsland and Molendinar and the establishment of a 275 kV substation at Molendinar. The cost of this project was $24 million and it was commissioned in October 2003.[45] The second stage (to be commissioned in October 2006) is the construction of a 275 kV double circuit line between Greenbank substation and Maudsland. This project's original cost estimate was $45 million, however, the project scope and input cost increases have resulted in the commissioning cost estimate increasing to $68 million.

Powerlink engaged a consultant to assess the cost of the Gold Coast reinforcement project in a '2005 environment' (both the cost of acquiring the easement just before construction of the line and the construction costs based on the new easement).[46] The consultant determined that the lowest cost of the project, given a '2005 environment' would be $112 million ($2005–06). Powerlink stated that the actual cost of the project (both the value of the easement already included in the RAB and actual construction costs) is $74 million ($2005–06). It noted that this was $38 million lower than the consultant's estimate for the project if the easement had been acquired just before construction.

Powerlink claimed that these savings are the result of management induced efficiencies and proposed that they be shared equally between it and customers. Further, it

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43 ACCC, *Draft statement of principles for the regulation of transmission revenues*, 27 May 1999, p. 97.

44 The easement is valued at $10.4 million ($2005–06) in Powerlink's asset register.

45 Business case cost estimate was $22.9m ($2001–02). Sourced from Powerlink information templates, 3.3 historic capex.

46 Note that the new easement varies from the existing easement in that it requires additional scope to the route.

considered that the amount should be spread evenly during the next regulatory period as part of its opex allowance. Powerlink has therefore sought an efficiency allowance of $4.9 million per annum.

Submissions

The EUAA stated that the Gold Coast reinforcement example seems to indicate that the savings may have been more fortuitous than due to management induced efficiency. It also stated that the costs associated with carrying the easement have been borne by customers. The EUAA was not convinced that this is a management induced efficiency.

PB's review

As part of its terms of reference, PB was also required to review the capex efficiency savings claimed by Powerlink. PB recommended that the AER not allow the proposed capex efficiency amount on the basis that the early acquisition and preservation of the easement is good industry practice rather than a management induced efficiency or innovation. It stated that:

> It is common practice within the industry for both TNSPs and DNSPs to acquire strategic easements and land for future assets well in advance of construction occurring and Powerlink are quoted as having a similar policy. Typically, long term planning identifies areas where either additional assets or system augmentation will be required, and land or easements are acquired once the requirement has been identified where it is believed that delaying the purchase may result in the asset not being available when required or being significantly more expensive to acquire. This often occurs as a consequence of changes in land use.

Specifically in relation to Powerlink's claim, PB stated that:

> … the acquisition of the easements in the 1980s for augmentation of supply to an obvious growth area such as the Gold Coast, in an obvious growth corridor is consistent with accepted good electricity industry practice in Australia and any savings in cost due to the early acquisition should not be attributed to a particular management efficiency or innovation.[47]

PB noted that the cost of the easement has been included in Powerlink's RAB since it was acquired, and it has been receiving an appropriate rate of return. It also noted that Powerlink is quoted in its consultant's report as having a policy to acquire land and easements where it is identified that future augmentation of the network will be required.

AER's considerations

Under the DRP, for a TNSP to demonstrate that a management induced efficiency gain has occurred it must show that:

- capital expenditure in the regulatory period was below forecast levels
- capex savings have arisen and these were the result of management induced actions.

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47 PB report, p. 169.

Inherent in this approach is the proposition that an allowance was provided but not fully spent, and when these savings are the result of management induced actions, the TNSP should be rewarded for taking measures that have resulted in the savings.

Powerlink's efficiency claim involves comparing the actual costs of the easement acquisition and construction of the overhead transmission line with a hypothetical scenario, whereby the easement was acquired just before construction in 2005.

The AER has considered PB's findings and agrees that the early acquisition of easements is standard industry practice, and therefore cannot be attributed to a particular management efficiency or innovation. Further, the AER considers that:

- Powerlink has not demonstrated that the claimed savings are the result of capex that was below forecast levels during the current regulatory period. The savings that Powerlink has claimed are not based on a reduction in the amount that was forecast to be spent on the project but rather a hypothetical forecast developed by Powerlink's consultant.

- The savings are not considered to result from management induced efficiencies. Efficiencies involve improvements in processes and procedures. Management induced efficiencies imply that management has taken steps or made determinations with the objective of ensuring value for money, best use and timely response. The effect is a direct consequence of the act, therefore such efficiencies must be within the control of the TNSP and not simply a by-product of management acts.

- Powerlink has not demonstrated that its action (the early acquisition and preservation of the easement) resulted in an efficiency gain which was within its control. Any increase in the cost of the easement was most likely due to the rising value of land, which is outside of Powerlink's control (i.e. not an efficiency gain but a windfall gain). It therefore cannot be management induced.

Accordingly, the AER has decided not to allow Powerlink's capex efficiency claim.

2.6.5 QNI capex efficiency allowance

In its 2001 revenue cap decision, the ACCC considered that Powerlink demonstrated a sufficiently innovative approach in its construction of the Queensland–NSW Interconnector (QNI) that resulted in management induced capex savings. The ACCC agreed to glide path these efficiency savings over two regulatory periods. It allowed $12.5 million during the current regulatory period and a further $8.2 million to be recovered during the next regulatory period.[48]

Powerlink's application

Based on the ACCC's 2001 decision to glide path $8.2 million during the next regulatory period, Powerlink has requested an annual efficiency amount of $2.9 million ($2006–07) per annum during the next regulatory period for capex efficiencies associated with the construction of QNI.

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48 ACCC, *Queensland transmission network revenue cap 2002–2006/07: decision*, 1 November 2001, p. 60.

AER's considerations

As part of the revenue reset process, the AER requested additional information from Powerlink on how the annual efficiency carryover amount of $2.9 million per annum had been calculated. Powerlink provided a spreadsheet showing the calculations for an annual allowance of $2.9 million ($2006–07) based on the discounted value of $8.2 million.

Having reviewed the spreadsheet, the AER considers that an amendment should be made to reflect the intent of the ACCC's 2001 decision. The $8.2 million was calculated by the ACCC as a present value in 2000–01 dollar terms. Powerlink's spreadsheet discounts future annual cash flows to obtain $8.2 million in 2001–02 dollar terms. The AER, therefore, has made an amendment to determine the $8.2 million in 2000–01 dollar terms. Accordingly, the amendment to the spreadsheet results in an annual allowance of $3.2 million ($2006–07) for Powerlink during the next regulatory period. This annual amount is included in Powerlink's opex allowance (see section 6.6.12).

2.6.6 Review of factors affecting past capex

In its 2001 decision, the ACCC approved a forecast capex allowance of $1043 million (inclusive of FDC) for the current regulatory period. Powerlink expects actual capitalisations for the period to be $1274 million (inclusive of FDC).

A number of submissions highlighted the need to substantiate Powerlink's claim about factors such as high demand growth and increased input costs contributing to its past capex being higher than was forecast. This section sets out the AER's high level review of those factors.

Powerlink's application

Powerlink stated that the business environment in which it operates determines its capital and operating costs. It claimed that this environment currently consists of:

- high input costs for materials such as steel and aluminium
- increasingly scarce skilled labour
- healthy contractor margins driven by competition for services from major infrastructure projects in Queensland and elsewhere.

In addition, a particular challenge Powerlink faces is high demand growth. Actual statewide maximum demand increased by 31 per cent over the past five years and in the SEQ region demand increased by 29 per cent over the past three years. Moreover, higher peak summer demand was associated with increases in air conditioning installations, as well as an increase in the underlying level of expected population growth and construction and mining activity.

Powerlink's current enterprise bargaining agreement (EBA) reflects step increases in wage costs that were required to achieve greater wage parity with other states for the purpose of attracting and retaining skilled workers. The continuing skills shortage in Australia has increased the costs associated with attracting and retaining skilled workers in Queensland.

Major infrastructure investment in Queensland has created strong demand for construction contractors and equipment supply. At the same time, construction material costs have risen sharply with the worldwide demand for steel, copper, aluminium and zinc increasing the cost of materials used in capital projects. Powerlink claimed that these factors were not foreseeable at the time of its 2001 application and therefore were not factored into its past capex allowance.[49]

Submissions

The EUAA and the MEU considered that Powerlink has not justified or detailed any of the increases in labour and material costs. The EUAA stated that Powerlink's explanation of cost increases is generally qualitative and the actual value of the increases needs substantiating. The EUAA stated that the reasons for Powerlink's higher than forecast capex in the latter years of the current regulatory period needs to be investigated to ensure that it is justified. It also considered that the AER should only allow increased costs of capex related to meeting increases in customer demand.

SP AusNet supported Powerlink's claim that there has been a significant increase in input costs in the electricity supply industry.

PB's review

As part of undertaking a detailed review of 60 projects, PB found that significantly more projects came in over the initial approved cost than under it. The main reasons identified as contributing to project cost variations were the cost of resolving legal disputes over the acquisition of easements and changes in project scope.

Changes to project scope occurred in 23 projects reviewed and were generally to accommodate additional work after the initial project approval was obtained, and particularly affected replacement projects. While recognising that unforeseen work can occur in large projects PB considered that Powerlink has a significant amount of discretion in determining when to replace assets. PB recommended that Powerlink could improve its original scope assessment of asset replacement projects and could review its project development procedures to determine whether it is possible to reduce the need for late scope changes. Nevertheless, PB concluded that the increased expenditures were prudent.

For projects where the actual costs were above the approved budget, PB identified two projects affected solely by higher inputs costs and three additional projects that were affected by scope changes and higher input costs. In addition, it found that 14 projects reviewed were not anticipated at the time of the 2001 decision and that higher load growth was the primary driving factor behind four of these projects. The remaining projects resulted from variations to anticipated projects and those which were required for the business to function (i.e. non-load driven).

PB agreed with Powerlink that demand growth and input costs during the current regulatory period have been higher than that assumed in 2001. It stated that while increases in demand and input costs had some effect in causing actual capex to be

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[49] Powerlink, *Queensland transmission network revenue proposal for the period 1 July 2007 to 30 June 2012*, April 2006, p. 27.

higher than forecast, the impact of these factors was not overly significant. PB considered the fact that these increases are not reflected to the same extent in actual project outcomes indicated that they were largely absorbed by efficiency gains made by Powerlink.

AER's considerations

In reviewing the factors that may have contributed to higher than forecast capex, the AER has analysed information on Queensland's peak summer demand growth, input costs and project cost variations.

Demand growth

The AER notes that in the ACCC's 2001 decision, Powerlink's forecast capex allowance was based on demand growth forecasts contained in its 2000 Annual Planning Statement (APS). Table 2.10 compares Powerlink's 50 per cent probability of exceedance (PoE) medium and high growth peak summer demand forecasts for 2001–02 and 2005–06 from its 2000 APS, and the 50 per cent PoE temperature and diversity corrected (actual) peak summer demand contained in its 2006 Annual Planning Report (APR) for 2001–02 and 2005–06.[50]

Table 2.10 Comparison of Powerlink's 2000 summer peak demand forecast with corrected actual summer peak demand outcomes (MW)

Queensland	2001–02	2005–06	Percentage change in peak summer demand (%)
Powerlink's forecast 50% PoE medium demand in 2000[1]	6110	6863	12.3
Powerlink's forecast 50% PoE high demand in 2000[1]	6344	7630	20.3
Powerlink's 50% PoE corrected demand in 2006[2]	6165	7687	24.7

Note: The 50 % PoE corrected demand in the 2006 APR excludes the load at Terranora (Tweed zone).
[1] Powerlink, *Annual planning statement 2000*, table A3.
[2] Powerlink, *Annual planning report 2006*, table 3.8, p. 36.

This comparison shows that the 2006 APR's 50 per cent PoE temperature and diversity corrected peak summer demand has grown twice as fast as Powerlink expected in its 2000 APS's 50 per cent PoE medium growth peak summer demand forecast.

Figure 2.1 shows the comparison between Powerlink's 50 per cent PoE medium and high growth demand forecasts made in 2000 for 2001–02 to 2005–06, and the 50 per cent PoE temperature and diversity corrected demand for the same five-year period. The corrected demands track a similar path to the 50 per cent PoE high growth demand forecasts made in 2000, particularly from 2003–04 to 2005–06. Therefore, if viewed in 2000, it appears reasonable that the actual (corrected) peak demand would be classified as high growth rather than medium growth.

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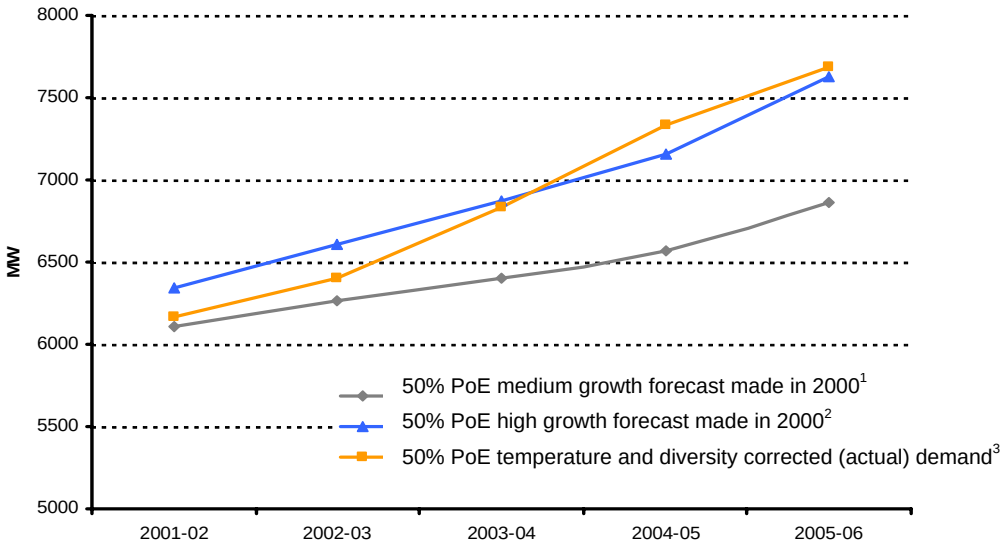
50 Powerlink calculated the actual demand with temperature and diversity corrections based on daily maximum demand associated with ambient temperature conditions across eight locations in Queensland. This is because Queensland is geographically too large to be accurately described as having a demand dependence on a single location's weather. For more information on actual demand corrections, see Powerlink's 2006 APR (on p. 29 and appendix F on p. 156).

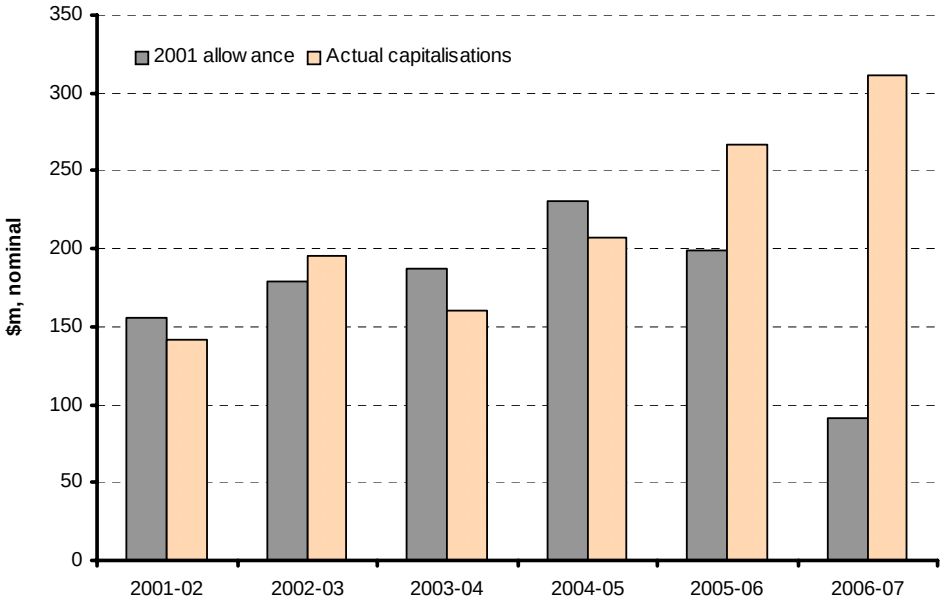
Figure 2.1 Comparison between Powerlink's 2000 forecast versus temperature and diversity corrected 50% PoE summer peak demand (MW)



[1] Powerlink, *Annual planning statement 2000*, table 2, p10.
[2] Powerlink, *Annual planning statement 2000*, table A3.
[3] Powerlink, *Annual planning report 2006*, table 3.8 p36.

Figure 2.2 shows Powerlink's 2001 capex allowance and its actual capitalisations for the current regulatory period. Comparing figure 2.1 with figure 2.2 suggests that the increase in actual capitalisations in the latter part of the current regulatory period is largely consistent with the pattern of higher than forecast demand being experienced in Queensland.

Figure 2.2 Comparison of Powerlink's 2001 allowance and its actual capitalisations



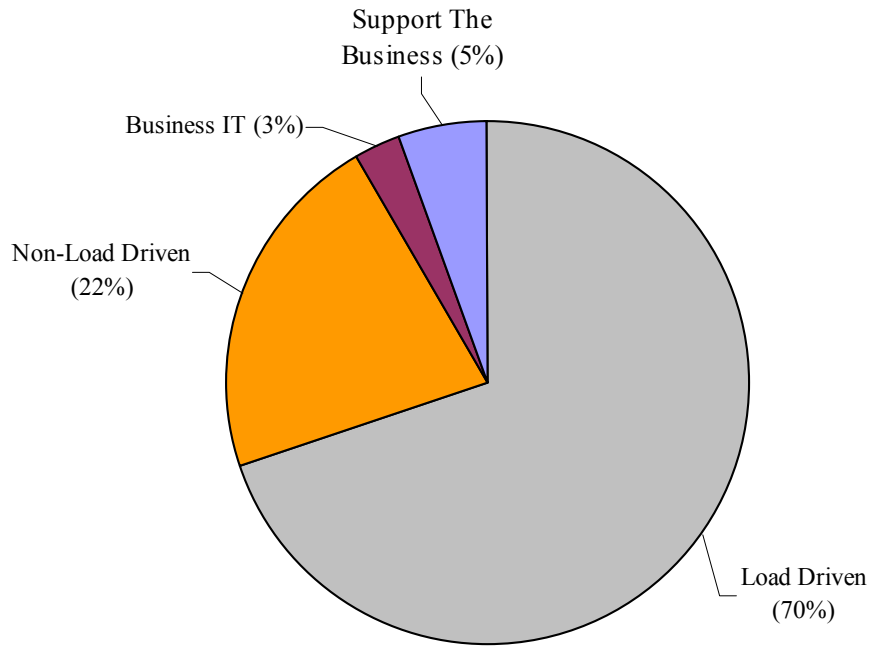
Note: The capitalisation figure for 2006–07 is forecast.

A comparison of Powerlink's 2006 APR and 2000 APS shows that peak summer demand in SEQ has substantially increased in the last three years (2002–03 to 2005–06) of Powerlink's current regulatory period and that the growth in peak summer demand has exceeded that forecast in 2000.[51] For further discussion on Powerlink's demand growth forecasts refer to section 4.6.3.

A review of Powerlink's load driven past capex (from 1 January 2002 to 30 June 2007) by location indicates that:

- 70 per cent ($752 million) of the total proposed value of Powerlink's commissioned projects is load driven as shown in figure 2.3
- 54 per cent ($407 million) of the value of load driven capex projects were undertaken in SEQ
- 54 per cent of assets under construction projects (52 out of 96) is load driven and being undertaken in the SEQ region.

Figure 2.3 Proportion of Powerlink's commissioned project by category



Source: Figures based on Powerlink information templates, 3.3 historic capex.

This analysis indicates that the majority of Powerlink's projects undertaken in the current regulatory period were load driven and the bulk of these projects were located in the SEQ region, which supports Powerlink's claims.

Load driven capex comprises augmentation, connection and easement projects. Several large augmentation projects which were not forecast in Powerlink's 2001 revenue cap decision were also identified. For example, higher demand growth in SEQ resulted in

[51] See table 4 in the 2000 APS and tables 3.16 and F3 in the 2006 APR.

the need to construct these projects for commissioning in late 2006.[52] The AER notes that the majority of Powerlink's load driven expenditures undertaken in the current regulatory period were augmentation projects and the bulk of these projects were located in the SEQ region:

- 59 per cent ($354 million) of the value of augmentation projects to be commissioned in the current regulatory period were constructed in the SEQ region
- 69 per cent ($332 million) of the total proposed value of Powerlink's assets under construction is made up of augmentation projects.

Powerlink stated that Queensland had experienced a prolonged increase in the number of air conditioner installations and this has resulted in higher peak summer demand. PB found that between the publication of Powerlink's 2004 and 2005 APRs there had been a significant upward revision of 480 MW in peak summer demand. Powerlink stated that this was due to several factors, particularly the increase in air conditioner installations. Moreover, surveys undertaken by Energex and the National Institute of Economic and Industry Research (NIEIR) predicted that air conditioner unit sales would exceed their original expectations in SEQ. Subsequently, Energex and NIEIR revised their demand forecasts in 2005 to reflect this view. Further, Powerlink advised that domestic air conditioner penetration surveys conducted by the Queensland Department of Energy and Energex in May 2004 and May 2005 found that penetration in SEQ had increased from 45 per cent to 56 per cent during this period, confirming NIEIR's predictions.

Table 2.11 shows data from the Australian Bureau of Statistics (ABS) on the increases in the market penetration of air conditioner units in Australia and Queensland.[53] This information supports Powerlink's claims. In the six-year period from 1999 to 2005, the proportion of Queensland dwellings with air conditioning units has increased by a factor of 2.3, which is greater than the national increase of 1.7. It appears reasonable that the increases in air conditioner installations have contributed to higher actual peak demand in Queensland.

Table 2.11 Dwellings with air conditioners in Queensland and Australia (%)

	March 1999	March 2002	March 2005
Market penetration of air conditioners in Queensland	24.8	38.5	58.2
Market penetration of air conditioners in Australia	34.7	48.6	59.9

Source: ABS, *Environmental issues: people's views and practices 4602.0*, March 2005, table 5.4, p. 65.

In summary, Queensland's peak summer demand has increased significantly in the mid to latter years of the current regulatory period and has substantially exceeded Powerlink's 2000 demand forecasts. The majority of Powerlink's past capex projects were load driven and located in the SEQ region, which has experienced the largest increase in demand growth. Several large augmentation projects have been advanced as

52 Algester, Goodna and Sumner 110 kV substation establishments and Goodna 275 kV substation establishment.

53 ABS, *Environmental issues: people's views and practices 4602.0*, March 2005.

a result of higher than forecast demand growth. The growth rate in market penetration of air conditioner units in Queensland over the past six years has also increased at a faster rate than the national rate. Therefore, the AER considers it reasonable that higher than expected demand growth has been a key reason for the higher than forecast capex during the current regulatory period. In particular, higher demand during the latter years of the current regulatory period has resulted in a need for increased investment above that forecast in 2001.

Input costs – labour and materials

The AER has reviewed the effect of labour cost escalation factors on Powerlink's ability to deliver its past capex program. The national skills shortage has particularly affected the agriculture, engineering and mining sectors. Powerlink has been affected by this shortage and recently implemented step increases in its wages in order to attract and retain skilled labour. To the extent that these wage increases are to achieve parity with other states, the AER views this as reasonable.

Data from the ABS on quarterly average weekly earnings shows that from May 2001 to May 2006 the annualised wage increase across the electricity, gas and water supply (EGW) industry was 4.45 per cent. In comparison, wages in the mining industry increased by 4.27 per cent, in the construction industry by 6.73 per cent and across all industries by 3.65 per cent on average.[54] These wage increases in the EGW, construction and mining industries, which are higher than the average across all industries, appear to be the result of a tight labour market. They may also explain the effect that a tight labour market has had on Powerlink's inputs costs in two ways. First, it supports actions taken by Powerlink to increase its wages to attract and retain skilled workers to the extent that they can shift across industries. Second, the tight labour market may have an impact on Powerlink's contractor costs when it seeks tender responses as a result of higher labour costs being passed on.

Equipment used in the electricity supply industry comprises a significant amount of base metals such as aluminium, copper, steel and zinc. Prices for base metals have risen steadily since 2004 and have increased further in 2006. This increase in prices appears to be driven by low stock levels, combined with limited short-term supply growth and strong demand.[55] Furthermore, supply disruptions, concerns over future output and financial speculators have contributed to increases in base metal prices.

Data from the ABS on the producer price index (PPI) indicates that increasing base metal prices has raised prices for intermediate and final stages of electrical equipment production. For example, the index of copper materials used in the manufacture of electrical equipment such as power transformers shows that there has been an average annual increase of 42 per cent in the price from June 2004 to June 2006.[56] These increases are likely to have had an impact on Powerlink's equipment costs associated

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54 ABS, *Average Weekly Earnings, 6302.0*, May 2006, 17 August 2006.

55 ABARE, *Australian Commodities 06.1 March Quarter*, March 2006, p. 115-161.

56 ABS, *Producer Price Index, 6427.0*, June 2006, 24 July 2006, table 47.
In comparison, between June 2001 and June 2004 the average annual percentage change in the price was minus three per cent.

with its capex in the latter part of the current regulatory period. However, there is no direct available evidence to measure this impact.

It is clear that labour costs and materials prices have increased in the current regulatory period and appear to have had an impact on Powerlink's inputs costs. In this regard, PB's review identified some projects which were affected by higher input costs. PB, however, concluded that the cost increases were largely absorbed by efficiency gains made by Powerlink because the increases are not reflected to the same extent in actual project outcomes. In addition, the AER notes that Powerlink has not provided evidence that quantifies the specific impact of rising labour and material costs and their contribution to its higher than forecast capex during the current regulatory period.

Project cost variation from initial cost estimate to completion

PB identified that the main reasons for Powerlink's project cost variation from the initial cost estimate to completion were due to the costs of resolving legal disputes in relation to the acquisition of easements and project scope changes after initial approval had been obtained.

The AER agrees with PB's finding that legal issues with easement acquisitions are largely outside of Powerlink's control and it appears that Powerlink is managing these appropriately. However, it accepts PB's advice that where Powerlink has control over project scoping, Powerlink should review its project development procedures to determine whether the scoping of projects during formulation could be improved by reducing scope creep during implementation. The AER also accepts PB's conclusion that its review indicated that the increased expenditures resulting from the project cost variations were prudent.

2.7 AER's conclusion

Prudence of Powerlink's commissioned and assets under construction projects

The AER's conclusion is that Powerlink's expenditure of $1165 million on commissioned projects during the current regulatory period is prudent and should be included in its RAB.

To allow a smooth transition to the as-incurred approach, a prudent amount of expenditure incurred in the current regulatory period must also be included in Powerlink's RAB to recognise assets that are under construction but will not be commissioned until the next regulatory period. The AER's conclusion is that $489 million of Powerlink's assets under construction at the end of the current regulatory period is prudent and should be included in Powerlink's RAB. Table 2.12 provides a summary of the conclusions.

Table 2.12 AER's conclusion on Powerlink's past capex ($m, nominal)

	Commissioned assets	Assets under construction	Total
Powerlink's amended proposal	1164.69[1]	488.52[2]	1653.21[3]
PB's recommendation	1136.81	359.99	1496.80
AER's conclusion on past capex	1164.69	488.52	1653.21

Note: All figures are exclusive of FDC.
[1] Adjusted for spreadsheet error, and updated for actual 2005–06 and forecast 2006–07 capitalisations. The original proposal for commissioned assets was $1144.30 million.
[2] Updated for expenditures to be incurred by the end of the current regulatory period. The original proposal for assets under construction was $480.41 million.
[3] Powerlink's original total proposal was $1624.71 million.

Finance during construction

For FDC, the AER's conclusion is:

- to provide an allowance of $119 million for Powerlink's commissioned assets
- to provide an allowance of $24 million for Powerlink's assets under construction.

Table 2.13 shows the break down of this allowance.

Table 2.13 AER's conclusion on finance during construction costs ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006-–07	Total
Commissioned assets	13.25	17.93	15.06	19.61	24.14	28.63	118.61
Assets under construction	–	–	–	–	–	24.21	24.21

Capex efficiencies

The AER concludes that the QNI capex efficiency allowance should be amended to reflect the intent of the ACCC's 2001 decision. This results in an annual allowance of $3.1 million ($2006–07) for Powerlink during the next regulatory period. This annual amount is included in Powerlink's opex allowance (see section 6.6.12).

The AER's conclusion is not to allow Powerlink's capex efficiency claim in relation to the Gold Coast reinforcement project. Accordingly, no allowance for this claim is provided for Powerlink in its opex allowance (see section 6.6.12).

3 Opening asset base

3.1 Introduction

This chapter sets out the methodology that has been used by the AER to determine Powerlink's closing regulated asset base (RAB) for the current regulatory period. The closing RAB becomes the opening RAB for the next regulatory period and is used to calculate Powerlink's maximum allowed revenue (MAR).

This chapter discusses the adoption of a roll forward methodology consistent with the regulatory principles operating when Powerlink's 2001 revenue cap decision was determined by the ACCC.

3.2 Regulatory requirements

In determining an opening RAB for a revenue cap decision, the AER is bound by the relevant provisions of the rules. Clause 6.2.3(d)(4)(iv) of the old rules provides the AER with the discretion to determine Powerlink's RAB for this decision, subject to the following limitations:

> (iv) subject to clauses 6.2.3(d)(4)(i) and (ii), the valuation of assets brought into service after 1 July 1999 ("new assets"), any subsequent revaluation of any new assets and any subsequent revaluation of assets existing and generally in service on 1 July 1999 is to be undertaken on a basis to be determined by the AER and in determining the basis of asset valuation to be used, the AER must have regard to:
>
> (A) the principle that deprival value should be the preferred approach to valuing network assets; and
>
> …
>
> (C) such other matters reasonably required to ensure consistency with the objectives specified in clause 6.2.2.

Powerlink's 2001 revenue cap decision was made by the ACCC in accordance with the incentive framework contained in its 1999 *Draft statement of principles for the regulation of transmission revenues* (DRP). The capital expenditure (capex) included in that revenue cap decision was a forecast. While this forecast was based on an assessment of the likely investment required over the regulatory period, the actual prudent level of capex is likely to differ from the forecast level. The closing RAB at the end of the current regulatory period will take account of actual capex.

The DRP requires the closing RAB to be determined following an ex post prudency assessment of actual past capex. The AER's approach to the determination of what constitutes a prudent investment was discussed in section 2.2.

Chapter 5 of the DRP, which discusses changes to the asset base over time, provides guidance on the treatment of excess return on capital associated with a lower than forecast capex. It states that 'the TNSP gets to keep the return on the difference between

forecast and actual expenditure'.[57] This indicates that the transmission network service provider (TNSP) is able to retain the excess return on capital resulting from a lower than forecast capex within the regulatory period.

Guidance on how excess return of capital (depreciation) associated with a lower than forecast capex should be treated is provided by statement S5.3 in the DRP. It states that:

> At the start of the regulatory period only actual capital expenditure in the previous regulatory period will be included (retained in the case of previously forecast expenditures) in the asset base. At the commencement of the regulatory period this means that … any excess depreciation associated with forecast capital expenditures that did not eventuate [in the previous regulatory period] will be applied as a reduction in the value of the remaining items within the regulatory asset base at the start of the next regulatory period.[58]

The DRP requires forecast depreciation to be used in determining the value of the closing asset base. This means that excess depreciation associated with a lower than forecast capex is treated as a bring-forward of depreciation and recognised by the establishment of a lower opening RAB at the start of the next regulatory period.

The DRP does not explicitly indicate how a higher than forecast capex should be treated at the end of the regulatory period. The approach taken by the ACCC in its 2005 *NSW and ACT transmission network revenue cap* decisions, however, was to provide the TNSP with both returns on and of capital that exceeds the forecast amount if the capex was found to be prudent after an ex post assessment. That is, the undepreciated value of the additional prudent capex and any foregone return on capital is added to the closing RAB.

3.3 Powerlink's application

Powerlink has proposed an opening RAB for the next regulatory period of $3797 million based on the 'lock-in' roll forward methodology. The opening RAB includes a higher than forecast amount of $219 million of commissioned assets and $530 million of assets under construction at the end of the current regulatory period. Both the commissioned assets and assets under construction amounts include finance during construction (FDC) costs.

In performing the roll forward of its RAB, Powerlink has deducted the cash amount received from the disposal of any of its assets from the RAB. It has also adjusted the capex allowance and economic (nominal) depreciation as determined in the ACCC's 2001 decision for actual inflation using the consumer price index (CPI).[59]

Powerlink stated that the AER's preference for recognising forecast capex under the as-incurred approach requires assets under construction as at 30 June 2007 to be rolled into the opening RAB. This results in a one-off increase in Powerlink's RAB of $530 million, or a step change of 16 per cent.

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57 ACCC, *Draft statement of principles for the regulation of transmission revenues*, 27 May 1999, p.56

58 ibid., p. 64

59 As Powerlink's MAR for the current regulatory period was determined on the basis of forecast inflation, the MAR is adjusted annually to account for actual CPI.

Powerlink noted that its 2001 revenue cap decision was made in accordance with the DRP with its capex rolled into the RAB on an as-commissioned basis. To ensure that Powerlink recovered the cost of financing the construction of its assets, these costs (FDC1) were capitalised with the asset values upon their commissioning.

Furthermore, to ensure that Powerlink received the correct return on capital associated with its capex, a second allowance (FDC2) was added to the asset value to compensate for the average six-month delay before a commissioned asset is added to the RAB for revenue modelling purposes.[60] Powerlink's FDC1 and FDC2 allowances are discussed further in section 2.6.3.

3.4 Submissions

The EUAA considered that the AER should ensure that its roll forward methodology is robust and justified.

3.5 Issues and AER's considerations

3.5.1 AER's asset base roll forward methodology

The AER has developed its asset base roll forward model for Powerlink's revenue reset in accordance with the DRP's capex incentive framework. Further, the development of the asset base roll forward model has been informed by the roll forward methodology adopted by the ACCC for the 2005 *NSW and ACT transmission network revenue cap* decisions and is consistent with the information requirements contained in the SRP. As part of the revenue reset process, the asset base roll forward model was provided to Powerlink for comment. The AER reviewed Powerlink's comments and made some further refinements to the model. Powerlink advised the AER that it was satisfied with the roll forward model for determining its opening RAB for the next regulatory period.

Under the AER's asset base roll forward model, the closing RAB (nominal) for each year of the regulatory period is calculated by:

1. Adjusting the opening RAB for the difference between actual CPI and forecast inflation.

2. Adjusting the forecast capex (allowed in the 2001 decision) for the difference between actual CPI and forecast inflation.

3. Adjusting the forecast economic depreciation (allowed in the 2001 decision) for the difference between actual CPI and forecast inflation.[61]

Powerlink has undertaken more capex in the current regulatory period than was approved in its 2001 revenue cap decision. However, as indicated in chapter 2, the AER has determined that $1165 million of Powerlink's commissioned assets during the

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60 Asset capitalisations can occur evenly throughout the financial year, so it is assumed that on average it takes place halfway through the year.

61 Economic (or nominal) depreciation is calculated by determining the straight-line depreciation for the RAB less the CPI adjustment on the opening RAB.

current regulatory period were prudent and should be included in its RAB.[62] Therefore, at the end of the current regulatory period, an adjustment to reflect the higher than forecast capex is made to the closing RAB by adding the prudent additional expenditure. That is, the undepreciated value of the additional prudent capex is rolled into the RAB at the end of the current regulatory period.

From 2001–02 to 2004–05 Powerlink's actual capex was lower than forecast in three out of the four years. In 2005–06 to 2006–07, its actual capex was higher than forecast.[63] The asset base roll forward undertaken for the current regulatory period indicates that, at the end of 2006–07, the accumulated excess return on capital associated with the lower than forecast expenditures in the earlier years more than offsets the foregone return on capital associated with higher than forecast expenditures in the latter years (see table 3.1). Consequently, no adjustment to the closing RAB is required in relation to forgone return on capital even though Powerlink's total actual capitalisations over the current regulatory period are higher than forecast.

Table 3.1 Accumulated return on capital associated with capex differences ($m, nominal)

Return on capex diffferences	2002–03	2003–04	2004–05	2005–06	2006–07	Total
Capex in 2001–02	–1.49	–1.72	–1.60	–1.82	–2.13	–8.77
Capex in 2002–03	–	1.57	1.46	1.66	1.94	6.62
Capex in 2003–04	–	–	–2.57	–2.93	–3.42	–8.92
Capex in 2004–05	–	–	–	–2.38	–2.78	–5.16
Capex in 2005–06	–	–	–	–	6.36	6.36
Capex in 2006–07	–	–	–	–	–	–
Total	–1.49	–0.16	–2.72	–5.47	–0.03	–9.86

Note: Total may not add up due to rounding.

Table 3.1 indicates that there is an aggregate excess return on capital of $9.9 million received by Powerlink because of the profile of its actual capex during the current regulatory period. However, in accordance with the DRP's capex incentive framework, the aggregate excess return on capital is not deducted from the TNSP's closing RAB. Instead, Powerlink retains the excess return on capital within the current regulatory period.

The AER will also roll into Powerlink's RAB an amount for prudent expenditure on assets under construction at the end of the current regulatory period as a result of the transition to modelling the return on capital under the as-incurred approach.[64] As

62 An FDC allowance of $119 million for commissioned assets is also added to the RAB.

63 See figure 2.2 for a comparison of Powerlink's annual forecast capex approved by the ACCC in 2001 and its actual capitalisations for the current regulatory period.

64 Although Powerlink's return on capital is modelled under the as-incurred approach, its return of capital is modelled under the as-commissioned approach. The recognition of capex in this manner is referred to as the hybrid approach. Refer to section 9.5 for further discussion in relation to the recognition of capex.

indicated in chapter 2, the AER has determined that $489 million of Powerlink's assets under construction were prudent and should be included in its RAB.[65]

Applying the roll forward methodology, the AER has determined that Powerlink's opening RAB for the next regulatory period is $3781 million as at 1 July 2007 (see table 3.2). This value is used as an input for the AER's post-tax revenue model for the purposes of determining Powerlink's MAR during the next regulatory period.

3.5.2 Asset base roll forward for the next revenue reset

Clause 11.6.12(k) of the Powerlink transitional provisions requires the AER to determine Powerlink's opening RAB at the beginning of the following regulatory period (as at 1 July 2012) in accordance with clause S6A.2.1(f) of the new rules, and it may be adjusted having regard to any agreed arrangements contained in this decision. No additional arrangements have been agreed to in this decision.

3.6 AER's conclusion

Consistent with the old rules and the SRP, Powerlink has proposed to lock-in and roll forward its RAB established in the ACCC's 2001 revenue cap decision to determine an opening RAB for the next regulatory period. In accordance with its roll forward methodology, the AER has determined Powerlink's opening RAB to be $3781 million for the next regulatory period (as at 1 July 2007). The RAB roll forward calculations are set out in table 3.2.

Table 3.2 Powerlink's opening RAB for the next regulatory period ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07[1]
Opening RAB	2276.87	2394.51	2553.16	2680.32	2852.56	3007.53
2001 decision capex (adjusted for actual CPI)	155.24	180.12	190.79	233.26	202.37	93.35
CPI adjustment on opening RAB	66.92	82.39	50.59	63.24	85.09	81.20
Straight-line depreciation (adjusted for actual CPI)	–104.53	–103.85	–114.23	–124.26	–132.50	–140.36
Closing RAB	2394.51	2553.16	2680.32	2852.56	3007.53	3041.72
Add: prudent capex over the 2001 decision allowance[2]						226.93
Add: prudent assets under construction at 30 June 2007						512.73
Opening RAB at 1 July 2007						3781.37

[1] Forecast.
[2] The cash values for disposal of assets have been deducted from capex.

Powerlink's opening RAB for the next regulatory period is approximately 66 per cent higher (in nominal terms) than its opening RAB at the start of the current regulatory period. This increase largely results from:

[65] An FDC allowance of $24 million for assets under construction is also added to the RAB.

- a higher than forecast amount of commissioned assets ($1283 million, inclusive of FDC) compared with the 2001 revenue cap decision
- the inclusion of an assets under construction component ($513 million, inclusive of FDC) for the current regulatory period to allow for the transition to the proposed regulatory accounting arrangements.

4 Forecast capital expenditure

4.1 Introduction

This chapter sets out the AER's conclusion on Powerlink's forecast capital expenditure (capex) allowance for the next regulatory period. The AER has assessed Powerlink's capex proposal by examining:

- whether Powerlink's capex governance framework and capex policies and procedures facilitate efficient investment outcomes
- whether the methods used to develop the capex proposal, including the probabilistic model and its key inputs are robust and reasonable
- whether there was a genuine need for the projects underlying Powerlink's capex proposal and whether the scope, timing and costs of these projects were efficient
- whether the cost estimation processes used by Powerlink were reasonable
- whether Powerlink's proposed contingent projects should be treated as contingent projects
- whether the capex program was likely to be deliverable.

The AER's conclusion on the efficient capex allowance for Powerlink for the next regulatory period is set out in section 4.7.

4.2 Regulatory requirements

Clause 11.6.12(c) of the Powerlink transitional provisions requires the AER to set Powerlink's revenue cap for the next regulatory period substantially in accordance with the old rules and the *Statement of principles for the regulation of electricity transmission revenues* (SRP), including the ex ante approach to setting the forecast capex allowance.

4.2.1 Rules requirements

The old rules require the following:

- In setting the revenue cap, the AER must have regard to the potential for efficiency gains in expected operating, maintenance and capital costs, taking into account the expected demand growth and service standards.
- The regulatory regime must seek to achieve efficiency in the use of existing infrastructure, efficient operating and maintenance practices and an efficient level of investment.
- The regulatory regime must foster an efficient level of investment within the transmission sector and the sectors upstream and downstream of it.

4.2.2 Statement of regulatory principles

The capex regulatory framework established in the SRP involves the AER setting an efficient allowance at the start of the regulatory period and allowing a TNSP to decide which capital investments it will undertake within this allowance, subject to service level considerations.

The objective of the ex ante allowance is to provide certainty and incentives for efficient investment. This requires an analysis of a TNSP's proposed investment program before the start of the regulatory period to ensure that the allowance is reasonably aligned with the efficient costs associated with meeting its statutory obligations.

The ex ante allowance is expressed as a profile of expenditure for each year of the regulatory period. The profile of expenditure is used, along with the opening RAB, to determine a TNSP's annual depreciation and return on capital during the regulatory period. This information together with other inputs such as opex and payable taxes is used to calculate the TNSP's allowed revenues, in accordance with the building block approach, for each year of the regulatory period.

At the end of the regulatory period, the closing RAB will be set equal to the depreciated value of the actual investment undertaken during the regulatory period, regardless of whether this closing RAB is larger or smaller than the closing RAB calculated on the basis of the forecast investment allowance. The effect of this arrangement is that if a TNSP spends less than its forecast capex during the regulatory period, it retains the benefit of that lower expenditure (both return on and of capital) until the end of the regulatory period. Conversely, if it exceeds its forecast capex allowance during the regulatory period it suffers a loss on that higher expenditure (both return on and of capital) until the end of the regulatory period.

It is important to note that a TNSP is not prevented from undertaking capex which exceeds its ex ante allowance. Under the capex incentive framework established in the new chapter 6A rules, should a TNSP exceed its ex ante allowance, it would lose the returns on and of that investment for the remainder of that regulatory period. However, at the next revenue reset, the actual written down value of the investment would be rolled into the TNSP's asset base and it would begin to earn returns.

The SRP also allows for large and uncertain projects related to a unique investment driver to be excluded from the ex ante allowance and treated as a contingent project.

4.3 Powerlink's application

Powerlink's capex proposal for the next regulatory period is $2449 million. Table 4.1 provides the annual break down of Powerlink's proposal.

Table 4.1 Powerlink's proposed ex ante capex allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Proposed capex	546.31	543.02	456.10	466.49	437.32	2449.24

Powerlink's capex proposal includes $349 million of expenditure on assets under construction. Work on these projects began in the current regulatory period but the projects will be commissioned in the next regulatory period. These projects were reviewed as part of the past capex assessment (see section 2.6.2).

Table 4.2 provides a break down of Powerlink's forecast capex proposal by investment category.

Table 4.2 Powerlink's capex proposal by investment category ($m, 2006–07)

Type	Investment category	Forecast capex	Percentage of total capex (%)
Load driven	Augmentations	1222.71	49.92
	Connections	69.03	2.82
	Easements	104.07	4.25
Non-load driven	Replacements	812.80	33.19
	Security/compliance	115.85	4.73
	Other	21.06	0.86
	Total network	2345.52	95.77
Non-network	Business IT	57.38	2.34
	Buildings	19.61	0.80
	Motor vehicles	18.51	0.76
	Assets, tools and other	8.22	0.34
	Total non-network	103.72	4.23
Total capex		2449.24	100.00

Load driven network investment includes expenditure on augmentations, connections and easements. Powerlink has used a probabilistic approach to forecast its load driven network investment requirements over the next regulatory period. Non-load driven network investment includes expenditure on replacing assets, complying with legal and regulatory obligations, ensuring the physical security of assets and 'other' assets.[66] Powerlink's non-load driven expenditure has been developed via a deterministic assessment. It has also undertaken a deterministic assessment of its expenditure requirements for non-network investment such as business information technology (IT), buildings, motor vehicles, and assets and tools.

Powerlink's application also proposed 10 contingent projects with the indicative costs for these projects ranging from $10 million to $115 million and a total indicative cost of $564 million.

[66] 'Other' non-load driven network investment includes a variety of projects ranging from the purchase of spare transformers to communication systems works.

Powerlink stated that its forecast capex is 60 per cent higher than the capex expected to be incurred over the current regulatory period.[67] It indicated that the key drivers for the increase in capex from the current regulatory period are:

- the high load growth expected in Queensland
- rising input prices such as labour and material costs
- the age profile of Powerlink's network which leads to a significant program of replacements.

4.4 Submissions

The AER received submissions commenting on Powerlink's forecast capex from the following interested parties: the Energy Users Association of Australia (EUAA), the Major Energy Users (MEU), Energy Action Group (EAG), Ergon Energy (Ergon) and SP AusNet. The main issues raised in relation to Powerlink's application were:

- a lack of information on the cost drivers and their relative contribution to the capex proposal
- the factors contributing to Powerlink's high demand forecast
- a lack of information on the prudency, timing and costs for individual projects
- the significant increase in replacement expenditure given the age profile of Powerlink assets
- whether the cost estimates are efficient and in line with industry practice
- the ability of Powerlink to deliver a large capex program in an environment of constraining external factors.

4.5 PB's review

The AER engaged PB to provide an independent assessment of the efficiency and appropriateness of Powerlink's forecast capex proposal. Specifically, PB was required to:

- review Powerlink's capital governance framework and its capex policies and procedures
- review Powerlink's probabilistic forecasting approach
- undertake a high level review of the proposed capex program
- undertake a detailed project review of a sample of projects

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67 Powerlink application, p. 79.

- identify any projects in the ex ante allowance that should be included as contingent projects

- comment on the deliverability of the capex proposal.

PB was required to provide an alternative capex estimate if it found that Powerlink had overestimated or underestimated its statutory requirements for transmission investment.

As part of its review of Powerlink's forecast capex proposal PB reviewed the documentation provided by Powerlink as part of its application, sought more detailed information on specific projects and issues and undertook follow-up discussions with Powerlink. PB's review of Powerlink's forecast capex proposal can be found in section 4 of its report. From its review of Powerlink's forecast capex proposal PB found that:

- Powerlink's policies and procedures for project development are generally robust and consistent with the requirements of the rules.

- Powerlink's probabilistic forecasting approach is plausible and provides a reasonable basis for developing its capex proposal.

- Overall the demand forecasts used by Powerlink to develop its capex proposal are reasonable.

- Powerlink's planning criteria are generally reasonable, given its obligation to comply with the rules and its Transmission Authority.

- Powerlink had undertaken a systematic and rigorous review of a complex network and used advanced planning techniques to develop its forecast capex. However, in a small number of instances there were more efficient and optimally timed project options that would allow Powerlink to achieve its reliability requirements.

- Powerlink's proposed replacement expenditure was too high and should be reduced.

- Powerlink had applied a systematic process to translate its individual project cost estimates into an annual capex profile, however, a number of adjustments should be made to this process.

- Five of Powerlink's proposed contingent projects meet the contingent project criteria. A number of projects in Powerlink's proposed ex ante allowance associated with a large potential industrial development should be treated as a contingent project.

- Powerlink's amended capex program is deliverable.

Table 4.3 shows the main adjustments that PB has made to Powerlink's forecast capex proposal and its recommended forecast capex allowance for Powerlink over the next regulatory period.

Table 4.3 PB's recommended forecast capex allowance ($m, 2006–07)

Category	Total
Powerlink's capex proposal	2449.24
Adjustments as a result of detailed project reviews	–201.65
Adjustment to replacement expenditures	–110.50
Adjustments to cost accumulation factors	–79.52
Removal of M50++ sub-theme	–15.70
PB's recommended adjustments	–407.37
PB's recommended capex allowance	2041.87

PB considered that its recommended reduction of $407 million would not materially degrade Powerlink's ability to meet its reliability based network obligations or impact on its ability to meet its service standards. Based on its amendments, PB recommended a forecast capex allowance of $2042 million (around a 17 per cent reduction on that proposed by Powerlink) and a provision for contingent projects of $617 million based on indicative costs.

Table 4.4 compares Powerlink's capex proposal with PB's recommended capex allowance for each year of the next regulatory period.

Table 4.4 Comparision of forecast capex allowances ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's proposal	546.31	543.02	456.10	466.49	437.32	2449.24
PB's recommendation	483.49	418.54	379.50	406.25	354.18	2041.87

4.6 Issues and AER's considerations

4.6.1 Powerlink's governance framework and capex policies and procedures

This section examines whether Powerlink's governance arrangements and capex policies and procedures are appropriate and provide a framework that is consistent with efficient investment outcomes. This is important, as it is not appropriate to review each individual project.

Powerlink's application

Powerlink stated that its business model separates corporate governance functions from the management of assets. The asset owner provides ownership functions such as corporate governance and financing while the asset manager plans and manages the network to ensure future network capability.

Powerlink also stated that all capital projects follow very similar approval procedures including the trigger for the project, the development of options, external consultation (where required), the establishment of a business case and approval. The business case requires an endorsement sheet signed off by the relevant managers and approvals are

made in accordance with appropriate delegations. Large capital projects require approval by the Powerlink Board.

Submissions

MEU stated that Powerlink is a well operated and successful transmission company with a highly regarded reputation for technical and operational efficiency. However, it noted that Powerlink's proposal appears to be a purely network augmentation strategy and shows no evidence that demand management strategies are being sought.

PB's review

PB was required to assess whether Powerlink's capital governance arrangements allowed for the consideration of all relevant issues related to investment projects. It was also required to assess whether Powerlink's capex policies and procedures were reasonable, implemented across the organisation and provided a framework that was consistent with efficient investment outcomes.

PB found that:

- Powerlink's categorisation of capex was logical and consistent with its business mission and business strategy.

- The level at which Powerlink classifies assets results in a significant amount of expenditure which should arguably be capitalised instead of being expensed.

- Easements are identified separately from the primary assets they support, and easement costs are not included in the economic evaluation of different project alternatives if the easement was purchased before the economic evaluation was undertaken. Where easements are purchased immediately before the project commencement, this approach has the potential to distort the selection of the most efficient project. PB did not identify any instance where the selection of the most efficient project was distorted.

- Powerlink uses a documented policy driven process to ensure that the most prudent project is implemented for a given constraint. The process is coordinated across Powerlink's various business groups to ensure that regulatory requirements are complied with and the project is consistent with Powerlink's asset management, plant and maintenance strategies.

- Powerlink's procedures for project development were generally robust and consistent with the consultation and the regulatory requirements of the rules.

- Powerlink provides an opportunity for interested parties to comment on the development of project alternatives for large network augmentations. This exceeds the rules' consultation requirements and results in Powerlink using network support as an alternative to network augmentation.

- Powerlink's processes for the identification and consideration of non-network project options to address network capacity constraints are robust.

- There is some risk in Powerlink's current project selection process that, without formal criteria for technical acceptability, the most economically efficient network project could be eliminated prematurely and not be economically evaluated.

- Powerlink has a structured and systematic governance arrangement for its procurement processes and these are resulting in procurement efficiencies.

Overall, PB found that Powerlink's governance arrangements and its capex policies and procedures were robust and consistently applied and provided a framework that should facilitate efficient investment outcomes.

AER considerations

PB's findings on Powerlink's capex governance arrangements and capex policies and procedures were generally positive. It found that Powerlink's procedures for project development were robust, coordinated across the various business groups, consistent with its asset management strategies, and consistent with the rules.

However, PB did identify some areas where improvements could be made. In particular, PB found that easement costs were not included in the economic evaluation of different project alternatives if the easement was purchased before the economic evaluation was undertaken. PB considered that this could potentially distort the selection of the most efficient project. PB also found that the process for the development of a short list of projects for full technical and economic evaluation did not appear to be documented and there were no criteria for technical acceptability. It saw some risk that without formal criteria for technical acceptability, the most economically efficient project could be eliminated prematurely.

While these are important issues, the AER notes that PB did not recommend any changes to Powerlink's forecast capex based on these findings. Nevertheless, Powerlink should consider incorporating the suggested improvements into its capex policies and procedures.

PB also noted that Powerlink's approach to asset categorisation resulted in a significant amount of expenditure being expensed rather than being capitalised. This issue and the AER's consideration of it is contained in section 6.6.8.

The MEU stated that Powerlink's capex proposal appears to be purely a network augmentation strategy and that there was no evidence that demand management strategies are being sought by Powerlink. PB found that Powerlink was actively seeking demand side management (DSM) alternatives, for example by approaching Queensland retailers who act as aggregators for DSM solutions. However, PB indicated that Powerlink had experienced limited success with such arrangements as some were not suitable for use in meeting the reliability critieria specified in its Transmission Authority. PB also noted that Powerlink is collaborating in a study on the development of a network demand program in Queensland. The AER considers that there is evidence that Powerlink has sought demand management solutions in addressing constraints.

The AER accepts PB's advice that Powerlink's governance arrangements and capex policies and procedures are robust and consistently applied, and provide a framework that should facilitate efficient investment outcomes.

4.6.2 Probabilistic planning approach

This section discusses whether Powerlink's probabilistic planning approach, which it used to forecast load driven expenditure, is a robust methodology and is likely to provide reasonable outcomes.

Powerlink's application

Powerlink used a probabilistic approach to develop its forecast load driven capex because of the uncertainty surrounding generation developments and load growth in Queensland over the next regulatory period. Powerlink engaged ROAM Consulting (ROAM) to assist it develop aspects of the probabilistic model including identification of key capex drivers and new generation developments.[68] The main processes associated with Powerlink's probabilistic planning approach are:

- The identification of theme sets (key capex drivers) that will impact on the development of Powerlink's network including load growth; inter-regional trade; generation developed from PNG gas; and carbon tax policy.[69]

- The identification of sub-themes and the allocation of probabilities to these sub-themes. There are five sub-themes for load growth, two for inter-regional trade, two for generation developed from PNG gas and two for carbon (greenhouse) tax policy. The key themes, sub-themes and their initial and adjusted probabilities are shown in table 4.5.[70]

- The development of 40 scenarios based on the various combination of the sub-themes ($5 \times 2 \times 2 \times 2$) and the determination of the probabilities that each scenario will eventuate.

- The identification of the scenario dependent generation developments (location, type and size) for each of the 40 scenarios.[71]

- The identification of key limitations or constraints over a 10 year period for each scenario using a full alternating current load flow model that took into account expected generation developments.

- The development of a deterministic transmission plan to address the key limitations or constraints associated with each scenario.

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68 ROAM Consulting is a provider of energy market modelling services. See http://www.roamconsulting.com.au

69 The inter-regional trade theme set captures the impact a change in the capacity requirements of QNI may have on the potential development of new generation projects in Queensland.

70 The initial probabilities were adjusted by ROAM following additional analysis that took into account broader market factors including reserve generation margins and capacity factors. However, PB found that Powerlink's capex proposal was not sensitive to ROAM's adjustment of the initial probabilities.

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

Table 4.5 Powerlink's sub-themes and probabilities (%)

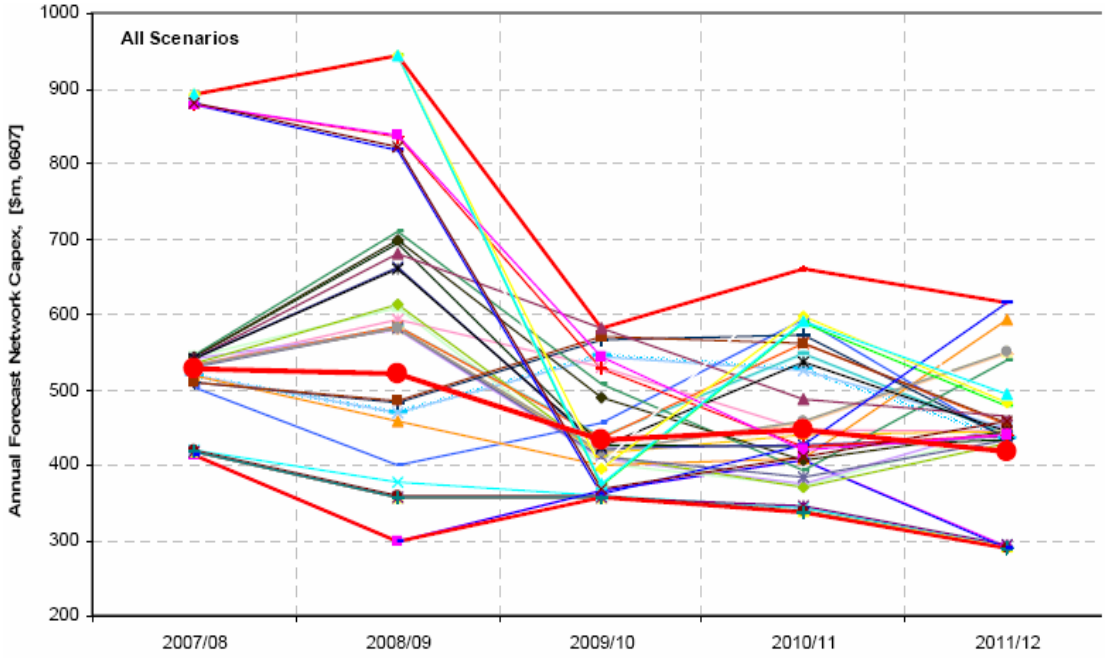
Theme set	Sub-themes	Initial probabilities	Adjusted probabilites
Load growth	Low growth, 50% PoE[1]	20	24
	Medium growth, 50% PoE	35	37
	Medium growth, 10% PoE	25	21
	Medium growth, 50% PoE plus 1000 MW development (M50++)[2]	10	11
	High growth, 50% PoE	10	7
Inter-regional trade	Existing QNI transfer of 300 MW to QLD	70	65
	Increased QNI transfer (500 MW upgrade) by 2010–11	30	35
Gas supplies	No generation from PNG pipeline	50	54
	Generation from PNG pipeline in 2010 or later	50	46
Greenhouse options	No greenhouse tax	80	87
	Introduction of greenhouse tax	20	13

[1] PoE refers to probability of exceedance. A 50 per cent PoE is based on long run average temperature records likely to be exceeded, on average one in every two years. Similarly, a 10 per cent PoE is where long run average temperature records are likely to be exceeded on average one in every ten years.
[2] The M50++ sub-theme attempts to capture the sensitivity of two 500 MW industrial loads in the Gladstone area of Central Queensland during the next regulatory period.
Source: PB report, p. 88.

The deterministic transmission plans prepared for each of the 40 scenarios were costed to provide an estimated capex requirement for each year of the next regulatory period. The profile of capex for all scenarios during the next regulatory period is shown in figure 4.1. Powerlink then weighted the deterministic capex for each transmission plan by its adjusted probability of occurrence and summed the results to arrive at an aggregate probabilistic weighted forecast capex (shown as the bold red line in figure 4.1).

The probabilistic weighted forecast capex includes the deterministic plans for network non-load driven network expenditures (for example, replacement expenditures) that are constant for each scenario. The probability weighted capex sought by Powerlink for the next regulatory period is $2346 million. This excludes proposed non-network expenditure of $104 million.

Figure 4.1 Capex profiles for each of the 40 scenarios ($m, 2006–07)



Source: PB report, p. 94.

Submissions

The EUAA considered that the probabilistic approach was a reasonable way of dealing with the high level of uncertainty and complexity with future generator options, locations and timing in Queensland. However, it considered that the complexity of the approach tends to take the focus away from its assumptions which are likely to significantly affect the outcomes.

PB's review

PB reviewed the probabilistic planning approach and found that:

- Powerlink's planning processes for identifying load driven network expenditure was systematic, thorough and of a very high standard.
- The themes and scenarios adopted by Powerlink were plausible and comprehensive. The theme sets should capture most reasonable outlooks in Queensland during the next regulatory period and the weightings applied to all themes, including the load growth themes, were reasonable.
- The projects associated with the M50++ sub-theme should be treated as a contingent project rather than being included in the ex ante allowance.[72] This is discussed further in section 4.6.7.

[72] The M50++ sub-theme is related to an additional industrial load development in the Gladstone area of Central Queensland.

- The approach adopted by ROAM Consulting to determine the location, size and timing of new generation provided a reasonable basis for Powerlink's probabilistic planning.

- There was a strong correlation between the load growth theme sets and forecast capex. The same correlation was not found in any of the other theme sets. Table 4.6 demonstrates the sensitivity of capex to Powerlink's load growth sub-themes.

- The probabilistic weighted network capex sought by Powerlink is slightly lower than that which would be realised under a deterministic approach for medium growth 50 per cent probability of exceedance (PoE) (i.e. $2346 million compared with $2488 million). In PB's view, this provided further assurance that the probabilistic approach provided a reasonable outcome.

- Queensland summer peak demand forecasts for the next regulatory period and beyond are more difficult to predict than other regions of the NEM and this uncertainty tends to support the use of a probabilistic approach to planning that allows the sensitivities to growth rates to be captured in the planning process.

Table 4.6 Forecast capex under different load growth sub-themes[73] ($m, 2006–07)

Load growth themes	Average deterministic forecast capex
Low growth, 50% PoE (L50)	1772
Medium growth, 50% PoE (M50)	2488
Medium growth, 10% PoE (M10)[1]	2442
Medium growth, 50% PoE plus 1000 MW development (M50++)	2602
High growth, 50% PoE (H50)	3182

[1] The M10 scenarios result in a lower average forecast capex than the M50 scenarios due to the location and size of generation developments associated with the theme that have the effect of deferring load driven network expenditure.

AER's considerations

The EUAA stated that the complexity of the probabilistic approach to forecasting tends to take the focus away from its assumptions, which are likely to significantly affect the outcomes. PB reviewed the underlying assumptions of Powerlink's probabilistic model. It found the probabilistic themes and scenarios were plausible, the weighting applied to all themes reasonable, and the expected generation developments were realistic.

While Powerlink's probabilistic capex forecasting methodology should result in a reasonable forecast of load driven expenditure for the next regulatory period, a definitive view on the efficiency of the overall capex program can only be obtained by examining the need, timing, scope and cost estimates of the projects that make up the overall weighted average capex program.

[73] PB report, p. 96.

It is not appropriate to examine the need, cost and timing of all the individual projects that make up the forecast capex program. The AER has therefore reviewed a sample of projects from each of Powerlink's main capex categories. The AER has also reviewed Powerlink's cost estimation process to determine its reasonableness. Discussion on the AER's review of specific projects and the cost estimation process can be found in sections 4.6.5 and 4.6.6 respectively.

The AER's overall assessment is that Powerlink's probabilistic planning approach provides a robust method to determine its load driven capex requirements, particularly given the high forecast levels of demand growth and the uncertainty surrounding generation developments in Queensland.

4.6.3 Demand forecasts

A key factor driving the need to augment electricity networks is the expected growth in electricity demand. Demand forecasts are used in conjunction with network planning criteria to determine the amount and timing of load driven expenditure. This section discusses whether Powerlink's demand forecasts can reasonably be relied upon for the purposes of forecasting its load driven capex requirements during the next regulatory period.

Powerlink's application

Powerlink stated that the demand forecasts applied in its probabilistic model are consistent with the 10-year demand forecasts published in its 2005 Annual planning report (APR). It noted that peak summer demand in Queensland is forecast to increase at an average annual rate of 4 per cent over the next 10 years with most of this growth occurring in the early years of that period. Powerlink stated that the accelerated demand growth is due to the expected continuing rapid increase in penetration of domestic air conditioners, industrial development and strong population growth, particularly in South East Queensland (SEQ).

Powerlink's peak summer demand forecasts for low, medium and high economic growth scenarios under 50 per cent PoE weather conditions are set out in table 4.7. These forecasts are based on Powerlink's 2005 APR.[74]

Table 4.7 Powerlink's summer peak demand forecasts (MW)

	2006–08	2007–08	2008–09	2009–10	2010–11	2011–12
Low growth 50% PoE	7826	8079	8260	8439	8617	8795
Medium growth 50% PoE	8188	8612	8981	9323	9656	9974
High growth 50% PoE	8643	9180	9743	10370	10910	11490

Source: Powerlink, *Annual planning report 2005*.

Submissions

The EUAA considered that the medium demand growth forecasts used by Powerlink were reasonable for Queensland.

[74] Powerlink's demand forecasts are based on 'as delivered' from the transmission grid rather than 'as generated'.

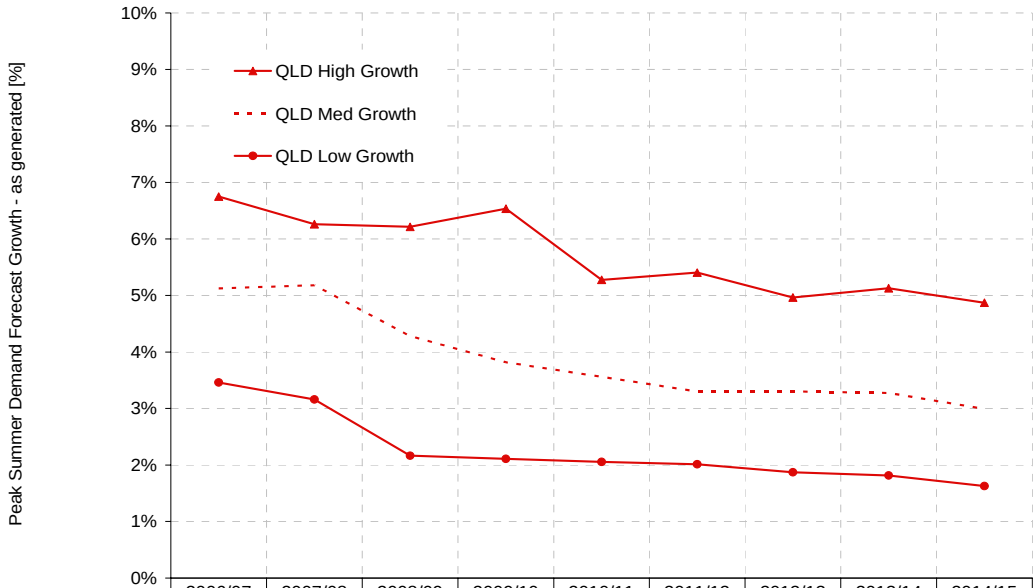
The EAG stated that the AER should review the accuracy of the Queensland demand forecasts to assess the contribution of load growth on capex. It considered further information was required on the impact of air conditioning growth, population growth, and commercial growth on demand forecasts.

PB's review

PB found that:

- Powerlink's demand forecasts were the most recent and complete forecasts available at the time Powerlink prepared its revenue application. It was valid for Powerlink to have used them as the basis for its transmission planning.
- Growth in peak summer demand is the key driver dictating the timing and quantum of Powerlink's forecast capex.
- Forecast peak summer demand growth in Queensland, while higher than other regions in Australia, will generally reduce under all economic growth scenarios during the next regulatory period (see figure 4.2).
- Based on its review of documentation published by Powerlink, NEMMCO, the National Institute of Economic and Industrial Research (NIEIR) and KEMA Inc (KEMA), and discussions with Powerlink staff on forecasting outcomes, PB considered that the general load forecasting methodology applied by Powerlink was reasonable. However, PB noted that the bottom up methodology only included the medium 50 per cent PoE. Therefore, there was no verification or check of NIEIR's high and low economic growth forecasts, including the 10 per cent PoE and 90 per cent PoE medium economic growth forecast.

Figure 4.2 Forecast peak summer demand growth for QLD (2006–07 to 2014–15)



	2006/07	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
QLD High Growth	6.8%	6.3%	6.2%	6.5%	5.3%	5.4%	5.0%	5.1%	4.9%
QLD Med Growth	5.1%	5.2%	4.3%	3.8%	3.6%	3.3%	3.3%	3.3%	3.0%
QLD Low Growth	3.5%	3.2%	2.2%	2.1%	2.1%	2.0%	1.9%	1.8%	1.6%

Source: PB report, p. 80.

- There was a significant change in the peak summer demand forecasts in Queensland between the publication of the 2004 and 2005 APRs. PB considered that the actual demand outcomes for 2005–06 to be an important check on the validity of the one-off correction in the forecast between 2004 and 2005. It found that the actual diversity and temperature corrected peak load for the 2005–06 summer was only marginally lower than what was forecast in the 2005 APR. PB considered that while the change between the 2004 and 2005 APRs was significant and unusual over a single year the adjustment was justified.

- The diversity and temperature corrections undertaken by Powerlink for the 2005–06 summer were rigorous and consistent with previous reviews. PB's only concern was with the determination of temperature sensitivity factors.

Overall, PB found that at a high level Powerlink's demand forecasting methodology, including its temperature and diversity corrections for actual summer peak demand were reasonable. However, it recommended that the AER consider undertaking some form of additional review of Powerlink's summer peak demand forecasting outcomes, similar to the backcasting exercise undertaken by NIEIR for the Victorian and South Australian regions.[75] PB considered that such a review was justified for a number of reasons including:

- the high sensitivity of forecast capex requirements to the demand forecasts

- the large and increasing impact of diversity and temperature corrections

- the timing of the KEMA review which occurred in 2004, prior to the substantial increase in forecasts between the 2004 and 2005 APRs.

AER considerations

Powerlink is a member of the national Load Forecasting Reference Group (LFRG). The LFRG is responsible for ensuring that demand forecasts in the NEM are prepared on a consistent basis.[76] In 2004, the LFRG engaged KEMA to review the demand forecasting procedures used by all jurisdictional planning bodies in the NEM. The KEMA review found that the approaches used by jurisdictions in developing demand and energy forecasts were sound and combined good technical methods with good judgement and experience.[77] The AER considers that the review conducted by KEMA in 2004 provides some assurance that Powerlink uses best practice methodologies to forecast electricity demand. KEMA's findings are relevant for the 2005 APR as Powerlink's general demand forecasting methodology has not significantly changed since that review was undertaken.

Powerlink primarily uses a bottom-up approach to forecast demand growth. This approach aggregates forecasts from each connection point in its network on an annual basis. These forecasts are based on medium demand growth 50 per cent PoE weather

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75 NIEIR, *An assessment of the forecasting accuracy of the current summer maximum demand forecast methodology for Victoria and South Australia: A backcasting exercise*, June 2005.

76 The LFRG is convened by NEMMCO and includes representatives from each jurisdictional planning body.

77 KEMA Inc, *Review of the process for preparing the SOO load forecasts*, June 2005, p. 2.

conditions. In addition to the bottom-up projections, Powerlink annually engages NIEIR to provide a top-down assessment of energy and demand forecasts for Queensland. Powerlink then applies ratios provided to it by NIEIR to develop the high and low demand growth forecasts under different weather conditions and medium demand growth forecasts under 10 per cent and 90 per cent PoE weather conditions.

PB noted that there was no verification or check on the ratios developed by NIEIR and used by Powerlink to develop its high and low demand forecasts. As discussed in section 4.6.2, the probabilistic weighted average capex sought by Powerlink is slightly less than what would result from the average of the medium growth scenarios. Accordingly, the high and low demand forecasts (which have been developed using NIEIR's ratios) do not have a material impact on Powerlink's forecast capex proposal. Therefore, the AER does not consider that the use of NIEIR's ratios poses any risks for the determination of Powerlink's capex.

Powerlink released its 2006 APR in July 2006.[78] The 2006 APR provides a check on the reliability of Powerlink's 2005 APR forecasts and verifies whether the large adjustment to the 2004 APR forecasts was justified. The actual demand for the 2005–06 summer peak was 7388 MW, however, as a result of Powerlink's diversity and temperature correction processes the corrected summer peak for 2005–06 was 7687 MW. This is marginally lower than the adjusted forecast of 7701 MW under medium growth 50 per cent PoE contained in the 2005 APR.[79]

Powerlink increased the actual load for the 2005-06 summer by approximately 300 MW by applying diversity and temperature corrections. PB stated that, at a high level, Powerlink's methodology for diversity and temperature corrections appeared reasonable. The AER also examined information provided by Powerlink on the diversity and temperature corrections.

Powerlink provided information demonstrating that the diversity correction was a consequence of the unusual weather conditions in Queensland for the summer of 2005-06. The state peak in Queensland generally coincides with the peak in SEQ. However, for the summer of 2005-06, the state peak unusually occurred at a time when SEQ was well below its peak. The information provided showed that the demand in SEQ was 4033 MW at the time that the state peak occurred. This was well below the peak in SEQ of 4149 MW. The AER therefore accepts Powerlink's diversity correction as it is reasonable to expect that if SEQ's own actual peak coincided with the state peak, the summer peak demand would have been higher.

Powerlink also applied temperature corrections to peak summer demand to reflect milder weather conditions than usual in Brisbane on working weekdays. Peak summer demand will generally occur on working weekdays and on days that coincide with maximum temperatures. As Brisbane accounts for a large proportion of load in

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78 Powerlink, *Annual planning report 2006*, July 2006.

79 To take into account boundary changes since the release of the 2005 APR and allow a 'like with like' comparison, Powerlink provided information which adjusted the medium growth 50 per cent PoE forecast of 7789 MW contained in its 2005 APR to 7701 MW.

Queensland and the majority of load in SEQ, Powerlink adjusted peak demand to reflect the lower than expected maximum temperatures on working weekdays in Brisbane.[80]

Powerlink stated that while average temperatures were higher in the 2005–06 summer than the 2004–05 summer, the working week did not experience high maximum temperatures. Instead, the hottest days occurred in holiday periods or weekends.[81] The AER reviewed daily peak temperatures in Brisbane and found that the maximum temperature for the 2005–06 Brisbane summer was 36.6°C and that three of the four hottest days in Brisbane occurred during the Christmas holiday period. In comparison, the peak in Queensland occurred when Brisbane's maximum temperature was 31.3°C.[82] For these reasons, the AER considers that Powerlink's peak summer demand would have been higher if Brisbane experienced its usual maximum temperatures on working weekdays.

Although satisfied with the correction methodology used by Powerlink, PB did raise some concerns on Powerlink's application of temperature sensitivity factors used in its temperature corrections. Powerlink stated that the sensitivity of demand to ambient temperatures increased from 181 MW per °C in 2004–05 to 245 MW per °C in 2005–06 due mainly to increased penetration of air conditioning. It also referred to Queensland Government surveys that indicated that the penetration of air conditioning installations in SEQ has increased from 31 per cent in November 2001 to 56 per cent in November 2005.[83]

Overall, the AER notes that corrected peak demand for the 2005–06 summer was close to the forecast in the 2005 APR. While Powerlink applied significant corrections to the actual peak, the AER accepts PB's findings that at a high level, Powerlink's temperature and diversity correction methodology was reasonable. The closeness of the 2005–06 summer peak demand to what was forecast in the 2005 APR provides assurance that Powerlink's forecasts can be relied upon for determining its capex requirements.

The AER also reviewed Powerlink's 2006 APR to determine if the peak demand forecasts were significantly different from those contained in Powerlink's 2005 APR. Powerlink provided updated information on the 2005 APR forecasts which took into account the Tweed boundary change to allow a comparison to be made between the forecasts.[84] The Tweed Shire load is no longer defined as part of Powerlink's network due to a regional boundary change. However, Powerlink still has a connection agreement with Country Energy to supply load to the Tweed region so the change does not have any material effect on Powerlink's proposed capex.

The 2006 APR forecasts represent a 1 per cent increase on average on the forecasts contained in the 2005 APR. The consistency between the two sets of demand forecasts,

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80 According to Powerlink's 2006 APR, unusually six of the seven maximum temperature days occurred in the holiday period or weekend (p. 160).

81 Powerlink, *Annual planning report 2006*, p. 26.

82 Based on information provided by NEMMCO which included information on temperatures sourced from the Bureau of Meteorology.

83 Powerlink, *Annual planning report 2006*, p. 26.

84 Powerlink, response of 22 June 2006 to PB on demand forecasts.

as shown in table 4.8, provides further assurance that the forecasts in Powerlink's 2005 APR can be reasonably relied upon for developing its forecast capex requirement.

Table 4.8 Forecast peak summer medium demand growth 50 per cent PoE (MW)[85]

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–12
2005 APR[1]	8095	8514	8878	9216	9543	9857	10181	10515
2006 APR	8230	8615	8990	9315	9624	9937	10255	10585
Increase	135	101	111	99	80	80	74	69

[1] For comparison, excludes the Tweed Shire load forecast.

PB has recommended that the AER consider undertaking a backcasting review of Powerlink's demand forecasts primarily because of the sensitivity of capex to demand forecasts and the large and increasing impact of temperature and diversity corrections undertaken by Powerlink. The AER notes that PB found Powerlink's demand forecasting methodology generally to be reasonable and the reasons for the increase in demand forecasts between 2004 and 2005 justified. The AER also notes that this issue arose part way through the review process and that the provision of a backcasting review did not form part of the AER's information requirements. It is considered reasonable that a TNSP should get notice of the need to provide such information prior to submitting its application. Therefore, the AER has not undertaken a backcasting review.

While the AER has not undertaken a backcasting review, it considers that such reviews are worthwhile and should form part of a TNSP's continuous improvement processes for planning. The inclusion of such a review as part of a TNSP's revenue cap application in the future would provide greater assurance that the demand forecasts underpinning capex proposals can be relied upon. As such, the AER intends to examine this issue as part of its guideline work for future reset processes.

In summary, the AER considers that it is reasonable to rely on the demand forecasts contained in Powerlink's 2005 APR for forecasting its load driven capex requirements for the following reasons:

- the demand forecasting methodologies used by Powerlink are reasonable
- the increase in demand forecasts between the 2004 APR and 2005 APR was justified
- the actual peak demand outcome for the 2005–06 summer was reasonably close to the forecast in the 2005 APR.

4.6.4 Powerlink's network planning criteria

Network planning criteria form the basis for assessing the requirement for and design of network augmentations. Powerlink has used its network planning criteria to develop the

85 Powerlink, response of 22 June 2006 to PB on demand forecasts.

40 transmission plans on which its probabilistic load driven forecast is based. This section examines whether Powerlink's planning criteria are consistent with the rules and its legislative obligations.

Powerlink's application

Powerlink is a registered TNSP in the NEM and therefore must comply with the network performance requirements of the rules. It is also the sole holder of a Transmission Authority in Queensland, which authorises it, under the *Queensland Electricity Act (1994)* to operate a high voltage transmission network in the eastern part of Queensland.

Powerlink stated that an important feature of the arrangements in Queensland is that it has mandated reliability obligations that drive non-discretionary investments in network augmentations as load grows. Clause 6.2 of Powerlink's Transmission Authority requires that:

> The transmission entity must plan and develop its transmission grid in accordance with good electricity 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.[86]

Powerlink stated that the above requirement reinforces the reliability obligations in the rules and in its existing connection agreements.

PB's review

In reviewing Powerlink's network planning criteria, PB found that:

- Powerlink has responsibility to plan its network to comply with the rules and its Transmission Authority. It has developed a Planning Criteria Policy to ensure compliance with the stability requirements of the rules and the reliability requirements of its Transmission Authority.

- Powerlink must plan its network to ensure that following a credible contingency event, the power system not only remains stable in accordance with Schedule 5.1.8 of the rules but also that sufficient power transfer capacity remains so that there is no loss of supply to any connected customer (generally referred to as the N–1 criterion), unless specifically agreed otherwise with the affected distribution network owner or directly connected customer.

- Powerlink's planning criteria are generally consistent with good electricity industry practice and the approach taken by other TNSPs operating in the NEM to the extent that they are appropriate in meeting the network performance requirements of Schedule 5.1 of the rules.

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86 Queensland Government, *Transmission Authority issued to Queensland Electricity Transmission Corporation Limited*, June 2003, p. 3.

- The reliability requirements in Powerlink's Transmission Authority are more onerous than those contained in Schedule 5.1.2.2(b) of the rules. The rules permit a reduction in power transfer capacity of the network following the loss of a network element but Powerlink's Transmission Authority requires it to provide full power transfer capability to all loads following the most critical network element outage. Hence the Transmission Authority requires Powerlink to apply a lower threshold for grid augmentation in some areas than would necessarily be required under the rules.

- Powerlink plans its network on the assumption that the largest critical generator in a single zone is unavailable before the deterministic planning criteria is applied (referred to as an N–G–1 planning approach). While PB considered this planning approach to be conservative, it noted that the sensitivity of the planning criteria on most investment decisions was relatively low and therefore considered the assumption prudent given Powerlink's reliability requirements.

- Although Powerlink's planning criteria were generally reasonable, the criteria applied to the Central Queensland to North Queensland load transfer was overly conservative and was likely to advance the need for augmentations in this area.

- There may be opportunities on a project-by-project basis to implement low-cost alternatives, such as control schemes to minimise the consequences of scenarios that have coincident generation and transmission outages and therefore a reasonably low likelihood of occurring.

Overall, PB found Powerlink's planning criteria to be generally reasonable, given its obligation to comply with the rules and its Transmission Authority.

AER considerations

PB expressed concerns that Powerlink's planning assumptions in North Queensland effectively reduce the net output of generators in this area by around 55 per cent. While acknowledging PB's concerns about Powerlink's planning approach in this area, the AER notes that PB did not recommend any adjustments to projects in this area on the basis that the planning assumptions were too conservative.

The AER notes PB's advice that Powerlink should continue to consider opportunities to implement lower cost arrangements such as load control schemes, particularly where a marginal overload results in the requirement for a large augmentation that could be deferred or would be mitigated by such means in the short term (e.g. commissioning of new generation).

Powerlink stated that it has previously sought to develop such arrangements but no interested parties had come forward. It also stated that its Transmission Authority only allows it to provide a lower standard of supply than N–1 if a customer voluntarily agrees to accept such an arrangement. Powerlink noted that both Energex and Ergon plan their sub-transmission networks to meet similar N–1 planning criterion and that this level of supply was generally reflected in connection agreements.

Overall, the AER accepts PB's findings that Powerlink's network planning criteria were generally reasonable, given its obligation to comply with the rules and its Transmission Authority.

4.6.5 Detailed review of selected forecast capex projects

This section sets out the AER's considerations on the detailed review of a sample of projects from Powerlink's four main capex categories: load driven, replacement, security and compliance, and non-network.

Powerlink's application

Powerlink's forecast capex program consists of a possible 424 projects that may take place in the next regulatory period. This includes 286 load driven projects; 79 replacement projects; 18 security, compliance and 'other' projects; and 41 non-network projects.

Powerlink stated that the expected high load growth results in a requirement for significant ongoing capex to augment its network and that the age profile of its grid also dictates a significant program of replacements. It noted that the work program extends beyond investment in the primary transmission network and includes investment in communication networks, security, buildings and other assets to support the continued operation of the business.

Submissions

The EUAA considered that Powerlink's application focused on the scenarios and probabilities used to develop its capex program rather than the underlying projects. It stated that there is insufficient explanation of the prudence, timing and cost estimates for individual projects associated with the probabilistic model. In particular, the EUAA questioned whether some of the projects could be cost effectively deferred.

The EUAA expressed concern about the substantial increase in Powerlink's replacement capex and noted that it equates to approximately 25 per cent of its RAB while the percentage of assets in Powerlink's network that predate 1970 is less than 25 per cent. Based on the average asset life used (40 to 50 years), it believed that only assets installed prior to 1970 should be considered for replacement.

EUAA also questioned whether the replacement assets affected by Cyclone Larry were covered by insurance or self insurance. It stated that if they were covered, the cost of replacing the affected lines should not be funded by users.

PB's review

As part of its role in providing the AER with an independent view on the efficiency and appropriateness of Powerlink's forecast capex, PB was required to undertake a detailed review of a sample of projects from each of Powerlink's main capex categories. The projects were selected, in consultation with the AER, on the basis of their cost, timing, geographic location and probability of proceeding. The purpose of the detailed project reviews was twofold: to assess the prudence and efficiency of each project; and to test whether Powerlink's stated capex policies and procedures were being complied with. In

assessing the efficiency of each project in the sample, PB was specifically required to provide its opinion on the following matters:

- whether or not there was a genuine need for the project
- whether Powerlink had considered the complete range of feasible alternatives
- whether the scope, cost and timing of the proposed project was efficient. If PB found the project's scope, cost or timing was not efficient it was required to recommend an alternative scope, cost and timing.

Based on its detailed review of the sample of projects, PB recommended that Powerlink's forecast capex be reduced by $312 million (see table 4.9).[87] PB recommended the following adjustments:

- Powerlink's proposed allowance for the sample of load driven projects be reduced by $147 million and the remainder of Powerlink's load driven network capex be reduced by $38 million
- Powerlink's proposed replacement allowance be reduced by $111 million
- Powerlink's proposed security and compliance allowance be reduced by $13 million
- Powerlink's proposed non-network allowance be reduced by $4 million.

Table 4.9 PB's adjustments based on review of projects ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Load driven projects	–28.56	–79.09	–1.10	–0.59	–37.06	–146.61
High level adjustment[1]	–14.77	–9.93	–4.22	–4.10	– .87	–37.89
Replacement expenditures	–	–	–53.10	–31.40	– 6.10	–110.50
Security/compliance	4.00	–2.21	1.59	–12.45	–3.94	–13.02
Non-network (business IT)	–	–	–1.38	–1.39	–1.36	–4.13
Total adjustments	–39.33	–91.23	–58.21	–49.43	–73.33	–312.15

[1] PB recommended a high level adjustment of 4 per cent on load driven projects not included in the sample review on the basis that the projects selected for review were a good representation of the entire load driven program.

Further discussion on PB's findings and recommendations in regard to its detailed review of projects from each of the main capex categories and the AER's consideration of them is contained in the following section.

87 While PB undertook a detailed review of a sample of replacement projects, its reduction was based on a high level review of Powerlink's proposed replacement allowance.

AER considerations

Load driven projects

Powerlink's proposed load driven capex totals $1396 million ($2006–07) over the next regulatory period. This compares with a total of $1037 million during the last five years of the current regulatory period.[88] Load driven capex represents 57 per cent of Powerlink's forecast capex proposal. In terms of the sub-categories of load driven expenditure, augmentations account for 88 per cent, while easements account for 7 per cent, and connections comprise 5 per cent.

PB reviewed 18 load driven projects with a total value of $449 million (32 per cent of Powerlink's proposed load driven expenditure). In general, PB's review confirmed the need for expenditure on the projects but based on the sample of projects reviewed, PB considered that Powerlink's load driven capex forecast should be reduced by $147 million.[89] PB considered that in a small number of instances there were more efficient and optimally timed options that would allow Powerlink to achieve its reliability requirements.

In addition to the recommended adjustment on the sample of projects, PB recommended a further 4 per cent reduction on the balance of Powerlink's load driven network capex on the basis that the projects that it reviewed were a good representation of the entire probabilistic forecast. It considered that this reduction, which it estimated to be $38 million, was necessary to remove what it considered to be a systematically high capex forecast.

PB's main conclusions from its review of a sample of load driven projects were that:

- Powerlink had undertaken a systematic and rigorous review of a complex network using advanced planning techniques.
- While Powerlink's grid planning analysis contains a comparison of options in nearly all cases, it appears to have assessed and documented relatively few alternatives. It considered that it was prudent for Powerlink to consider some of these options in a more detailed and transparent manner on a project by project basis.
- Powerlink was incorporating designs into its projects to meet anticipated longer term requirements and while this shows some strategic initiative, there were occasions where this approach was considered inefficient.

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88 References to the last five years of the current regulatory period are in real 2006-07 dollar terms, based on the nominal as-incurred expenditure provided in Powerlink's application. The nominal amount has been escalated to $2006–07 using actual CPI to provide a comparison with the capex for the next regulatory period. It should also be noted that the final two years of the current regulatory period are forecast expenditures. The same process has been used to provide comparisons for replacement, security and compliance and non-network expenditure.

89 PB's reduction is based on the expenditure profile for the median of the earliest and the latest dates as provided in Powerlink's forecast capex information templates.

- Powerlink and the DNSPs are undertaking effective and practical joint planning that considers a large number of options and anticipated projects, and the NPV analysis is reasonable and thorough.

- Powerlink undertook a rigorous process to develop a reasonable and efficient program of reactive compensation projects.

Recognising that judgment is required, the AER sought advice from CHC Associates (CHC) on PB's recommended adjustments to Powerlink's load driven capex projects.

Having assessed the information available, including the advice received from CHC, the AER has decided not to accept all of PB's recommended adjustments. In general, the AER has accepted PB's adjustments where CHC agreed with PB's recommendations or where there existed uncertainty as to whether PB's recommended project scope or timing was more efficient. In the latter case, the AER is seeking further information from Powerlink to justify that its proposed project represents a more efficient option relative to PB's recommended proposal.

Based on its review of sample projects, PB recommended scope and timing adjustments to 10 load driven projects resulting in load driven capex being reduced by $147 million. However, taking account of the advice from CHC, the AER considers that Powerlink's load driven capex should be reduced by $127 million. Appendix C sets out the AER's considerations on each of the 10 projects that PB recommended adjustments be made to.

PB recommended a further 4 per cent ($38 million) reduction on the remainder of Powerlink's load driven capex on the basis that the projects selected for review were a good representation of the entire load driven program. Although PB has undertaken a comprehensive review of a significant proportion of Powerlink's load driven capex program, the AER does not consider that it is reasonable to apply an across the board reduction to the remaining load driven capex for the following reasons:

- The issues raised by PB in relation to the reviewed projects did not appear to be the result of systematic failings.

- PB's reduction is applied to load driven assets under construction projects, which PB reviewed as part of its past capex review and found them to be prudent.

- The sample projects selected were not chosen for the purpose of predicting findings to the population.

PB's recommended reductions to load driven projects were based on the median timing of each project. The AER requested Powerlink to model its conclusions on load driven projects to obtain a more accurate estimate of the impact on Powerlink's forecast capex proposal. As a result, the AER considers that Powerlink's capex allowance should be reduced by $127 million as shown in table 4.10. Table 4.10 also compares PB's recommended amendments and the AER's conclusions on load driven projects.

Table 4.10 Comparison of PB amendments and AER conclusions on load driven projects ($m, 2006–07)[1]

		2007–08	2008–09	2009–10	2010–11	2011–12	Total
Strathmore to Ross line	PB	–	–1.47	–14.68	–0.71	–	–16.86
	AER	–0.75	–8.27	–8.43	–0.39	–	–17.84
Line into Larapinta	PB	–	–	–	–7.32	–25.72	–33.04
	AER	–5.63	–0.13	–	–6.63	–19.61	–32.00
CQ–SQ projects	PB	–21.36	–60.66	6.00	33.42	1.57	–41.03
	AER	–21.35	–60.66	5.99	33.42	1.57	–41.03
Woolooga to North Coast	PB	–	–	–1.57	–15.71	–0.75	–18.24
	AER	–0.13	–1.28	–1.29	–12.23	–0.59	–15.50
South Coast easement	PB	–	–	–1.79	–0.45	–9.32	–11.56
	AER	–	–	–1.79	–0.40	–9.25	–11.44
Larcom Creek substation	PB	–4.43	–5.33	3.61	–	–	–6.14
	AER	–3.47	–1.21	4.25	–	–	–0.44
Larapinta substation	PB	–	–1.01	–4.40	–0.69	–	–6.10
	AER	–0.48	–1.13	–4.92	–2.29	–0.25	–9.07
Molendinar transformer	PB	–2.77	–10.62	12.90	–0.56	–	0.07
	AER	–	–	–	–	–	–
Halys to Blackwall line	PB	–	–	–0.78	–7.79	–0.37	–8.95
	AER	–	–	–	–	–	–
High growth generics	PB	–	–	–0.39	–1.90	–2.47	–4.76
	AER	–	–	–	–	–	–
Total	PB	–28.56	–79.09	–1.10	–0.59	–37.06	–146.61
	AER	–31.82	–72.68	–6.19	11.48	–28.13	–127.32

[1] The AER accepts PB's recommendations for Strathmore to Ross, Line into Larapinta, Woolooga to North Coast line and South Coast easement as outlined in appendix C. The AER also partially accepts PB's recommendations for Larcom Creek substation. The AER requested Powerlink to model its conclusions in order to obtain more accurate capex forecast.

Replacement capex

Powerlink's forecast capex proposal for replacement assets is $813 million ($2006–07) for the next regulatory period, representing 33 per cent of its total proposed forecast capex. This is a very significant increase in expenditure from the last five years of the current regulatory period where Powerlink plans to incur $249 million ($2006–07) on replacement assets. Powerlink stated that the main factor driving the increase in its replacement expenditure is the age of its assets.

Powerlink's replacement policy identifies four factors that may result in the need for asset replacement: age, capacity, capability and compliance.[90] Powerlink stated that

[90] Powerlink, *Asset replacement policy*, July 2005.

these factors trigger an assessment of an asset's condition or further analysis to determine whether the asset requires replacement or refurbishment. Powerlink then uses a risk management matrix to determine the priority of assets for replacement.

PB undertook a detailed review of 13 replacement projects. These projects have a total value of $364 million and equate to approximately 45 per cent of the total value of replacement projects forecast for the next regulatory period.[91] Overall, PB found that:

- Powerlink has procedures for identifying and prioritising its replacement requirements which are consistent with good electricity industry practice.
- The level of asset replacement expenditure in the current regulatory period is not sustainable and a significant increase is justified going forward as a number of lines and substations are only now reaching the end of their expected lives.
- There was a need for replacement work during the next regulatory period on all projects reviewed, however, the project scope on which the forecast was based was often greater than justified by condition assessments.
- There was little evidence that Powerlink had considered any other measures apart from asset replacement, as a strategy for mitigating the identified risks.
- Powerlink's replacement forecast should be considered, at best, an upper bound to the range of possible replacement expenditure and that a prudent operator in a more competitive environment would be able to rely on a significantly lower replacement budget without any material impact on the level of service.

Although PB considered that Powerlink's proposed replacement expenditures were overstated it was not able to form a view based on the information available on the amount by which replacement expenditures should be reduced. PB therefore considered it reasonable to use a top-down approach to determine an appropriate level of replacement expenditure.

From its review of Powerlink's RAB age profile, PB determined that approximately 35 per cent of Powerlink's asset base had been installed over the last 10 years (1996-2005). Based on Powerlink's standard asset lives it noted that none of these assets would require replacement before the end of the next regulatory period. Therefore, PB considered it reasonable that from the remaining proportion of assets in Powerlink's RAB, some may need to be replaced during the next regulatory period.

In arriving at its recommendation, PB noted that Powerlink's estimated depreciation for 2007–08 of $154 million would indicate an undepreciated opening RAB of $5400 million, of which $3510 million (or 65 per cent) was older than 15 years at the end of the current regulatory period. Based on the assumption of a 35 year capital weighted average life for Powerlink's RAB, PB considered that Powerlink should be replacing its asset base to ensure that the $3510 million portion is renewed over 35 years.[92] As such,

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91 There are 79 projects in Powerlink's forecast replacement capex program.

92 PB considered a 35-year capital weighted average life to be conservative based on Powerlink's average asset lives.

PB recommended that the replacement allowance for the next regulatory period should be around $500 million. It also recommended that a replacement premium of 20 per cent[93] and a 20 per cent augmentation premium[94] should be added to the allowance.

Overall, PB recommended that Powerlink's replacement expenditure be reduced by $111 million to an amended allowance of $702 million. This represents an annual replacement allowance of approximately $140 million.

The EUAA questioned whether the assets affected by Cyclone Larry were covered by insurance or self insurance. In Powerlink's 2001 revenue cap decision, Powerlink did not claim and was not provided with a self insurance allowance. In addition, Powerlink has advised that it is unable to obtain insurance coverage for transmission structures and lines. The costs associated with the replacement of the lines affected by Cyclone Larry have been included in Powerlink's replacement capex. However, it should be noted that Cyclone Larry was not a driver for replacement of these assets as they were already at the end of their technical and economic lives. The AER's assessment of Powerlink's insurance and self insurance allowance for the next regulatory period is set out in sections 6.6.9 and 6.6.10.

The AER agrees with PB that Powerlink's replacement expenditure needs to increase relative to that undertaken in the current regulatory period. In particular, it is noted that the 132 kV lines between Townsville and Cairns (the oldest lines on Powerlink's network) are reaching the end of their expected life and are scheduled for replacement during the next regulatory period. In addition, the 132/110 kV substations in Central and SEQ are now reaching an age where replacement or refurbishment is becoming necessary and that these substations are larger and more numerous than those replaced by Powerlink to date.

The AER has reviewed PB's top-down analysis and considers that the methodology and the assumptions are reasonable, and the outcome provides Powerlink with an appropriate allowance during the next regulatory period. It also notes that the recommended allowance does not change Powerlink's proposed replacement expenditures for the first two years of the regulatory period and that unlike load driven expenditure Powerlink has some degree of flexibility as to when it undertakes its replacement expenditure. The AER therefore accepts PB's recommendation that Powerlink be provided with a replacement capex allowance of $702 million for the next regulatory period.

Security, compliance and 'other' projects

Powerlink's proposed security, compliance and 'other' capex totals $137 million during the next regulatory period and represents an average expenditure of $27 million per annum ($2006–07). This compares with a total of $60 million incurred during the last five years of the current regulatory period, at an average of $12 million per annum. This category represents 5.6 per cent of Powerlink's forecast capex proposal.

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93 The replacement premium reflects the higher costs involved with replacing an asset. These additional costs may include the costs of maintaining supply and work around existing electrical infrastructure.

94 PB found that there was an element of augmentation in many asset replacement projects. The augmentation premium provides for the additional costs associated with this augmentation element.

Powerlink's forecast work program in this category is made up of five security/compliance projects and 13 other type projects. The security/compliance projects account for $116 million of expenditure and include two large projects. 'Other' projects include the purchase of spare system transformers, energy management system upgrades, and communication system works and account for approximately $21 million of expenditure.

PB found that the need for Powerlink's security/compliance and other projects was genuine and that the basis for the considerable increase towards the end of the next regulatory period was valid. In particular, it noted that:

- a large proportion of this capex category is in accordance with the newly developed *National guidelines for protecting critical infrastructure from terrorism*[95]
- Powerlink has taken reasonable steps to identify project alternatives and its cost estimates appear reasonable and efficient
- although some other non-load driven network capex could be better categorised, in general they are of a relatively low value and should be included in the ex ante allowance
- some of the timing of the security projects could be modified without considerably increasing risks.

As part of its detailed review, PB reviewed two large security projects that account for 71 per cent of expenditure in this category. The AER's considerations of PB's recommendations on these projects are set out in appendix C.

The AER accepts PB's findings that there is a genuine need for Powerlink's investment in security/compliance projects. It also accepts PB's findings from its detailed review of security projects, including that the substation security upgrade project should be advanced and some expenditure related to the transmission line security upgrade should be deferred as shown in table 4.11. It should be noted that, under the ex ante capex framework, Powerlink may still choose to undertake these projects in line with its proposed scope and timings.

Table 4.11 Adjustments to Powerlink's security projects ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Substation security upgrade	4.00	3.52	–3.31	1.24	–5.45	0.00
Transmission line upgrade	0.00	–5.73	4.90	–13.69	1.51	–13.02

For the other capex category, the AER accepts PB's recommendation that Powerlink's proposed allowance should be included in the ex ante allowance.

95 Australian Government, *National guidelines for protecting critical infrastructure from terrorism*, February 2005.

Non-network capex

Powerlink's proposed non-network capex for the next regulatory period totals $104 million ($2006–07). This represents an average expenditure of $21 million per annum. This compares with a total of $87 million incurred during the current regulatory period, at an average of $17 million per annum. This category of expenditure represents 4.2 per cent of Powerlink's forecast capex proposal.

Powerlink categorises its non-network capex into business information technology (IT) capex and support the business capex. The business IT category, with expenditure of $57 million is divided into IT replacements such as hardware and cyclical upgrades, and IT projects that includes infrastructure and application based projects. The support the business category, with forecast capex of $46 million, includes all other non-network related capex including buildings, office equipment and assets, motor vehicles and mobile plant and other specialist tools and equipment.

From its review of Powerlink's business IT forecast category, PB found that the proposed expenditures remain relatively constant during the next regulatory period. However, it noted that there was a substantial increase in the current regulatory period between 2003–04 and 2005–06. For IT replacements, PB found a consistent cycle of expenditure, with no material increase in these expenditures over the next regulatory period. It recommended that IT replacement expenditures be included in Powerlink's capex allowance.

For IT infrastructure projects, PB stated that Powerlink had prepared a project by project forecast for 2007–08 and 2008–09, but for the remainder of the regulatory period it adopted a three year rolling average due to the difficulty in forecasting IT projects.

PB found that the range of projects forecast until 2008–09 was comprehensive in nature and that Powerlink had used a reasonable basis to establish the forecast. However, it considered that the level of expenditure did not appear to be necessary or efficient over the entire regulatory period as evidenced by the significant increase between 2003–04 and 2005–06. PB recommended that Powerlink's three-year rolling average, used to establish its forecast business IT projects between 2009–10 and 2011–12 be reduced by approximately 15 per cent to a level more commensurate with the long run average. PB considered that its recommendation was a conservative estimate and resulted in a $4.1 million reduction in Powerlink's forecast capex.

The AER notes that there has been a significant increase in Powerlink's business IT expenditures from the middle of the current regulatory period up until the start of the next regulatory period (from about $2 million in 2003–04 to around $12 million by 2007–08). While the application of a three-year rolling average to forecast IT infrastructure project expenditures may be one method to develop this forecast, the AER agrees with PB that the use of a rolling average would result in an inefficient forecast due to the lumpy, one-off nature of these projects (e.g. re-cabling offices). The AER agrees that a 15 per cent reduction should be applied to the annual IT infrastructure project forecast for 2009–10 to 2011–12 so that it is more aligned with the long run average of this category of expenditure. Table 4.12 sets out the AER's adjustment to Powerlink's forecast business IT allowance.

Table 4.12 AER's adjustments to Powerlink's business IT forecast ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Business IT	–	–	–1.38	–1.39	–1.36	–4.13

PB found Powerlink's proposed support the business capex to be relatively constant throughout the next regulatory period, with two one-off expenditures in 2008–09 and 2009–10. These related to a new warehouse ($6.2 million) and a new transmission line training facility ($4.2 million). PB indicated that Powerlink had considered a number of alternatives to these projects and that the costs were reasonable. It also considered that these projects were important to Powerlink's strategic development and recommended that the proposed allowance be accepted. PB also reviewed Powerlink's motor vehicle and mobile plant forecast ($19 million) and considered that these expenditures were reasonable and relatively consistent with historic expenditure.

Overall, PB found that Powerlink had prepared a well considered and strategic forecast of its non-network capex requirements and that a large proportion of this expenditure was ongoing and trended consistently with historical expenditure. PB considered that there was a genuine need for the majority of the work and that various alternatives had been considered.

The AER accepts PB's finding that Powerlink has developed a well considered non-network forecast capex proposal that will support Powerlink's significant capex program over the next regulatory period. Therefore, subject to the adjustment for IT infrastructure projects, the AER considers that non-network expenditures of $100 million should be included in Powerlink's ex ante allowance.

4.6.6 Cost accumulation process

This section examines whether Powerlink's cost accumulation process provides a reasonable basis for estimating the cost and profile of capex over the next regulatory period. It discusses the processes that Powerlink has used to develop its base project cost estimates and then translating them into a profile of capital expenditures for the next regulatory period. Specifically, it reviews Powerlink's base planning objects (unit rates), specific input escalators, standard project expenditure profiles, cost estimation risk factor, and the application of a generic locality factor to capacitor bank projects.

Powerlink's application

Powerlink has undertaken the following cost accumulation process in developing the annual capex profile for network projects in the next regulatory period which are not yet in the detailed planning phase:

- estimated the capital cost of each project in 2005–06 dollar terms
- added a 2.6 per cent cost estimation risk factor to that capital cost[96]

[96] Cost estimation risk factor is referred to as a risk adjustment factor in PB's report.

- determined the likely expenditure profile of each project using generic S-curves based on the project type involved

- applied escalation factors for labour and other factors to provide the estimated cost of the project in nominal dollars for the years in which the expenditure is forecast to be incurred

- de-escalated the costs using forecast inflation to provide the estimated project cost profile in 2006–07 dollar terms.

Submissions

The EUAA stated that Powerlink's cost estimates have not been independently reviewed or benchmarked against recent projects to ensure that they are realistic and efficient. It also stated that Powerlink has not provided any indication of whether unit costs are in line with industry practice.

SP AusNet noted that it has experienced increased delivery times for major plant such as transformers and high voltage switchgear and that TNSPs are required to pay higher prices in order to receive priority delivery from manufacturers.

PB's review

Overall, PB found that Powerlink had applied a systematic process to translate its individual project cost estimates into an annual profile of expenditure for the next regulatory period. However, it made a number of observations and recommendations about the cost accumulation process. The following is a summary of PB's key findings. Where appropriate these are discussed in more detail in the AER's consideration section. PB stated that:

- Project cost estimates are underpinned by the base planning objects (BPOs) which are essentially unit rates for different types of assets. The BPOs used by Powerlink to develop its forecast capex are reasonable.

- It did not accept that short line adjustment factors were appropriate but found that Powerlink had used discretion in applying them and in some cases had not applied them at all.[97] On this basis, PB did not recommend any changes to Powerlink's forecast capex in relation to this approach.

- Given the vast geographic area of its network, Powerlink has applied location factors to its project cost estimates.[98] The location factors applied by Powerlink were suitable and that the factors had been applied appropriately.

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97 Powerlink's BPOs for transmission lines are typically developed based on large projects with line lengths approaching 100 km and therefore benefit from economies of scale. For projects with shorter line lengths, adjustment factors are applied to the BPOs to compensate for the fact that these scale economies will not be achieved.

98 Location factors are multipliers of the capital city (Brisbane) based cost of a construction type project. The Brisbane area is the reference for locality factors and by definition is given a locality factor of 1.0.

- The labour escalation factors used by Powerlink over the regulatory period were too high, but the other escalation factors for materials, plant and property compensation were reasonable.

- Powerlink had identified the commissioning date of each project using a reasonable, logical and practical methodology that accounted for the actual need of the project and its ability to deliver the program using finite resources. PB therefore did not recommend any adjustment to the proposed project timings.

- Powerlink had used 10 S-curves based on its previous experience to estimate project expenditure profiles. The S-curves were representative and reasonable for forecasting Powerlink's network related capex.

- Powerlink had incorporated adjustments into some S-curves to allow for pre-payment of manufactured items to ensure they are delivered on time. PB did not consider this to be a reasonable approach and recommended that these adjustments be removed.

- Powerlink's application of a general 2.6 per cent cost estimation risk factor to all cost estimates was not justified and should not be applied.

- The generic locality factor applied to capacitor banks was inappropriate and should have been based on the actual location after the project was finalised.

AER's considerations

Cost estimation—base planning objects

Powerlink's BPOs underpin the majority of its project cost estimates. These are essentially unit rates for different asset types including switchyard bays, transformers and transmission lines. The process used by Powerlink to create BPOs requires detailed (bottom-up) estimates for the cost of each component, including steel, aluminium and copper materials, electrical equipment, labour and installation.

As part of its review, PB was required to assess the appropriateness of Powerlink's BPOs. PB found Powerlink's methodology to create and review BPOs was robust and was carried out at an appropriately detailed level. Powerlink's BPOs generally reflect past experience with projects and therefore incorporate recent information on input prices and contractor margins.

Powerlink has BPOs for each significant network element, however, a relatively small number of BPOs make up the majority of project costings. In particular, lines, cables, transformers and switchyards represent around 75 per cent of the cost of Powerlink's forecast capex program. PB established benchmark costs for five of Powerlink's key BPOs.[99] In establishing these benchmarks, it used both publicly available data and

[99] 275 kV DCST Twin-Sulphur 2400A line; 275 kV Twin-Phosphorous 1800A line; 275kV DC Twin 1200 mm cable; 275 kV AIS 11/2 CB switchyard bay with 2 CBs; and 275/132kV transformer 375 MVA ODAF.

information not in the public domain.[100] PB's benchmarks also take into account differences in voltage and capacity levels and were adjusted for time and currency differences. They include costs associated with design, installation and commissioning.

PB generally found Powerlink's BPO costs to be within the benchmark range and that the majority of BPOs were either close to the average benchmark cost or below it. PB therefore considered each of Powerlink's key BPOs to be reasonable. In addition, it found no evidence that Powerlink had inflated its BPOs significantly from those used in the current regulatory period.

The AER accepts PB's advice that Powerlink's BPOs are reasonable and provide it with an appropriate basis on which to estimate the cost of its forecast capital works program.

Forecast capex escalation factors

In developing its annual forecast capex requirement, Powerlink has applied the cost escalation factors set out in table 4.13 to its base project cost estimates.

Table 4.13 Powerlink's proposed forecast capex escalation factors[101]

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Annual labour escalator	1.0769	1.0583	1.0560	1.0560	1.0560	1.0560
Annual other escalator[1]	1.0270	1.0291	1.0291	1.0291	1.0291	1.0291
Annual non-urban property compensation escalator	1.0500	1.0500	1.0500	1.0500	1.0500	1.0500
Annual urban property compensation escalator	1.0861	1.0861	1.0861	1.0861	1.0861	1.0861

[1] This factor, based on the CPI, applies to all capex except labour and property compensation and therefore includes materials and electrical plant.

Powerlink has escalated labour costs in accordance with its EBA for 2006–07 and 2007–08, and then at 5.6 per cent per annum for the remainder of the next regulatory period. PB considered that Powerlink's labour escalation factors were too high, as it did not expect these levels would continue through to the end of the next regulatory period. It recommended labour escalation factors for the final four years of the next regulatory period be consistent with its recommendations on labour escalation factors for Powerlink's opex. In addition, for the years 2006–07 and 2007–08, PB recommended escalation rates of 5.6 per cent on the basis that a large proportion of the design and construction associated with Powerlink's forecast capex program was outsourced.

PB's recommended labour escalation rates are set out in table 4.14. It estimated that its recommendation resulted in a reduction in forecast capex of $22 million.

The AER does not consider that the lower labour escalation rates recommended by PB for 2006–07 and 2007–08 are appropriate. While the majority of capital works are

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100 NSW Treasury, *Valuation of electricity networks assets, a policy guideline for NSW DNSPs*, May 2003. NZ Commerce Commission, *Handbook for optimised deprival value of system fixed assets of electricity line businesses*, 2004.

101 The base project cost estimates are in 2005–06 dollar terms. This is why Powerlink has included the escalation factors for 2006–07.

outsourced, the AER is of the view that Powerlink's contractors operate in the same market for skilled workers as Powerlink. On this basis, the AER considers that the labour escalators proposed by Powerlink based on its EBA for 2006–07 and 2007–08 are reasonable.

The AER engaged Access Economics to provide advice on wage growth forecasts for the utilities sector in Queensland and other Australian States and Territories.[102] The AER accepted this advice and has adopted Access Economics' wage growth forecasts as the appropriate labour escalation factors. The AER therefore proposes to reduce Powerlink's labour escalation factors for the last four years of the next regulatory period as shown in table 4.14.[103] Further discussion on the AER's considerations for adopting these labour escalation factors is provided in section 6.6.2. Following a request from the AER, Powerlink advised that this conclusion resulted in a reduction to its proposed forecast capex of $15 million.

Table 4.14 Powerlink's, PB's and AER's labour escalation factors

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink's proposal	1.0769	1.0583	1.0560	1.0560	1.0560	1.0560
PB's recommendation	1.0560	1.0560	1.0560	1.0560	1.0460	1.0460
Access Economics' recommendation	1.0560	1.0580	1.0530	1.0350	1.0350	1.0400
AER's conclusion	1.0769	1.0583	1.0530	1.0350	1.0350	1.0400

Powerlink has escalated its easement acquisition and compensation costs by the long-term appreciation trend of Australian grazing property index for non-urban properties, which has been 5 per cent per annum (real) over the past 25 years for Queensland. For urban properties, Powerlink has used the 10-year average growth in Brisbane and Townsville local government areas of 8.61 per cent per annum (nominal). Overall, PB considered that these approaches to the different types of land were reasonable. The AER accepts PB's advice that the escalation factors applied to both urban and non-urban properties are reasonable.

The annual 'other' escalation factor has been applied by Powerlink to all capex except labour and property compensation (e.g. materials and electrical plant). PB considered that it was reasonable for these costs to be escalated at CPI. The AER considers that escalation of these items at CPI is a reasonable assumption and notes that it is consistent with the AER's conclusions in section 6.6.3 in relation to maintenance materials.

Application of a cost estimation risk factor to forecast capex estimates

Powerlink considered that its actual project costs are often higher than its initial estimates. To quantify this cost estimation risk it engaged Evans and Peck to undertake a risk review of its proposed forecast capex program.[104] The Evans and Peck review

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102 Access Economics is an economic consulting firm. It was engaged by the AER because of its expertise in economic modelling and forecasting.

103 Access Economics, *Wage growth forecasts in the utilities sector*, 17 November 2006.

104 Evans and Peck is a management consultancy firm, specialising in improving performance in the delivery of major infrastructure projects and programs.

examined risks associated with the uncertainty in costing a project of known scope in advance and risks associated with events during the life of a project that were not originally envisaged.[105]

The process involved each forecast capex project being classified as a high, medium or low risk and being applied a risk profile. The three types of projects were assigned risk profiles based on a Pert Distribution.[106] The probability distributions determined were based on the combined judgement of Powerlink and Evans and Peck. The three probability distributions used were low risk project (± 10 per cent), medium risk project (–15 per cent to +20 per cent) and high risk project (–20 per cent to +35 per cent).[107]

The estimated expenditure and risk profile of each project was modelled using a Monte Carlo simulation to determine a risk-adjusted estimate of the forecast capex requirement. The modelling resulted in a recommendation of a 2.6 per cent increase in the expected cost of Powerlink's forecast capex program.[108] Powerlink has applied this factor to all of its base cost estimates which were BPO based to develop its forecast capex proposal.

The Evans and Peck review was a high level review and did not quantify the various individual risks associated with the risk categories. However, its report stated that the risks included: labour availability; changes in legal requirements and planning approvals; uncertain staging and outage costs; site variations; technology changes; and difficulty in scoping and designing projects. [109]

Based on its review of the development and application of the cost estimation risk factor PB stated that:

- Many of the identified risks relate to items that are minor cost components of projects (for example, the substation costing risk relates to decommissioning and disposal, staging and access). Applying an uncertainty factor of 80–135 per cent for these items on the total project costs appears unrealistic, given that the major cost components of substations are plant and equipment.

- Some of the risks listed had been explicitly taken into account in the forecast capex and opex estimates (e.g. for line projects, costing risk is indicated to be associated with changes in legal requirements and planning approvals, labour rates, plant and material cost increases and design risks). Each of these items, and the risks

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105 Evans and Peck, *Risk review of capital works programme*, 2006.

106 A Pert Distribution is a bell-shaped curve defined by minimum, likely and maximum expected values. The curve can be skewed or symmetrical.

107 High risk projects include construction of overhead and underground powerlines, establishment and replacement of substations, replacement of substation secondary systems, obtaining easements and paying compensation. Medium risk projects include communications and IT projects. Low risk projects include augmentation of Static-VAr Compensators; augmentation of substation capacitor banks and augmentation of substation transformers.

108 It is noted that because low risk projects have a symmetrical distribution, this risk category does not contribute to the 2.6 per cent. However, the high and medium risk categories are skewed distributions with a higher risk of cost increase than decrease.

109 Powerlink advised that staging does not refer to changes in the timing of the overall project but to the various stages of a project which are put into service.

associated with likely changes in them, has been factored into the cost estimates and capex forecasts.

- The assumed risk profiles are not based on Powerlink's experience and the Evans and Peck report provides no evidence to suggest that Powerlink's actual history of cost overruns is material or of the order indicated.

- It was not clear that the cost uncertainties are not already built into Powerlink's BPOs as these are updated on an ongoing basis to factor in actual historic project cost outcomes.

- The Evans and Peck review only examines costing risk and does not take into account benefits (e.g. the risk of a project being deferred is likely to benefit Powerlink as it keeps the additional returns associated with the lower spend within the period).

- The regulatory rate of return already incorporates a commercial risk factor.

PB concluded that the Evans and Peck report did not provide sufficient evidence to establish that a material costing risk exists and that it would be inefficient to include an additional 2.6 per cent risk factor as part of Powerlink's capex forecast. PB estimated that the removal of the cost estimation risk factor from Powerlink's proposed capex would result in a $55 million reduction in Powerlink's forecast capex.

The AER has reviewed the Evans and Peck consultancy report, additional information provided by Powerlink, and PB's findings and conclusions. The AER does not consider that the cost estimation risk factor should be applied for the following reasons:

- The Evans and Peck report does not provide any evidence that Powerlink's actual history of cost overruns is material or of the magnitude assumed. The risk profiles applied are based on judgement rather than on actual historical data.

- The Evans and Peck review examined risks associated with the uncertainty in costing a project of known scope in advance and risks associated with events during the life of a project that were not originally envisaged. The AER agrees with PB that the uncertainty in costing a project of known scope in advance is already captured to some extent in Powerlink's BPOs as these are updated on an ongoing basis to factor in actual project cost outcomes.

- It is likely that the listed risks have been partly taken into account in Powerlink's forecast capex estimates. For example, Evans and Peck stated that Powerlink has applied external escalation rates to project scope costs but have not incorporated the risk associated with variation in the escalation factors on individual projects. Evans and Peck stated that the risks securing of reasonable rates for the supply of labour, plant and material will be higher than in the past. The AER considers that the application of input escalation rates already factors in these risks and do not systematically over or underestimate them.

- The AER agrees with PB that the addition of the cost estimation risk factor to forecast capex costs effectively transfers the risk to Powerlink's customers. The

AER considers that Powerlink is best placed to manage these risks and should have an incentive placed upon it to implement initiatives to manage them. For example, PB found that one of the key reasons for budget overruns in the current regulatory period were problems with easement routes and local opposition. In response to this Powerlink has been involved in the development of a more streamlined easement acquisition process.

- Evans and Peck applied a probability distribution to each project cost estimate in Powerlink's forecast capex program. For medium and high risk projects, the probability distributions had the property that the average of the distribution is larger than the mode (i.e. the distribution is skewed). Evans and Peck then conducted a Monte Carlo simulation and calculated the average of the resulting costs of the projects to be 2.6 per cent higher than the original total cost estimate. This logic is sound if the cost estimate for each project is the mode and the distribution of cost outcomes has the property that the mean is greater than the mode. However, if the cost estimate for each project represents the mean (expected) cost for the project than the average forecast total expenditure must be equal to the sum of the cost estimate for each project. If this is the case then no risk adjustment would need to be made. It is not clear whether the cost estimates used by Evans and Peck in their analysis are the most likely (mode) or expected (mean) cost outcome. In addition, the AER notes that the skewed probability distributions applied to Powerlink's projects have been based on judgement rather than analysis of historical data.

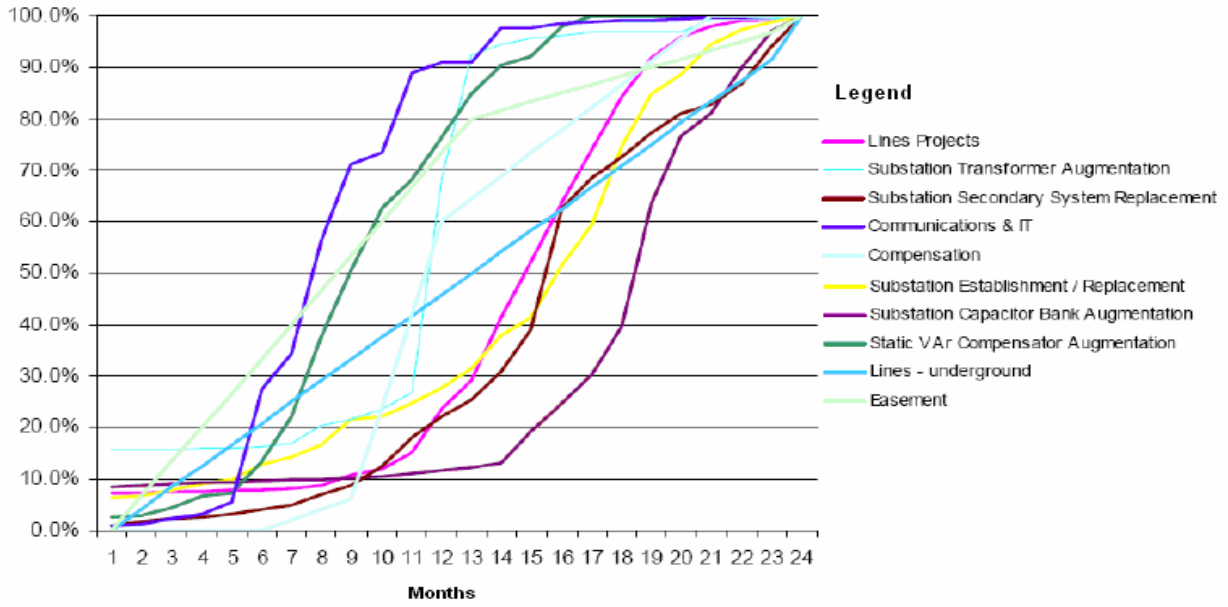
- PB noted that many of the identified risks were associated with minor cost elements of projects and that applying the proposed risk profile to these items was unrealistic given that the major cost components of substations are plant and equipment.

Overall, the AER does not consider that Powerlink has sufficiently justified the need for the application of an additional cost estimation risk factor to its forecast capex estimates. It agrees with PB that it would be inefficient to apply it to Powerlink's base project cost estimates. On this basis, the AER accepts PB's recommendation that the risk adjustment factor be removed. Following a request from the AER, Powerlink advised that this conclusion resulted in a reduction in forecast capex of $39 million.

Application of generic S-curves and adjustments to some S-curves for pre-payments

Powerlink has used generic S-curves to estimate the expenditure profile associated with each of its projects. The curves are based on historical project expenditure profiles and their application reflects the reality that most of the capex is incurred well in advance of a project's commissioning date.

Figure 4.3 Generic S-curves used by Powerlink to develop its capex profile



Source: PB report, p. 128.

Powerlink has developed 10 generic S-curves that cover the major types of transmission projects it proposes to undertake in the next regulatory period. These curves are shown in figure 4.3. The curves have been normalised over a 24-month period, which is the typical period for construction of transmission projects. The curves are applied by project type to determine the incidence of expenditure in each financial year, working back from the nominated commissioning date.[110]

PB reviewed information on the development of Powerlink's S-curves. It found that the majority of the curves had been based on an average of a number of typical historical projects. PB considered the averaging process to be sound and it was satisfied that the S-curves developed by Powerlink were suitable for the purpose of forecasting its capex profile. The AER accepts PB's advice that the S-curves are suitable for forecasting capex profiles.

Powerlink has adjusted four of its generic S-curves to address the risk of delays in the delivery of plant due to tightening supply conditions. It considered two options to address this risk: order equipment two months earlier than normally required; or pre-pay up to 25 per cent of the cost of the manufactured items. Powerlink concluded that the pre-payment option was preferred as it did not introduce risks associated with the early ordering of plant for projects that had not been approved or for which the design was incomplete. On this basis Powerlink has adjusted four of its generic S-curves to allow for a pre-payment of up to 25 per cent of the cost of manufactured items.

The four S-curves that have been adjusted relate to the following project types: lines; substation establishments/replacements; substation transformer augmentations; and substation capacitor bank augmentations. PB noted that in comparison with unadjusted

[110] These S-curves allow Powerlink to estimate the amount of expenditure that will be incurred on projects in the current, next and 2012–2017 regulatory periods.

S-curves, this represents an advancement of the expenditure associated with the manufactured items in each of these projects by up to nine months.

While it acknowledged the tight supply conditions raised by Powerlink, PB recommended the removal of the pre-payment adjustment to the four S-curves on the basis that:

- the risks envisaged by Powerlink are already captured in the historic S-curves to some extent as they are based on current market conditions. PB did not expect that all historic project procurements reflected just in time procurement
- pre-payments may not be an efficient or appropriate method to mitigate the risk of manufactured items not being delivered on time
- it was unclear whether pre-payments would be necessary for all projects of the nominated type or that they would be required for the duration of the period
- Powerlink uses long-term high volume supply contracts to ensure timely delivery of long lead critical items.

PB also indicated that in coming to its conclusion it had noted the various arguments that Powerlink has used to provide assurances that it can deliver its forecast capex program. PB advised that its recommendation to remove the pre-payment adjustment would result in an increase in forecast capex of $0.6 million and a decrease in expenditure associated with assets under construction in the current regulatory period of $13 million.

Powerlink stated that the current conditions for the purchase of electricity transmission equipment requires earlier ordering and reservation of manufacturing slots with suppliers. SP AusNet also referred to a substantial shift in market conditions for plant and equipment during 2005 and 2006 and that this had manifested in increased delivery times for major plant such as transformers and high voltage switchgear. SP AusNet considered that TNSPs would be required to pay higher prices in order to receive priority delivery from manufacturers.

The AER has reviewed PB's findings and comments from both Powerlink and SP AusNet on this issue. On balance, the AER accepts PB's reasons and recommendation that the pre-payment applied to the manufactured items within certain projects types should be removed. Following a request from the AER, Powerlink advised that this conclusion resulted in a reduction in forecast capex of around $6 million.

Application of a generic locality factor to capacitor bank projects

Given that 47 reactive compensation projects are proposed during the next regulatory period, Powerlink developed generic project costs which it applied to capacitor bank projects, rather than costing each individual project.[111] Although accepting the need to develop standardised costs due to the large number of capacitor bank projects, PB

[111] The standard capacitor bank sizes are 50 MVAr at 110 kV and 120 MVAr at 275 kV.

considered that it was unnecessary to apply a general locality factor of 5 per cent to these projects, given that the final sites had already been determined.[112]

PB recommended that locality factors, based on the final site, be applied and considered that this was likely to reduce the overall cost of these projects as the vast majority of capacitor banks are required close to the reference point of Brisbane. PB considered that its recommendation to reduce the locality factor from 1.05 to 1.0 would result in a reduction of capacitor bank project costs by $3.4 million ($2006–07) for the next regulatory period.

The AER accepts PB's recommendation that a generalised locality factor should not be applied to capacitor bank projects but rather the locality factor should be based on the final site as these are already known and many are close to the Brisbane reference point. Following a request from the AER, Powerlink advised that this conclusion resulted in a reduction in forecast capex of about $1 million.

Overall, the AER's conclusions in relation to Powerlink's cost accumulation process result in a reduction in forecast capex of approximately $61 million.

4.6.7 Contingent projects

This section sets out the AER's consideration of Powerlink's proposed contingent projects and discusses whether any other projects within Powerlink's ex ante allowance should be treated as contingent projects.

Under the Powerlink transitional provisions (clause 11.6.12), the AER is required to assess Powerlink's proposed contingent projects in accordance with the old chapter 6 rules and the SRP. The contingent project mechanism in the SRP allows large and uncertain projects to be excluded from the ex ante allowance on the basis that their inclusion may result in windfall gains or losses not directly attributable to the actions of the TNSP. The SRP also indicates that contingent projects must have unique investment drivers (rather than general drivers such as demand growth) and that if a project is to be treated as a contingent project, it must not form part of the ex ante allowance.

Once a trigger event related to a contingent project identified in this decision occurs, clause 11.6.12(f) sets out the process to be undertaken by the AER in adjusting the revenue determination.

Powerlink's proposal

Powerlink proposed that 10 projects be considered as contingent projects. The projects, their proposed triggers and indicative costs are set out in table 4.15. Powerlink's proposed contingent projects total $564 million.

[112] Powerlink has applied locality factors which are direct multipliers of the cost of construction outside of Brisbane. A locality factor of 1.05, for example, indicates that the cost of the project is increased by 5 per cent to reflect increased costs of constructing the project outside of Brisbane.

Table 4.15 Powerlink's proposed contingent projects, triggers and costs

Project name	Triggers	Cost ($m)
QNI upgrade (QLD component)	Passes the net market benefit limb of the regulatory test	100
Supply to Queensland Rail for rail link	Additional supply points for new railway link	70
Augmentation of supply to SEQ	Significant changes in generation pattern in SEQ	50
Ebenezer 275/110kV substation	Mooted point load due to industrial developments west of Ipswich	40
Yabula transformer	Mooted point load due to industrial developments in Thuringowa area	25
Stuart North substation	Mooted point load due to industrial developments in Stuart (Townsville area)	10
Nebo to Moranbah 275 kV DCST and Lilyvale to Dysart 132 kV SCST line	Coal mining demands in the Bowen Basin expand at levels materially above the load forecast	17–115
Biloela to Moura SCST line	Mooted additional industrial load in Biloela area	17
Nudgee establishment and 275 kV Nudgee to Murrarie line	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
Total indicative cost		564

PB's review

PB was required to assess whether Powerlink's proposed contingent projects met the contingent project criteria and whether there were any investments in Powerlink's proposed ex ante allowance that would be more appropriately classified as contingent projects. Based on its review, PB stated that:

- None of Powerlink's proposed contingent projects were large enough to meet the SRP's 10 per cent error rule, however, given the cumulative risk Powerlink could face if a number of these projects proceeded, it recommended that the AER consider reducing the materiality threshold for contingent projects to $50 million.

- Five of Powerlink's proposed contingent projects should be included as contingent projects: QNI upgrade; augmentation of supply to SEQ; Nebo to Moranbah 275 kV line; Nudgee substation establishment and Nudgee–Murarrie 275 kV line; and desalination plant in SEQ.

- Although above PB's proposed error threshold, the Queensland Rail project should not be treated as a contingent project because the majority of expenditure is likely to occur in the 2012–2017 regulatory period.

- Powerlink's four remaining contingent projects had indicative costs that were less than $50 million and most were speculative industrial developments with uncertain timing and size. On this basis, PB considered that they should not be treated as contingent projects. PB also noted that it was possible that some of these projects

were implicitly captured in the high demand growth scenario. It considered that not recognising these projects as contingent would not materially increase the risks faced by Powerlink.

- Eight projects unique to the M50++ sub-theme set in the probabilistic capex forecasting model should be removed from the ex ante allowance and treated as a contingent project.

AER considerations

Powerlink's proposed contingent projects

The SRP indicates that to be treated as a contingent project, the project must have the potential to result in a significant error in the ex ante allowance. Under the SRP, a project meets the criterion of large if the expected error presented by the inclusion of the project in the ex ante allowance, is equal to more than 10 per cent of the ex ante allowance. It should be noted, however, that the 10 per cent error rule is an indicative number and the SRP provides the AER with discretion as to whether a project should be classified as a contingent project.[113]

None of Powerlink's proposed contingent projects meet the 10 per cent error threshold contained in the SRP. As a result, the AER has decided to use its discretion and apply the materiality test set out in the new chapter 6A rules to Powerlink's proposed contingent projects. This approach has been adopted for two main reasons. First, the AEMC's chapter 6A rule determination indicates that the AER is able to have regard to the approach contained in the new rules.[114] Second, the adoption of the new materiality threshold ensures consistency with future revenue resets.

Clause 6A.8.1(b)(2)(iii) of the new rules states that a contingent project must meet a materiality threshold of the greater of $10 million or 5 per cent of a TNSP's MAR for the first year of the regulatory period. Powerlink's MAR for the first year of the next regulatory period indicates a contingent project threshold of approximately $27 million.

The AER considers that seven projects should be treated as contingent projects because they meet the materiality threshold established under the new rules, are uncertain and have unique investment drivers. The projects are:

1. QNI upgrade (Queensland component)

2. Supply to Queensland Rail for electrification of a railway track linking its northern and central coal haulage routes

3. Augmentation of supply to SEQ

4. Ebenezer 275/110 kV substation establishment

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113 ACCC, *Statement of regulatory principles for the regulation of electricity transmission revenues–background paper*, 8 December 2004, p. 58.

114 AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18—Rule determination*, 16 November 2006, pp. 126-27.

5. Nebo to Moranbah 275 kV DCST line

6. Nudgee substation establishment and Nudgee to Murrarie 275 kV line

7. Desalination plant in SEQ.

With the exception of the Ebenezer substation establishment project and the Queensland Rail project, which meet the materiality threshold contained in the new rules, the AER's conclusions on contingent projects are consistent with PB's recommendations.

Since Powerlink submitted its application in April 2006, the likelihood of a desalination plant in SEQ proceeding during the next regulatory period has increased.[115] While the AER intends to treat this as a contingent project for this draft decision, it will consider providing an allowance for this project in the ex ante allowance in its final decision, should additional information confirm the increased certainty of this project and the need for associated transmission works.

The AER has not included Powerlink's other proposed contingent projects on the basis that they do not meet the materiality threshold established under the new rules. These projects are:

- Yabula transformer
- Stuart North substation
- Biloela to Moura SCST line.

It should be noted that, although these projects will not be treated as contingent projects, Powerlink is not prevented from undertaking them from within its ex ante allowance if its operational priorities change.

Contingent project associated with M50++ sub-theme

In addition to the 10 projects proposed by Powerlink, PB was also required to review the ex ante allowance and determine whether any projects within it would be more appropriately classified as contingent projects. PB has recommended that eight projects unique to the M50++ sub-theme be treated as a single contingent project and therefore be excluded from the ex ante allowance. PB estimated that its recommendation would result in a $16 million reduction to the ex ante allowance.[116] PB was satisfied that none of the remaining projects in the ex ante allowance met the contingent project criteria.

The M50++ sub-theme attempts to capture the sensitivity of two 500 MW industrial developments in the Gladstone area of Central Queensland during the next regulatory period (one in 2009–10 and the other in 2010–11). The specific projects associated with

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115 Deputy Premier, Treasurer and Minister for Infrastructure, the Honourable Anna Bligh, *Early works commence on Queensland's largest desalination facility*, http://statements.cabinet.qld.gov.au, 19 September 2006.

116 The adjustment has been calculated by transferring the probability of this theme set equally between the medium growth 10 per cent PoE and the medium growth 50 per cent PoE theme sets.

the M50++ sub-theme and their estimated costs are set out in table 4.16. PB referred to the projects associated with the M50++ theme as the Gladstone development.

With an unweighted value of around $240 million, the Gladstone development meets the materiality threshold set out in the new rules. The development is uncertain and has a unique investment trigger not linked to the general investment drivers captured in the probabilistic model. The AER accepts PB's recommendation to include these projects as a single contingent project with a trigger of a 500 MW industrial development in the Gladstone area. Powerlink advised that the AER's conclusion resulted in a $14 million reduction in the forecast capex allowance.

Table 4.16 Projects associated with the M50++ theme set ($m, 2006–07)[1]

Project title	Cost	Probability of project (%)
Gladstone area transmission reinforcement	128.58	11
Larcom Creek remote 132 kV bus establishment	9.39	11
Auburn switching station (3 switched circuits)	12.71	2
Auburn switching station (4 switched circuits)	27.78	4
Auburn switching station (2 switched circuits)	17.28	3
Gladstone zone 120 MVAr No. 2	2.00	15
Calvale 275 kV substation refurbishment	43.16	10
Total	240.90	n/a

[1] PB recommended that these projects be treated as a single contingent project.

Contingent project—undergrounding costs

In addition to the contingent projects proposed by Powerlink and identified by PB, the AER considers that the proposed costs associated with undergrounding transmission lines should also be treated on a contingent basis.

Powerlink proposed to include a probability weighted amount of $136 million for undergrounding transmission lines in its ex ante allowance, with approximately half of this expenditure incurred in the final year of the next regulatory period. It indicated that the cost of undergrounding transmission lines is in the order of 15 times more expensive than overhead construction.[117] Powerlink's application includes 16 transmission line projects that contain limited sections of undergrounding.[118]

Powerlink's undergrounding proposals have been developed based on its experience in constructing transmission lines. While consultants are able to make judgements concerning a technical engineering requirement for undergrounding, decisions about undergrounding can often be driven by other factors, such as social and environmental reasons. Being public interest considerations, these decisions can only be properly made by planning authorities or relevant Ministers.

117 Powerlink.application, p. 9.

118 Powerlink refers to this approach as tactical or strategic undergrounding.

Under the previous ex post regulatory arrangements, the ACCC was able to determine whether there was a legal, regulatory or administrative requirement for undergrounding prior to including undergrounding costs in a TNSP's RAB. Under the ex ante framework the AER assesses the efficiency and appropriateness of the forecast capex allowance prior to the commencement of the regulatory period and does not undertake an ex post review. Most of the proposed projects that include some portion of undergrounding will not yet have received formal planning approval/designation as they are not proposed to be constructed until late in the next regulatory period.

Given the relatively high cost of undergrounding compared to overhead construction and the uncertainty surrounding the amount of undergrounding that will be required, the AER proposes that undergrounding costs be treated as a contingent project category. Where Powerlink has not demonstrated that there is a legal, regulatory or administrative determination requiring undergrounding, the AER has included the efficient costs of overhead line construction in Powerlink's ex ante capex allowance.[119]

The AER considers that this approach will establish a more efficient ex ante allowance because of the potential for windfall gains and losses if proposed undergrounding costs are included in the ex ante allowance. These could occur if either the relevant Minister or planning authority determines that undergrounding is not required or alternatively that additional undergrounding is needed. The AER proposes to treat Powerlink's undergrounding costs as a category of contingent projects.

The AER notes that the undergrounding costs associated with many of the line projects do not meet the materiality threshold for contingent projects in the new rules. However, the AER considers that it is reasonable to use its discretion under the SRP to treat these projects as contingent projects due to their uncertainty and relatively high cost compared with overhead construction.

Following a request from the AER, Powerlink advised that the treatment of undergrounding costs as a contingent project category has the effect of reducing the ex ante allowance by around $87 million.[120]

The AER has approved contingent projects for Powerlink with a total indicative cost of $890 million. This compares with Powerlink's contingent project proposal of $564 million. The AER's approved contingent projects and their indicative costs are set out in table 4.17. Appendix D describes the specific triggers and indicative costs for these projects.

Arrangements for assessment of contingent projects

Powerlink's transitional provisions contain a clause dealing with the process to be undertaken when a trigger event associated with a contingent project contained in this decision occurs (clause 11.6.12(f)). The AER reviewed these arrangements and found them to be very similar to those contained in clause 6A.8.2 of the new rules. In general, this clause sets out what a TNSP's contingent project application must contain the

[119] It should be noted that the AER does not expect Powerlink to undertake consultation on the projects based on the cost of full overhead construction.

[120] The unweighted cost of the undergrounding to be treated as contingent projects is $233 million.

assessment process to be undertaken when a trigger event has occurred and the factors to be considered by the AER when making a contingent project determination.

The AER has decided to apply clause 6A.8.2 when a contingent project trigger event has occurred, except for those sub-clauses requiring the AER to assess whether the forecast total capex for the contingent project meets the materiality threshold referred to in clause 6A.8.1(b)(2)(iii). This is because Powerlink's transitional provisions in relation to contingent projects do not provide scope for the AER to assess whether the contingent project meets a materiality threshold after the trigger event has occurred. The AER considers that this approach meets the intent of the contingent project mechanism and will ensure similar contingent project arrangements are applied to Powerlink as will be applied to other TNSPs in the future.

The trigger event for an undergrounding contingent project is a legal, regulatory or administrative requirement for the undergrounding. However, the AER is aware that formal project approval/designation can occur quite late in the project development process. So as not to delay the project's implementation, the AER will assess an undergrounding contingent project application from Powerlink when planning approval is sought for the project or when Powerlink conducts its economic evaluation of project options. The AER will assess the application under clause 6A.8.2 of the new rules but make its determination conditional on it receiving notification from Powerlink of planning approval and that the project has passed the regulatory test.[121] Further information on the AER's process for assessing an undergrounding contingent project is contained at appendix E.

Table 4.17 AER's approved contingent projects and indicative costs ($m)

Project name	Cost
QNI upgrade (QLD component)	100
Supply to Queensland Rail for rail link	70
Augmentation of supply to SEQ	50
Ebenezer 275/110kV substation	40
Nebo to Moranbah 275 kV DCST	90
Nudgee establishment and 275 kV Nudgee to Murrarie line	100
Desalination plant in SEQ	37
Gladstone major industrial development (M50++)	170[1]
Undergrounding costs	233
Total indicative cost of contingent projects	890

[1] The indicative cost of this contingent project has been reduced from $241 million to $170 million. This is because the indicative cost for the Gladstone development does not include the Larcom Creek substation project (as it is included the ex ante allowance) or the Auburn Creek switching station (2 and 3 switched circuits) projects.

[121] The AER requires notification that both planning approval and approval to construct have been obtained, however, only one may be required if the other has previously been provided with the undergrounding contingent project application.

4.6.8 Powerlink's ability to deliver its forecast capex program

Forecast capex is primarily determined on the basis of expected demand and the need for replacement assets. Whether Powerlink's capex program can be delivered depends upon supply side conditions over the next five years. An assessment of deliverability is needed because under the capex incentive framework a TNSP is able to retain, within the regulatory period, the excess return on and of capital associated with a lower than approved capex allowance.

Powerlink's application

Powerlink recognised that its forecast capex proposal involves a material increase on the current regulatory period. However, it stated that a significant proportion of the capital program is attributable to higher input costs and consequently the work increase in physical terms is much less than the increase in dollar terms. To ensure the higher work volume can be delivered, Powerlink indicated that it had implemented or commenced implementation of a number of initiatives. Specifically, Powerlink stated that:

- Design standardisation—its designs for transmission lines and substations now adopt a high degree of standardisation, providing benefits in terms of design (allowing more outsourcing of design work) and commissioning resources. Standardisation also has benefits in terms of procurement by allowing standard equipment modules to be bulk purchased.

- Program management—it is creating larger construction programs comprising many projects and awarding them to major contractors, rather than engaging contractors on a project-by-project basis.

- Supply chain management—it is procuring materials and equipment via long-term, high volume contracts and this enables long lead-time materials and equipment to be ordered well in advance and delivered on time.

- Streamlined easement acquisition—the *Queensland Integrated Planning Act* provides a streamlined process in which the Minister can designate development as community infrastructure, obviating the need for potentially more time consuming approvals (e.g. by local governments).[122]

- Increased outsourcing—the design standardisation initiative has allowed significant amounts of design work to be outsourced. It also advised that it had established a model for the turnkey development of new substations and that initial contracts for these works have been awarded.

- Increased internal staffing—it is increasing its internal resources to enable delivery of increased workload through: improved recruitment and retention; increased recruitment of trainees and graduates; recruiting engineers from overseas; and a staged retirement program.

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[122] Powerlink indicated that it has worked with the Queensland Government to establish an efficient process for these Ministerial designations.

- Strengthened governance/management structures—a major restructure was implemented in August 2005 creating the position of Chief Operating Officer. The role has been established with a mandate to develop initiatives to ensure timely delivery of the work program.

Submissions

The MEU stated that the significant increase in forecast capex from the current regulatory period raises questions about the ability of Powerlink to implement its total capex program, especially in the light of the claimed external constraining factors such as skilled labour shortages and material cost increases.

PB's review

Overall, PB considered that its amended capex program was achievable and that there was still reasonable scope for Powerlink to realise efficiencies during the next regulatory period. In particular, PB stated that:

- The initiatives being implemented by Powerlink provided a high degree of certainty that it can deliver its forecast capex program.
- A significant proportion of the increase in the capex program was due to increased costs as opposed to increased physical work.
- Powerlink was outsourcing more work and increasing its internal staffing levels and therefore it appeared that Powerlink would have the physical resources to deliver the program.
- Powerlink has mitigated the risk of budget and time overruns by gaining easement approval through the Queensland Government's designation process.
- Project timetables are achieveable as a result of Powerlink building sufficient margins into its project timeframes and by the use of well established, governed and standardised procurement practices.
- Powerlink had taken account of its finite resources by staggering the commissioning dates of its projects.
- PB recommended that a number of projects be reduced in scope or deferred in timing until the 2012–2017 regulatory period.

AER's considerations

In its application, Powerlink noted that it had already implemented or was in the process of implementing a number of initiatives to ensure it could deliver its forecast capex program. In view of Powerlink's forecast capex allowance being approximately 60 per cent higher than that undertaken during the current regulatory period, the AER wrote to Powerlink in November 2006 seeking an update on these initiatives and any other information Powerlink was able to provide to support its claim that it will be able to

deliver the increased capex in the next regulatory period.[123] In its response, Powerlink indicated that it was on track to deliver its forecast capex program and the initiatives outlined in its application have been implemented and are working well.[124] It stated that it had increased its capex by 65 per cent between 2004–05 and 2005–06 and is on track to deliver forecast capex of over $500 million in 2006–07. In terms of the initiatives that it had implemented to ensure the deliverability of its forecast capex program, Powerlink stated that:

- Design standardisation—standard designs for substations, switchyard layouts, transmission lines, towers, transformers, and secondary systems are now being used.

- Program management—its capex program has been divided into seven work programs and long-term contractual arrangements with construction contractors established. This enables contractors to plan and invest in the people and equipment, as well as allowing it to optimise its project management resources.[125]

- Supply chain management—period contracts and standard specifications have been established for primary plant elements and secondary systems components. Also, production slots with manufacturers for all critical elements, particularly for large transformers and transmission line insulators which have experienced the longest lead time increases in recent times have been reserved.

- Streamlined easement acquisition—resources to manage activities associated with easement activities have increased by 30 per cent to ensure appropriate processes are followed and required access dates are achieved.

- Increased outsourcing—its design work contractual arrangements are in place with five organisations. It also noted that 70 per cent of Powerlink's substation design work is now outsourced compared with 40 per cent two years ago.

- Increased internal staffing—despite a tight labour market, it has been able to increase its internal staffing from 600 in 2004 to 750 in 2006 (a 25 per cent increase). It considered that this was the result of a range of recruitment and retention initiatives, including overseas recruitment.

- Strengthened governance/management structures—the Chief Operating Officer position has provided the focus for the implementation of the above initiatives and that the restructure had been instrumental in achieving the marked increase in the capital program.

Powerlink stated that it was confident that the initiatives already implemented and the focused organisational structure would allow Powerlink to deliver its forecast capex program. However, it noted that its confidence in delivering the program was predicated

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123 On an as-incurred basis, Powerlink's capex is proposed to increase from $1.5 billion in the current regulatory period to $2.4 billion in the next regulatory period.

124 Powerlink response to AER letter on deliverability, 23 November 2006.

125 Powerlink indicated that it has over $1.2 billion of capital projects currently approved and under construction.

on it and its contractors being able to meet Queensland market rates for construction and electricity industry resources.

The AER has considered Powerlink's application, PB's review and the concerns raised by the MEU. It is satisfied that Powerlink has the potential to be able to deliver the forecast capex program as amended by it for the following reasons:

- Between 2004–05 and 2005–06 Powerlink's capex increased from $187 million to $307 million, a 65 per cent increase, and it is on track to spend more than $500 million in 2006–07 ($nominal).[126] Powerlink's forecast capex, as amended by the AER, averages around $406 million per annum ($2006–07). This suggests that Powerlink will have the ability to deliver the amended program. Figure 4.4 shows the annual profile of capex incurred by Powerlink during the current regulatory period and the annual forecast capex for the next regulatory period.

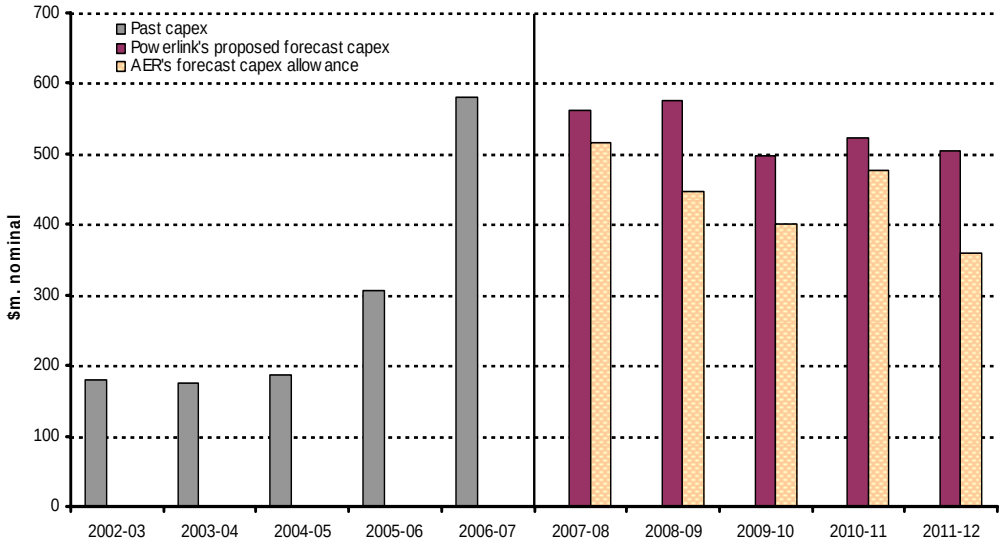
- PB assessed its recommended capex program as being achievable because of the actions taken by Powerlink. It noted that Powerlink's actions included: outsourcing of work; increasing its internal workforce, mitigating risks with easement acquisitions; staggering the commissioning dates of its capex program and Powerlink's demonstrated ability to meet project timetables. The AER notes that its amended forecast capex program is similar to that recommended by PB.

- Powerlink has implemented a number of initiatives aimed at increasing the capacity of the organisation to undertake its work program. Despite the tight labour market and significant infrastructure developments currently occurring in Queensland, these initiatives appear to provide Powerlink with the ability to deliver the increased capex. For example, as a result of these initiatives Powerlink has: increased staff numbers by 25 per cent between 2004 and 2006; increased the amount of substation design work from 40 per cent to 70 per cent; and established long-term contractual arrangements with construction contractors.

- A significant component of the increase between Powerlink's past and forecast capex appears to be the result of cost increases rather than increased work effort. As such, the forecast program does not require a 60 per cent increase in work effort.

[126] At the time of this draft decision, this figure is considered a best estimate. As part of finalising its decision, the AER requires Powerlink to provide an update on the forecast capex for 2006–07.

Figure 4.4 Comparison of actual past capex and forecast capex ($m, nominal)



Source: Past capex figures (as-incurred) provided by Powerlink.

4.7 AER's conclusion

The AER's conclusion on Powerlink's capex for the next regulatory period is an ex ante allowance of $2032 million ($2006–07) and contingent projects with a total indicative cost of $890 million. This compares with Powerlink's proposed ex ante allowance of $2449 milllion and contingent projects with a total indicative cost of $564 million.

It should be noted that probability weighted expenditures of $101 million have been removed by the AER from the ex ante allowance and the associated projects have been treated as contingent projects. The amended ex ante allowance results in an average annual capex allowance of $406 million, compared to Powerlink's average annual capex proposal of $490 million.

In reaching this conclusion, the AER considers that:

- Powerlink's governance arrangements, and capex policies and procedures are robust and will deliver efficient outcomes
- the probabilistic approach is a reasonable methodology for forecasting Powerlink's demand driven expenditure
- the demand forecasts provided by Powerlink can be relied upon in developing its forecast capex requirements
- Powerlink's planning criteria are reasonable, given its obligations to comply with the rules and its legislative obligations
- reductions should to be made to some load driven, replacement, security and compliance and non-network projects

- seven of Powerlink's proposed contingent projects together with projects associated with an industrial development in the Gladstone area should be treated as contingent projects. In addition, Powerlink's undergrounding costs should be treated as a contingent project category

- certain cost accumulation factors adopted by Powerlink to develop its capex proposal should be adjusted as they are not justified and/or inefficient

- Powerlink has the potential to be able to deliver the AER's amended forecast capex allowance.

Table 4.18 sets out the AER's conclusion on Powerlink's ex ante allowance for the next regulatory period. It shows Powerlink's proposed ex ante allowance and the adjustments made by the AER to arrive at its conclusion on an efficient forecast capex allowance. The total adjustment represents a reduction of $417 million over the period.

Table 4.18 AER's conclusion on Powerlink's ex ante allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's capex proposal	546.31	543.02	456.10	466.49	437.32	2449.24
Adjustments resulting from detailed project reviews[1]	–27.82	–74.89	–5.98	–2.36	–33.43	–144.45
Adjustment to replacement expenditure	–	–	–53.10	–31.40	–26.10	–110.60
Adjustment to undergrounding costs[2]	–5.47	–14.2	–13.46	–4.37	–49.38	–86.89
Transfer of M50++ to contingent projects[2]	–1.24	–13.53	–3.25	2.52	1.44	–14.05
Adjustments to cost accumulation factors	–9.66	–14.86	–11.76	–6.70	–18.11	–61.09
AER's total adjustments	–44.18	–117.48	–87.54	–42.30	–125.58	–417.07
AER's ex ante capex allowance	502.12	425.55	368.56	424.19	311.74	2032.16

[1] This includes adjustments made to load driven, security and compliance, and non-network projects.
[2] These adjustments involve the removal of probablility weighted expenidure from the ex ante allowance and the associated projects being treated ascontingent projects.

Table 4.19 sets out the AER's approved contingent projects for Powerlink.

Table 4.19 AER's approved contingent projects and indicative costs ($m)

Project name	Cost
QNI upgrade (QLD component)	100
Supply to Queensland Rail for rail link	70
Augmentation of supply to SEQ	50
Ebenezer 275/110kV substation	40
Nebo to Moranbah 275 kV DCST	90
Nudgee establishment and 275 kV Nudgee to Murrarie line	100
Desalination plant in SEQ	37
Gladstone major industrial development (M50++)	170
Undergrounding costs	233
Total indicative cost of contingent projects	890

5 Cost of capital

5.1 Introduction

This chapter provides an estimate of an efficient benchmark cost of capital or weighted average cost of capital (WACC) that Powerlink is likely to face when financing its transmission business during the next regulatory period. The key issues considered include: the WACC parameters specified in the rules; the determination of the debt margin; debt raising and refinancing costs; interest rate hedging costs; and equity raising costs.

5.2 Regulatory requirements

5.2.1 Rules requirements

Clause 11.6.12(d) of the Powerlink transitional provisions requires the AER to determine the WACC by reference to the values, methodologies and benchmarks prescribed in the new chapter 6A rules. Clause 6A.6.2 of the new rules provides for the determination of the WACC and is generally consistent with the approach contained in the *Statement of principles for the regulation of electricity transmission revenues* (SRP) except for the benchmark credit rating used to determine the cost of debt.

Sub-paragraph 6A.6.2(b) outlines that the appropriate expression of the rate of return for a TNSP under the post-tax nominal framework is the vanilla WACC:[127]

$$\text{WACC} = k_e\,(\text{E/V}) + k_d\,(\text{D/V})$$

where:

k_e = the required rate of return on equity or cost of equity

k_d = the required rate of return on debt or cost of debt

E = the market value of equity

D = the market value of debt

V = the market value of equity plus debt.

It also states that the return on equity is detemined by using the capital asset pricing model (CAPM):

$$k_e = r_f + \beta_e(r_m - r_f)$$

where:

k_e = the required rate of return on equity or cost of equity

[127] The tax liability of a TNSP is explicitly modelled by using the post-tax revenue model (PTRM).

r_f = the expected risk-free rate of return (usually based on government bond rates of an appropriate term)

$r_m - r_f$ = the expected market risk premium (MRP), which measures the return of the market as a whole less the risk-free rate for the same period

β_e = the systematic risk (equity beta) of the individual company's equity relative to the market.

5.3 Powerlink's application

Powerlink has used the AER's post-tax approach to setting the WACC expressed in nominal terms and has estimated a nominal vanilla WACC of 8.34 per cent. The key parameters underlying Powerlink's calculation of the WACC are summarised in table 5.1.

Table 5.1 Powerlink's WACC parameters

Parameter	Powerlink's proposal
Risk-free rate (nominal)	5.28 %
Expected inflation rate	2.91 %
Debt margin (adjusted)	1.10 %
Market risk premium	6.00 %
Gearing	60 %
Value of imputation credits	0.50
Equity beta	1.00
Nominal vanilla WACC	8.34 %

5.4 Submissions

The AER received submissions from the Energy Users Association of Australia (EUAA) and the Major Energy Users (MEU) on the following WACC parameters: risk-free rate; MRP; and equity beta. These are further outlined below in section 5.5.1.

The MEU and the EUAA noted that the AER must take care in not over rewarding service providers by granting them excessively generous WACC parameters.

The EUAA stated that the return on capital accounts for 62 per cent of Powerlink's annual revenue requirements during the next regulatory period. It considered that this provides strong incentives for ambit claims and exercise of strategic behaviour by regulated entities during regulatory reviews.

5.5 Issues and AER's considerations

5.5.1 The WACC parameters specified in the rules

Businesses are typically funded by equity and debt, therefore, there is a need to derive the weighted average cost of equity and debt. This is usually referred to as the WACC. The derivation of the WACC requires several parameters, which are discussed below.

Powerlink's application

Powerlink has estimated the return on equity using the CAPM and adopted the parameters specified in the SRP.

It noted that if the values of the specified parameters in the SRP are different from the new rules, which are expected to come into effect during the revenue reset process, the AER is to adopt the new values for the purposes of Powerlink's revenue cap decision.

Submissions

The EUAA stated that, given a five yearly regulatory cycle, it is more appropriate to base the estimation of the risk-free rate on five year government bonds rather than the 10-year government bonds because refinancing can be arranged to coincide with the regulatory cycle. However, the EUAA acknowledged that over the period January to April 2006 the difference between the five-year and 10-year bond yields has only been 3 basis points.

Both the MEU and EUAA considered that an MRP of 6 per cent is too high. They referred to some studies and the United Kingdom's regulatory practice to support their claims that the MRP should lie somewhere between 3.5 to 5 per cent.

The EUAA considered that the equity beta should be significantly less than one. It stated that an equity beta of one implies that TNSPs have the same risk as the market as a whole. EUAA believed that this is incongruous when 99 per cent of a TNSP's revenue is guaranteed.

The MEU also stated that the equity beta should be significantly less than one. It referred to advice obtained by the South Australian Government that an equity beta of no more than 0.8 is appropriate.

AER's considerations

The AER notes the issues raised by the MEU and EUAA in their submissions on the risk-free rate, market risk premium and equity beta. However, the new rules now prescribe the WACC parameters to be adopted by the AER for the purposes of setting a rate return for electricity transmission networks.

The new rules for determining the WACC are generally consistent with the approach contained in the SRP.[128] As clause 11.6.12(d) of the Powerlink transitional provisions

[128] The AEMC's new rules specify that the corporate debt margin be referenced to Standard and Poors' credit rating of 'BBB+' instead of an 'A' credit rating considered in the SRP. All things being equal, adopting a credit rating of 'BBB+' instead of 'A' will provide a higher estimate of the debt margin and consequently, the WACC would also be higher.

requires the AER to determine the WACC for Powerlink by reference to the specified values, methodologies and benchmarks contained in the new chapter 6A rules, the AER will therefore adopt the following benchmarks:

- risk-free rate: based on 10-year Commonwealth Government bond rates (nominal)
- MRP: a value of 6 per cent
- equity beta: a value of 1
- gamma: a value of 0.5
- gearing: a value of 60 per cent
- cost of debt: based on 10-year corporate debt margins (nominal) corresponding to a benchmark credit rating of 'BBB+'.

In deriving the WACC for a post-tax nominal framework, several other market based parameters including the risk-free rate, inflation rate, and debt margin, must be estimated. These parameters are further discussed, along with benchmark financing costs, in the following sections.

5.5.2 Estimate of the risk-free rate

The risk-free rate measures the return an investor would expect from an asset with zero volatility and zero default risk. The yield on long-term Commonwealth Government securities (bonds) is used as a proxy for the risk-free rate because the risk of government default on interest and debt repayments is considered to be low.

In the CAPM framework, all information used for deriving the rate of return should be as current as possible. While it may be theoretically correct to use the on-the-day rate as it represents the latest available information, it may also expose the TNSP to day-to-day volatility. For this reason, an averaging method is used to smooth out any volatility in the bond yields.

Powerlink's application

Powerlink has nominated an averaging period of 20 days for calculating the risk-free rate. Recognising that the AER will determine the applicable risk-free rate at the time of its decision, for the purposes of its application, Powerlink proposed a risk-free rate of 5.28 per cent based on 10-year government bonds ending on 24 February 2006.

AER's considerations

Under the new rules the TNSP nominates the time period to calculate the moving average of the bond rate. Consistent with the new rules, the AER accepts Powerlink's nomination of an averaging period of 20 days.

Before submitting its application, Powerlink requested to fix the date for determining the averaging period from 6 November to 1 December 2006 (20 days) to:

- ensure that there is alignment between Powerlink's regulated cost of debt and its actual cost of debt

- minimise the potential variability in interest costs during the current regulatory period.

The AER considered this request reasonable and agreed to fix the date, subject to there being no opportunity to revise the date following the lodgement of Powerlink's revenue reset application.

For this decision, the nominal 10-year bond rate and moving average of 20 days for Commonwealth Government bond rates as at 1 December 2006, results in a proxy risk-free rate of 5.68 per cent (effective annual compounding rate).[129]

5.5.3 Expected inflation rate

The expected inflation rate is not an explicit parameter in the WACC calculation when expressed in real terms, although it is used in the PTRM to forecast nominal allowed revenues. However, it is a component of the nominal risk-free rate (which has implications for the cost of both debt and equity) and can be estimated by:

- the difference between the nominal and inflation indexed Commonwealth Government bond yields, or

- the Commonwealth Treasury's inflation forecasts.

Regulatory practice has historically forecast the inflation rate as the difference in the nominal bond yield and inflation indexed bond yield, as determined using the Fisher equation.[130]

Powerlink's application

Powerlink proposed an inflation forecast of 2.91 per cent for the next regulatory period on the basis of the difference between the nominal bond yield and inflation indexed bond yield. Powerlink noted that this is consistent with the AER's approach to deriving forecast inflation.

AER's considerations

The AER considers that Powerlink's approach is consistent with current regulatory practice. For this draft decision, the AER forecasts inflation of 3.15 per cent per annum (based on the prevailing market bond rates).

5.5.4 Debt margin

Businesses issue debt to fund their operations. Including the weighted average cost of debt with the return on equity is referred to as the WACC. In theory, the cost of debt

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129 Source: Reserve Bank of Australia.

130 (1 + inflation rate) = (1 + nominal rate) ÷ (1 + real rate). The use of the 10-year and 20-day moving average for the inflation indexed bond rates as at 1December 2006 results in a real risk-free rate of 2.45 per cent (effective annual compounding rate).

estimation should be the expected return required by investors of debt securities. In practice, the yield to maturity is typically used even though this yield assumes no default and thus exceeds the expected return when there is default risk.[131]

A common approach by regulators, in estimating the required return for corporate debt, is to add a premium to the yield on an equivalent maturity risk-free security. Accordingly, the cost of debt is the debt margin plus the risk-free rate:

$$k_d = r_f + d_m$$

where:

k_d = the cost of debt

r_f = the risk-free rate of return

d_m = the debt margin.

The debt margin varies depending on the entity's gearing, credit rating and the term of the debt. Applying the cost of debt (as a percentage) to the RAB, using the assumed gearing, will generate the interest expense for regulatory purposes (also referred to as the cost of debt).

Powerlink's application

Powerlink has proposed a debt margin of 1.03 per cent based on a 10-year corporate bond with a benchmark 'A' credit rating.

Powerlink stated that a report by NERA for the Energy Networks Association indicates that the estimation methodology employed by CBASpectrum understates the yields (i.e. has a downward bias) on low-rated, long-dated bonds.[132]

Powerlink's proposed debt margin (estimated over 20 trading days to 24 February 2006) is an average of two estimates:

- debt margin of 0.82 per cent using CBASpectrum data plus an upwards adjustment of 0.25 per cent
- debt margin of 0.99 per cent using Bloomberg data.

Submissions

The EUAA stated that Powerlink's proposed debt margin is too high and should not be greater than 0.9 per cent.

The EUAA noted that Powerlink's proposed debt margin is higher than debt margins allowed in recent revenue cap decisions. It stated that since Powerlink's previous revenue cap decision, debt margins have been set at no more than one per cent. The

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131 Davis K, *Report on risk free interest rate and equity and debt beta determination in the WACC*, May 2003, p. 12.

132 NERA, *Critique of available estimates of the credit spread on corporate bonds, a report for the Energy Networks Association (ENA)*, May 2005.

EUAA considered that the credit ratings for other TNSPs are comparable to Powerlink and therefore there is no justification for Powerlink to be provided with a higher debt margin.

AER's considerations

In its March 2006 Directlink decision, the AER considered claims that the use of CBASpectrum data provides yields for low-rated, long-dated corporate bonds which are understated and that it is more appropriate to estimate the debt margin using Bloomberg data. To investigate those claims, the AER conducted a review which compared the estimated average daily fair yields for corporate bonds of various credit rating and maturity over the period of January–December 2005 from the Bloomberg and CBASpectrum databases. It was found that there were differences between the estimated average yields from both databases and they varied with the credit rating, term to maturity of the bond and timeframe over which the yields were averaged.

As part of the Directlink review process, the Allen Consulting Group (ACG), on behalf of the Directlink Joint Venturers, provided a submission to the AER. The ACG's submission stated that:

> … in terms of the accuracy of estimating individual bonds for a given ratings category in the market, the Bloomberg service tends to provide significantly closer estimates of actual bond yields …
>
> … the Bloomberg estimates should be applied when they provide a closer estimate of actual bond yields than do the CBASpectrum fair yields.[133]

As outlined in section 5.5.1, the AER will adopt a credit rating of 'BBB+' for the purposes of determining a benchmark debt margin for Powerlink. It has extended the review of the two databases by comparing more recent average daily fair yields over the period 1 June–31 August 2006 for bonds with 'BBB+' credit rating and maturity of up to 10 years.[134] Differences when comparing the average yields for actual bonds with the estimated average fair yields from the Bloomberg and CBASpectrum databases were again observed.

Bloomberg and CBASpectrum are both respected providers of financial information to the market. The AER's review, however, indicates that Bloomberg appears to provide estimates of 'BBB+' rated, long-term fair yields (debt margins) which are more consistent with the observed yields of similarly rated actual bonds. The AER has chosen to use Bloomberg data for determining the benchmark debt margin for Powerlink rather than to attempt adjusting the CBASpectrum data.

For this draft decision, the 20-day moving average benchmark debt margin over the government bond yields as at 1 December 2006, for 'BBB+' rated corporate bonds with a term of 10 years, is 1.14 per cent (effective annual compounding rate).[135] Combined

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133 ACG, *'A' rating debt margin differential between Bloomberg and CBASpectrum–memorandum*, 21 February 2006.

134 Bloomberg's 'BBB' fair yields are assumed to approximate 'BBB+' fair yields due to the estimation technique employed and the market being disproportionately weighted with longer term 'BBB+' rated bonds.

135 The 20-day moving average is consistent with that used for calculating the risk-free rate.

with the nominal risk-free rate of 5.68 per cent, it provides a nominal cost of debt of 6.82 per cent.

The AER notes the EUAA's concern that Powerlink's proposed debt margin is higher than previous revenue cap decisions. However, the AER is of the view that a debt margin allowance of 1.14 per cent is consistent with the current market environment and the requirement to reference a 'BBB+' credit rating.

5.5.5 Debt raising costs

To raise debt, a company has to pay debt financing costs or transaction costs over and above the debt margin. Such costs are likely to vary between each debt issue and depend on market conditions.

According to the ACG the debt raising cost being considered should be the transaction cost of re-financing fixed rate bonds to the value of the notional gearing component of the regulated firm's RAB. The allowed debt benchmark does not relate to:

- acquisitions by the regulated firm
- non-core construction or investment activities that are being undertaken.

Therefore, the transaction costs associated with the benchmark cost of debt should not relate to activities outside of the re-financing of bonds for the regulated firm's core activities.[136]

Powerlink's proposal

Powerlink has proposed an allowance of 12.5 basis points per annum to be applied to the notional debt component of its opening RAB based on previous regulatory decisions. This results in an amount of $3.3 million ($2006–07) per annum during the next regulatory period, which Powerlink has included in its opex proposal.

AER's considerations

The SRP provides for a benchmark allowance for debt raising costs that reflects current market costs. In the SRP the ACCC undertook to review debt and equity raising costs and subsequently commissioned to examine the issues. The ACG consultancy report concluded that debt raising costs are a legitimate expense that should be recovered through the revenues of the regulated entity.[137] The ACG based its benchmark on debt raising costs applicable to Australian international bond issues and joint Australian market/international issues and found that the benchmark decreases as the number of bond issues increase. In developing the benchmark, the ACG calculated a gross underwriting fee benchmark of 5.5 basis points per annum based on a 5-year term.[138] To this, it added allowances for legal and roadshow expenses; credit rating fees for the firm

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136 Allen Consulting Group, *Debt and equity raising transaction costs*: *final report to the ACCC*, December, 2004, p.5.

137 ibid., p. xiii.

138 Because a 10-year debt margin is the benchmark for calculating the WACC, consistency would require that debt raising costs should be also based on a 10 year term (i.e. refinance debt once every 10 years). However, ACG recommends its benchmark debt raising costs be based on a 5-year term as a conservative approach.

and for each issue of bonds; and registry and paying charges. The median bond issue size was determined to be $175 million.

In accordance with the ACG methodology, the AER has updated the gross underwriting fee and bond issue size benchmarks using current publicly available data. This has resulted in the gross underwriting fee increasing from 5.5 basis points per annum to 6.0 basis points per annum and the median bond issue size increasing from $175 million to $200 million. Table 5.3 shows the updated build up of debt raising costs and the total benchmark for different number of bond issues, based on the ACG's methodology.

Table 5.3 Benchmark debt raising costs for corporate bond issues

Fee	Explanation/Source	1 issue	2 issues	6 issues	11 issues
Amount raised	Multiples of median bond issue size	$200m	$400m	$1,200m	$2,200m
Gross underwriting fees	Bloomberg for Australian internal issues, term adjusted	6.0	6.0	6.0	6.0
Legal and roadshow	$75K–$100K: Industry sources	1.0	1.0	1.0	1.0
Company credit rating	$30K–$50K (once-off): S&P ratings	2.5	1.3	0.4	0.2
Issue credit rating	3.5 (2–5)bps up-front: S&P ratings	0.7	0.7	0.7	0.7
Registry fees	$3K per issue: Osborne Associates	0.2	0.2	0.2	0.2
Paying fees[1]	$1/$1m quarterly: Osborne Associates	0.0	0.0	0.0	0.0
Total	Basis points per annum	10.4	9.2	8.3	8.1

Source: ACG, *Debt and equity raising transaction costs*: *final report to the ACCC*, December, 2004.
[1] Rounded to one decimal place.

On the basis of the ACG methodology and the updated information, the AER considers it is appropriate to allow benchmark debt raising costs derived in accordance with table 5.3. Powerlink has an opening RAB of around $3781 million and the assumed benchmark gearing ratio is 60:40. The notional debt component of Powerlink's RAB is therefore around $2269 million.

As shown in table 5.3, this debt size would require about 11 bond issues. On this basis, the AER considers an allowance of 8.1 basis points per annum for debt raising costs is a reasonable benchmark for Powerlink. This benchmark is multiplied by the debt component of Powerlink's RAB to provide an average allowance of about $2 million per annum ($2006–07) and this amount is to be included in its opex during the next regulatory period (see section 6.6.12).

5.5.6 Debt refinancing (clearing spread) costs

Powerlink's application

Powerlink has proposed an allowance of 7.5 basis points per annum for its debt refinancing cost (clearing spread) in addition to the debt margin.

Powerlink stated that from a risk management perspective, it is prudent for a TNSP to refinance its existing debt portfolio over the same period in which 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. However, it stated that refinancing a significant amount of debt over a short period 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).

In support of its proposal, Powerlink has provided advice it obtained from Westpac on determining the additional margin required to issue debt in excess of an optimal sized deal for a particular credit rating. Westpac estimated that, based on its experience in managing bookbuilds, a clearing spread of 5 to 10 basis points per annum (i.e. the margin paid to clear the amount of debt sought) would be required to achieve a debt refinancing deal size applicable to Powerlink. Westpac considered that the optimal deal size is $500 million to $750 million, while Powerlink has indicated it plans to raise $1500 million in a single issue.

AER's considerations

The AER notes that Powerlink's proposed additional allowance of 7.5 basis points per annum for a clearing spread is in addition to its proposed debt margin of 103 basis points per annum.

Australian regulators have adopted benchmark assumptions about the financing structure of regulated entities when estimating the costs of debt and equity. The benefit of the benchmarking approach is that regulated entities have incentives to adopt more efficient financing arrangements, including the size of the bond issue. In particular, businesses retain the benefits from adopting more efficient arrangements than that assumed by the regulator and customers are protected if regulated entities act inefficiently.

The AER notes that the recommended benchmark allowance of 8.1 basis points per annum for debt raising costs, based on the ACG methodology, already includes a component for gross underwriting fees.[139] The ACG's report states that the fee structure of bonds is essentially the same with equity issues, which require underwriting and marketing to investors. The gross underwriting fees comprise management, selling and underwriting fees. The ACG stated that the underwriting fee represents a reward for risk taken by the underwriter. The underwriting would involve a book build to determine the market clearing price. If the issues were not sold or cleared, the underwriter would take it up and guarantee proceeds to the issues.

The AER therefore considers that the benchmark debt raising costs developed by the ACG includes an appropriate allowance for the cost associated with determining a market clearing price and is consistent with the AER's benchmark assumptions on financing arrangements. The ACG similarly states that given a model that uses benchmarks to derive the required returns:

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[139] ACG, op. cit., p. 52.

> … the principle of consistency suggests that any allowance for these transaction costs should be based upon a benchmark allowance rather than actual costs that may be incurred by the businesses.[140]

Accordingly, the AER considers that Powerlink's proposal for an additional allowance for a spread to clear its proposed debt issue is not consistent with the AER's benchmark approach. Powerlink's allowance for debt raising costs includes an appropriate amount for the cost associated with determining a market clearing price based on a benchmark debt issue. To provide an additional allowance for clearing spread would amount to a cost of service approach to regulation that is inconsistent with incentive based regulation.

5.5.7 Interest rate risk management (hedging) costs

Powerlink's application

Powerlink has stated that it faces a potential interest rate risk as it progressively borrows additional funds to undertake its capex program. It claims that if funds are drawn down at prevailing market rates as required to finance capex, there is a risk that the actual cost of debt achieved will exceed the cost of debt determined by the AER.

To manage the risk associated with a possible rise in the cost of borrowing, Powerlink is proposing to hedge expected future debt requirements at the start of the regulatory period by entering into forward rate agreements (FRAs). Powerlink stated that it will incur:

- an administration fee of 0.08 per cent per annum on the face value of the FRAs
- potential cost of hedging due to the 'normal' (i.e. positive) shape of the yield curve.

Table 5.4 shows the total hedging costs requested by Powerlink.

Table 5.4 Powerlink's proposed administration and hedging costs ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12
FRA administration costs	1.51	0.59	0.34	0.11	-
Hedging costs	0.07	0.29	0.62	0.98	0.47
Total hedging costs	1.58	0.88	0.96	1.09	0.47

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

AER's considerations

The AER considers that the interest rate risk that Powerlink may face is already factored in its equity beta and it would not be appropriate to provide an additional allowance for interest rate risk hedging costs. Allowing for such hedging costs would lead to the estimate of the cost of capital being overstated and not reflecting the risk adjusted cash flow rate of return required by investors in commercial businesses facing similar business risks to those faced by a TNSP. Therefore, the AER has not provided Powerlink with an additional allowance for interest rate risk hedging costs.

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[140] ACG, op. cit., p. 5.

The distinction between systematic risk (also known as market or non-diversifiable risk) and non-systematic risk (also known as specific or diversifiable risk) is a fundamental aspect of the CAPM. It assumes that investors are able to eliminate the effect of specific risks on any one asset by holding a well diversified portfolio of assets.

Consequently, the risks faced by the holder of a well diversified portfolio are those that are common to the market as a whole. Investors require a risk premium for bearing market risk. This risk premium is provided for in the equity beta parameter of the CAPM.

Interest rate risk is considered to be a market risk because interest rate changes affect the whole economy and it is commonly cited in corporate finance texts:

> Market risk stems from the fact that there are economy wide perils that threaten all businesses. For example, rising interest rates, recessions, major droughts, inflation …[141]

> Market risk refers to the unanticipated changes in project cash flows created by changes in interest rates, inflation rates and the economy that affect all projects and all firms …[142]

The AER notes that the issue of providing an allowance for hedging costs was considered in the Victorian Essential Services Commission's (ESC) 2001–2005 electricity distribution price review. The ESC did not allow an amount for hedging costs on the grounds that if the risk was diversifiable, then compensation was unnecessary, and if it was non-diversifiable then it would be reflected in the equity beta. The ESC's findings reflected the fact that hedging was not widespread and so the non-diversifiable component of the risk would be reflected in the equity beta. These findings were upheld by the appeal panel.

5.5.8 Equity raising costs

An entity pays equity raising costs when it raises new equity capital. For initial equity raising costs, the fundamental question is whether the RAB has already been determined. For utilities, costs for raising subsequent equity capital have generally been for acquisition activity outside the regulated business. The need for access to external equity funds would generally not be expected if the entity were financed in a manner consistent with the regulatory benchmarks.

Powerlink's application

Powerlink has proposed a benchmark allowance of 3.83 per cent for equity raising cost associated with:

- the opening RAB of the ACCC's 2001 decision on the basis that the valuation did not include equity raising costs. The ACCC determined the opening RAB by rolling forward the value established by the jurisdictional regulator. The jurisdictional valuation was determined using an optimised depreciated replacement cost (ODRC)

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141 Brealey R, Myers S, Partington G and Robinson D, *Principles of corporate finance*, 2000, p. 18.

142 Damodaran A, *Applied corporate finance–a user's manual*, 1999, p 42.

methodology.[143] Powerlink has estimated the allowance to be $1.5 million ($2006–07) per annum.

- actual capex of $1274 million for the current regulatory period. Powerlink has estimated the allowance to be $0.37 million ($2006–07) per annum.

- forecast capex of $2449 million for the next regulatory period. Powerlink has estimated the allowance to be $0.60 million ($2006–07) per annum.

In total, Powerlink is seeking an allowance for equity raising costs of $2.5 million ($2006–07) per annum.

AER's considerations

The 2004 consultancy undertaken by the ACG, on behalf of the ACCC, considered the legitimacy of regulated utilities recovering equity raising costs and the benchmark value for such costs.[144]

The ACG concluded the following:

- if the RAB for a regulated entity has already been established, it is not appropriate to include an allowance for the cost of raising equity.[145] The ACG considered that such costs would have already been included in the RAB.

- if the RAB has not been established and the initial RAB is to be valued using an ODRC methodology, a benchmark allowance for equity raising costs would appear to be appropriate.

- if new stand alone assets are built and a RAB is yet to be established, the opening regulated asset value should reflect all costs, including a benchmark allowance for the cost of raising the equity.

- for subsequent capex, it is not appropriate to include an allowance for the cost of raising equity unless a case can be made that equity would be raised, as long as the gearing level and assumptions about financing decisions (e.g. dividend payout ratio) are consistent with the regulatory benchmarks. The ACG found that firms finance subsequent capex in the least-cost manner. That is, financing is sourced from retained earnings when possible and that debt financing is preferred to equity financing (this relates to the 'pecking order theory' of capital structure).[146]

In previous regulatory decisions (SPI PowerNet in 2002, ElectraNet in 2002, GasNet in 2002), the ACCC provided a benchmark allowance for equity raising costs. In the GasNet final decision the ACCC recognised that there are different views in the validity

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143 The ODRC valuation was undertaken by Arthur Anderson, Gutteridge, Haskins and Davey, and Worley for the former Queensland Energy Reform Unit as at 1 July 1999.

144 ACG, op. cit., pp. ix-xii.

145 ibid, pp. xi-xii.

146 Brealey R, Myers S, Partington G, and Robinson D, *Principles of corporate finance*, 2000, p. 544.

of such as allowance.[147] More recently, in the Transend revenue cap decision, the ACCC did not provide an allowance for equity raising costs on the basis that the TNSP would be unlikely to incur such costs during its regulatory period.[148] The ACCC also did not provide an allowance for equity raising costs in its TransGrid revenue cap decision because the RAB was already established and would be rolled forward.[149] This decision was based on the ACCC's further consideration of this issue, in particular the conclusions of the ACG report. EnergyAustralia did not request an allowance for equity raising costs.

The AER provided a benchmark allowance for equity raising cost in its Directlink decision based on the ACG's conclusions, in particular that the RAB was being established for the first time.[150]

Allowance for equity raising costs associated with the 2001 RAB

Powerlink did not request an allowance for equity raising costs in relation to the opening RAB and capital expenditure in its 2001 revenue cap application. However, it is now seeking an allowance for these costs. In its 2001 revenue cap decision for Powerlink, the ACCC accepted the 1999 jurisdictional asset valuation and rolled it forward to determine the value of Powerlink's RAB as at 1 July 2001. This was in accordance with requirements set out in clause 6.2.3(d)(4)(iii) of the then National Electricity Code.

The SRP states that, rather than reopen the RAB, the AER's preferred approach is to 'lock-in' the RAB in order to provide greater certainty for investment. It was noted that if the AER was to consider revaluing the RAB, its preference would be to reopen the entire valuation and consider every element of the asset base. In its 2005 TransGrid decision the ACCC considered that for existing assets a roll forward of the jurisdictional asset base best satisfied the objectives of the National Electricity Code and would not deter investment compared with a re-opening of the asset base.

The AER considers that the lock-in approach remains appropriate and that caution should be exercised when contemplating the reopening of the RAB. In particular, there is potential for reopening decisions to create uncertainty for investors. The AER considers that once the RAB has been set it generally should only be rolled forward by adjusting for inflation, disposals, depreciation, and capex and should not be reopened. As Powerlink's RAB was already determined by the ACCC in its 2001 decision, there is no case to reopen the RAB to include an allowance for equity raising costs when Powerlink has already proposed to lock-in and roll forward its 2001 RAB. The ACG's conclusions also support this view. The ACG states that when the RAB for a regulated firm has already been established:

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147 ACCC, *GasNet Australia access arrangement revisions for the principal transmission system, final decision*, 13 November 2002, p. 149.

148 ACCC, *Tasmanian transmission network revenue cap 2004–2008/09, decision*, 10 December 2003, p. 72.

149 ACCC, *NSW and ACT transmission network revenue cap 2004–05 to 2008–09, decision*, 27 April 2005, p. 147.

150 AER, *Directlink Joint Venture application for conversion and revenue cap, draft decision*, 8 November 2005, p. 224.

> … it would be appropriate to preserve the starting value rather than reopening it – including to reopen it to reflect current views on the transaction costs of raising equity. [151]

The ACG concluded that when the RAB has already been established and has been used to determine revenues based on the building block approach, equity raising costs must be considered to be incorporated in the RAB.

Accordingly, the AER considers that it is not appropriate to provide Powerlink with an allowance for equity raising costs associated with its 2001 RAB.

Allowance for equity raising costs associated with capital expenditure

The ACG stated that external equity funding for an existing firm's capex would generally not be expected if the regulated entity financed in a way that is consistent with regulatory benchmark assumptions. External equity financing for subsequent capex should be considered only when a case is made that the retained earnings and additional borrowings are insufficient given the gearing ratio and assumptions about other financing decisions are consistent with regulatory benchmarks.

If Powerlink's retained earnings are not sufficient and external financing is required, the pecking order theory of capital structure states that firms choose debt over equity (Myers and Majluf, 1984). Furthermore, the pecking order theory states that equity will be issued only when the debt capacity of a firm has been exhausted and financial distress threatens. There is no evidence to suggest that Powerlink will face financial distress during the current and next regulatory periods.

The AER notes that Powerlink has historically used a mixture of debt and internal funds to finance its capital investment programs.[152] For example, in 2004–05 about 70 per cent of Powerlink's financing was provided from internally generated cash flows, with the remainder from new debt. A report by the Productivity Commission on the financial performance of government trading enterprises from 2000–01 to 2004–05 shows that Powerlink's actual gearing has ranged from 44 per cent to 47 per cent, which is well below the regulatory benchmark ratio of 60 per cent.[153] Also, for the same period, Powerlink has returned a substantial amount of dividends to its shareholder, with the payout ratio ranging from 79 per cent to 95 per cent.

Powerlink has questioned the validity of the pecking order theory, even though its recent financing behaviour demonstrates that it is using a mixture of debt and internal funds. It has quoted a study on the financial behaviour of publicly traded American firms that finds 'debt financing does not dominate equity financing'.[154] However, the AER queries the relevance of an American based study, noting that it may have limited application in Australia. Nonetheless, there are other studies, based on American firms, which support the pecking order theory (Shyam-Sunders and Myers, 1999; Cai and

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151 ACG, op. cit., p. ix.

152 Powerlink, *2004–05 Annual report*, p. 8.

153 Productivity Commission, *Financial performance of government trading enterprises 2000–01 to 2004–05*, July 2006, pp. 140-141.

154 Frank, M and Goyal, V, *Testing the pecking order theory of capital structure: journal of financial economics*, No. 67, 2003, pp. 217-248.

Ghosh, 2003). In the context of the Australian market, there are also studies that support the pecking order theory (Chiarella et al., 1991; Allen and Clissold, 1997).

Based on the material before it, the AER considers that it is not appropriate to provide an allowance for equity raising costs associated with Powerlink's capex.

5.5.9 Treatment of taxation

In its earlier regulatory decisions, the ACCC applied the statutory company tax rate of 30 per cent. This was done in the context of difficulties in determining an accurate long-term tax rate as part of the pre-tax real framework being used at the time. The capital intensive nature of electricity utilities, however, has historically meant that the effective tax rate for such networks has been less than the statutory tax rate.[155]

Powerlink's application

Powerlink has applied the standard statutory tax rate of 30 per cent and, using the PTRM, has modelled an effective tax rate of 20.55 per cent.

AER's considerations

The AER considers that a post-tax nominal framework that uses the effective tax rate can generate more appropriate and cost-reflective revenue outcomes. In its recent regulatory decision for Directlink, the AER applied an effective tax rate which was derived from the standard statutory tax rate. This is consistent with the ACCC's regulatory approach to the treatment of taxation in its previous revenue cap decisions. Powerlink's application has accepted the use of an effective tax rate.

The effective tax rate is defined as the difference between pre-tax and post-tax rates of return. It is sensitive to several factors, including the corporate tax rate and the range of available tax concessions that serve to lessen tax liabilities or defer them to a later period. This means that the tax liability expressed as a percentage of taxable income can differ from the corporate tax rate.

Based on this approach to modelling the effective tax rate, the AER has derived an effective tax rate of 20.22 per cent for this draft decision.

5.6 AER's conclusion

The AER has determined a nominal vanilla WACC of 8.76 per cent for Powerlink. The WACC is greater than that proposed by Powerlink, largely because of higher bond yields in the financial market since Powerlink submitted its revenue cap application. The parameter values adopted for this decision are shown in table 5.5. The AER will not update the WACC for the final decision because the averaging period for the bond rates was fixed and the other parameters are prescribed by the new rules.

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155 According to the Independent Pricing and Regulatory Tribunal's calculations, the average effective tax rate paid by the NSW distributors amounted to 25 per cent in 1996–97: IPART, *The rate of return of electricity distribution network—discussion paper*, November 1998, p. 9.

Table 5.5 Comparison of cost of capital parameters

Parameter	AER's conclusion	Powerlink's proposal
Nominal risk-free rate	5.68 %	5.28 %
Real risk-free rate	2.45 %	–
Expected inflation rate	3.15 %	2.91 %
Debt margin	1.14 %	1.10 %
Cost of debt	6.82 %	6.38 %
Market risk premium	6.00 %	6.00 %
Gearing	60 %	60 %
Value of imputation credits (gamma)	0.50	0.50
Equity beta	1.00	1.00
Nominal post-tax return on equity	11.68 %	–
Post-tax nominal WACC	7.01 %	–
Pre-tax real WACC	5.95 %	–
Nominal vanilla WACC	8.76 %	8.34 %

6 Operating and maintenance expenditure

6.1 Introduction

This chapter sets out the AER's conclusion on Powerlink's operating and maintenance (opex) allowance for the next regulatory period.

The key issues reviewed include:

- the efficiency of the base year
- cost drivers such as labour, maintenance materials, legislative requirements, and growth of the asset base
- network maintenance
- operational refurbishment
- network support expenditures.

6.2 Regulatory requirements

6.2.1 Rules requirements

The AER's task in assessing Powerlink's opex is outlined in the rules. In particular, part B of chapter 6 of the old rules requires that:

- in setting the revenue cap, the AER must take into account Powerlink's revenue requirements, having regard to the potential for efficiency gains in expected operating, maintenance and capital costs, and expected demand growth and service standards
- the regulatory regime must seek to achieve efficiency in the use of existing infrastructure, fosters efficient operating and maintenance practices, and an efficient level of investment.

6.2.2 Statement of regulatory principles

The SRP outlines an approach for setting an opex allowance with the following key features:

- the opex allowance for the regulatory period is established at the start of the period based on the AER's assessment of the transmission network service provider's (TNSP) proposal
- the opex allowance is reset taking into account the actual expenditure from the previous regulatory period and other information about likely future expenditure.

The AER provides an incentive to TNSPs to reduce opex by the following means:

- no claw-back of any differences between forecast and actual opex which arise during the regulatory period
- a carry forward mechanism.

Clause 6A.6.5 requires the AER to develop and publish an efficiency benefit sharing scheme that provides a fair sharing between TNSPs and network users. The Powerlink transitional provisions indicates that the efficiency benefit sharing scheme referred to in clause 6A.6.5 of the new rules will apply to Powerlink for the next regulatory period.

6.3 Powerlink's application

Powerlink groups its opex into three major components determined by the nature of their cost drivers:

- direct opex—costs directly attributable to maintaining and operating its network
- other controllable costs—costs that include planning, engineering and asset manager support, and corporate costs (including insurance)
- network support—costs associated with paying for non-network alternatives to network augmentations.

Powerlink categorised the first two of these as controllable operating costs, whereas network support costs are considered by it to be largely outside its control. Powerlink developed its forecast opex requirements by determining an efficient base year level of opex, then modelling the impact of future cost drivers and efficiency factors on each of the components of its base year opex. It then reviewed the resulting opex forecasts to assess their efficiency.

Historical opex trends

In the current regulatory period, Powerlink stated that the following trends have increased its controllable operating costs:

- increasing labour costs, driven by skills shortages in Queensland relative to southern states
- increasing costs of maintenance materials driven by increasing commodity prices
- increased legislative obligations (e.g. relating to safety and vegetation management)
- a larger network than was forecast at the start of the current regulatory period due to a higher than expected demand growth.

A comparison between the controllable opex allowed in the ACCC's 2001 decision and actual controllable opex outcomes is shown in table 6.1.

Table 6.1 Comparison of 2001 decision and actual controllable expenditure ($m, nominal)

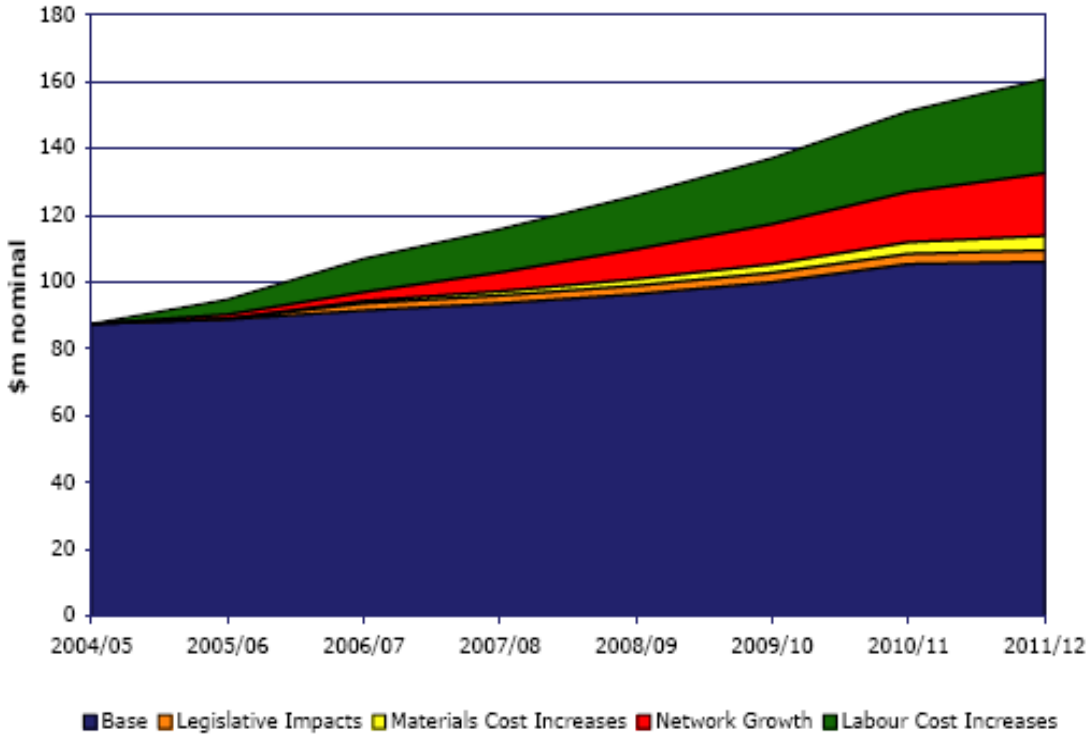
	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	Total
2001 allowed opex[1]	65.64	71.97	76.43	80.40	84.51	89.43	468.38
2001 allowed opex (CPI adjusted)	65.64	72.41	77.72	81.49	85.69[2]	90.84[2]	473.79
Actual	69.66	73.20	78.31	87.50	94.81[2]	107.01[2]	510.49
Difference	4.02	0.79	0.59	6.01	9.12	16.17	36.70

[1] 2001 allowed opex excludes network support and the QNI capex efficiency allowance.
[2] Forecast.

Forecast opex

Powerlink has forecast its opex requirements for the next regulatory period using 2004–05 as the base year. The key elements it used to forecast its opex requirements include work units, network growth, input costs and efficiency factors.[156] Figure 6.1 shows the impact of various drivers on Powerlink's opex. Powerlink's forecast opex is set out in table 6.2.

Figure 6.1 Impact of major cost drivers on Powerlink's opex



Source: Powerlink application, figure 7.7, p. 109.

[156] A work unit represents the cost to deliver 8 hours of productive work. It includes materials costs and direct and indirect overheads such as travel time and accommodation.

Table 6.2 Powerlink's opex proposal ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total	% of controllable opex	% of total opex
Network maintenance	64.32	69.07	73.65	78.29	83.51	368.84	58.1	46.8
Network operations	10.11	10.53	10.94	11.37	11.83	54.78	8.6	7.0
Asset manager support	25.00	25.78	27.37	30.96	29.35	138.46	21.2	17.6
Corporate support	8.74	9.01	9.27	9.54	9.83	46.40	7.3	5.9
Insurance	4.93	5.10	5.28	5.45	5.60	26.36	4.2	3.3
Total controllable opex	113.11	119.48	126.52	135.61	140.12	634.85	100.0	80.6
Capex efficiencies	7.70	7.70	7.70	7.70	7.70	38.50	–	4.9
Debt management costs	4.89	4.20	4.28	4.40	3.79	21.56	–	2.7
Equity raising costs	2.47	2.47	2.47	2.47	2.47	12.35	–	1.6
Network support[1]	24.03	17.34	22.15	8.22	8.30	80.04	–	10.2
Total opex	152.20	151.19	163.12	158.40	162.38	787.30	–	100.0

Note: The above data includes corrected corporate support costs and modelling errors resulting in a net increase of $3.4m in Powerlink's opex proposal for the next regulatory period.
[1] Powerlink's opex proposal includes the allowance for network support and a symmetric pass through mechanism for network support costs greater or less than the allowance in any given year.

6.4 Submissions

The EUAA and MEU noted that:

- Powerlink is a well managed and successful TNSP
- the opex claim is significantly higher than the actual average opex over the current regulatory period and needs to be carefully scrutinised
- firms in competitive markets have to seek efficiency and productivity gains and are not always able to pass through underlying cost increases.

The MEU requested further information about currency transactions, noting that Powerlink has successfully hedged in the past to minimise business risk. It also stated that the AER needs to apply a savings factor to Powerlink's opex claims to

acknowledge the opex efficiency savings that would be expected from a large capex program.

6.5 PB's review

The AER engaged PB to review Powerlink's opex proposal. The terms of reference required PB to determine an efficient starting opex for the next regulatory period. PB was also required to recommend an efficient level of forecast opex, taking into account historic opex levels, trends and benchmarks for key opex components. Powerlink's network support methodology and its proposed allowance was also reviewed. PB was not required to review Powerlink's debt management and equity raising cost proposals. These proposals are considered in chapter 5 of this draft decision.

PB has reviewed Powerlink's business model, maintenance policies and processes, and the data and assumptions underlying the opex forecasting model. It found that Powerlink was a relatively efficient TNSP, noting:

> … Powerlink's operational expenditure benchmarks well against its peer utilities. We consider that this is due to the use of RCM2 [Powerlink's reliability centred maintenance program] and whole of life cycle maintenance costing strategies together with the application of well managed and efficient SLAs [service level agreements] with its service providers.[157]

PB recommended adjustments to Powerlink's forecast opex in the following areas:

- labour and materials escalation factors
- vegetation management escalation factors
- operational refurbishment
- asset growth escalation factors, specifically condition based maintenance.

PB's recommended adjustments were applied to Powerlink's opex forecasting model to determine a revised expenditure requirement. Where PB's proposed changes could not be incorporated into Powerlink's opex model, a separate analysis was undertaken by PB to quantify the change in opex.

Powerlink's proposed controllable opex is $635 million. The total effect of PB's recommended adjustments is a reduction of $62 million ($2006–07) in controllable opex over the next regulatory period. PB's recommendations therefore result in a controllable opex allowance for Powerlink of $573 million ($2006–07). This reduction is largely associated with PB's recommendation to transfer $48 million of operational refurbishment costs from opex to capex. This issue is discussed in section 6.6.8.

PB's recommended opex adjustments result in an average annual controllable opex of $115 million. This compares to Powerlink's average annual controllable opex of $93 million during the current regulatory period.[158] PB's recommended forecast represents a 24 per cent increase per annum on Powerlink's average annual controllable opex over the current regulatory period.

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157 PB report, p. 142.

158 Estimated over 5 years to 2006–07.

Table 6.3 shows PB's recommended controllable opex allowance for Powerlink over the next regulatory period. PB's recommended opex increases from $105 million to $124 million over the next regulatory period ($2006–07). This compares to Powerlink's controllable opex proposal which increases from $113 million to $140 million.

Table 6.3 PB's recommended controllable opex allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's forecast controllable opex	113.11	119.49	126.54	135.64	140.16	634.94
Changes to labour, material and vegetation management costs	0.02	–0.23	–0.52	–1.81	–3.19	–5.74
Change to operational refurbishment costs	–7.30	–8.96	–10.42	–11.16	–10.52	–48.35
Changes to condition based maintenance	–0.54	–1.12	–1.62	–2.03	–2.53	–7.84
PB's recommended adjustments	–7.82	–10.31	–12.56	–15.00	–16.54	–61.93
PB's recommended controllable opex allowance	105.28	109.17	113.98	120.65	123.93	573.00

Note: Numbers may not add due to rounding.

6.6 Issues and AER's considerations

The AER has reviewed Powerlink's opex proposal in order to determine an efficient level of opex for the next regulatory period. This included reviewing Powerlink's opex model, cost drivers and expenditure line items.[159] No specific issues have been identified with network operations, asset manager support or corporate support either by the AER, PB or interested parties. The AER has not made any specific adjustments to these opex categories.

6.6.1 Efficient base year

Powerlink's opex forecasts were developed using a model which escalates base year costs in each of its opex categories until the end of the next regulatory period. In reviewing this approach it is important to ensure that Powerlink has forecast its opex from an efficient base level.

Powerlink's application

Powerlink has forecast its opex requirements for the next regulatory period using its actual opex outcomes in 2004–05 as the base year. This year was the latest year for which audited financial data was available at the time Powerlink was developing its revenue cap application. Table 6.4 shows Powerlink's opex for the proposed base year.

[159] The AER's analysis was based on corrected data for corporate support forecasts (an increase of $3.84 million ($2006–07)) and labour escalators (revised from 5.61 per cent down to 5.6 per cent for the years 2008–09 to 2011–12).

Table 6.4 Powerlink's actual opex for 2004–05 ($m, nominal)

Total opex	2004–05
ACCC revenue cap decision	80.40
ACCC revenue cap decision (CPI adjusted)	81.49
Powerlink's actual opex	87.50
Difference	6.01

Submissions

The EUAA agreed that Powerlink faces cost pressures but considers that cost increases must be addressed through productivity gains and improved efficiencies or through reduced returns. The MEU requested that a productivity or efficiency dividend be applied to Powerlink's opex.

PB's review

PB reviewed Powerlink's actual 2004–05 opex. This review included identifying any one-off items contained in the actual 2004–05 expenditures and ensuring they were not included in the opex used to derive forecasts. PB also used benchmarking to assist it in assessing the efficiency of the base year expenditures.

PB found that the difference between the opex allowance in the ACCC's 2001 decision and Powerlink's actual opex in 2004–05 was a result of:

- a one-off cost due to the introduction of the Powerlink's new enterprise bargaining agreement (EBA) ($3.4 million)
- the costs of preparing for this revenue reset ($0.64 million)
- small cost increases across other opex categories which were within normal forecasting ranges.

PB confirmed that costs relating to the EBA and revenue reset were not included in the base year cost data used by Powerlink to forecast controllable opex for the next regulatory period. PB also noted that information from both the International Transmission Operating and Maintenance Study (ITOMS) and the AER shows that Powerlink benchmarks well against other TNSPs when comparing opex to RAB ratios, even when operational refurbishment expenditures are included in Powerlink's opex.[160]

PB considered that the ITOMS benchmarking process was well developed and that the results from it are good indicators of performance and areas for potential improvement.

Overall, PB considered Powerlink's actual opex for 2004–05, after adjustment for one–off costs, to be efficient and an appropriate basis from which Powerlink's forecast opex can be projected.

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[160] The ITOMS is a consortium of international transmission companies that compare performance and practices and identify best transmission industry practices worldwide.
See http://www.umsgroup.com/ums_static/itoms.asp

AER's considerations

Powerlink has proposed using 2004–05 opex outcomes as the base for its opex projections because this was the most recent full year for which audited financial data was available at the time it developed its revenue cap application. The AER considers that the alternative of using more recent data, that has not been audited, increases the likelihood of inaccuracies being introduced to the opex forecasts for the next regulatory period. Therefore, Powerlink's proposal to use 2004–05 data as the basis for its opex forecasts is reasonable.

Powerlink stated that its relative efficiency is demonstrated by the ITOMS benchmarking study and opex comparisons published by the ACCC.[161] PB argued that although benchmarking is not a measure of absolute efficiency, it can be used as a reasonable indicator of Powerlink's relative efficiency. This is particularly so when different studies lead to the same conclusion. The AER considers that the ITOMS benchmarking study and the benchmarking information contained in its annual regulatory report provide support to Powerlink's claim to being an efficient TNSP.

PB has reviewed the ITOMS information for the AER, and has confirmed that the data presented has been normalised across the participating TNSPs, so that the scatter plots do compare like measures for the TNSPs. This information shows that Powerlink compares well against its international peers.

The AER recently published its first annual transmission regulatory report, which included opex comparisons for NEM based TNSPs.[162] Figures 6.2, 6.3 and 6.4 compare the opex ratios of six Australian TNSPs as published by the AER in its regulatory report. The figures support the claim that Powerlink is a relatively low cost operator in comparison to other TNSPs. Powerlink performs well when considering opex/line length measures (figure 6.2) and has the lowest opex/RAB ratio of the six Australian TNSPs shown (figure 6.3). Powerlink is around the mid point when comparing opex to peak demand (figure 6.4). This data might also indicate that other TNSPs are improving their efficiency levels relative to Powerlink.

Powerlink's opex data, as used in the AER's regulatory report, excludes network support payments, but includes its operational refurbishment expenditure. As discussed in section 6.8 of this draft decision, Powerlink's treatment of operational refurbishment expenditure is different to other TNSPs. It results in higher opex and lower capex for Powerlink compared with other TNSPs. However, if Powerlink's opex was adjusted to account for its different treatment of operation refurbishment expenditures, its opex would decrease, improving its position relative to other Australian TNSPs, for all the ratios shown.

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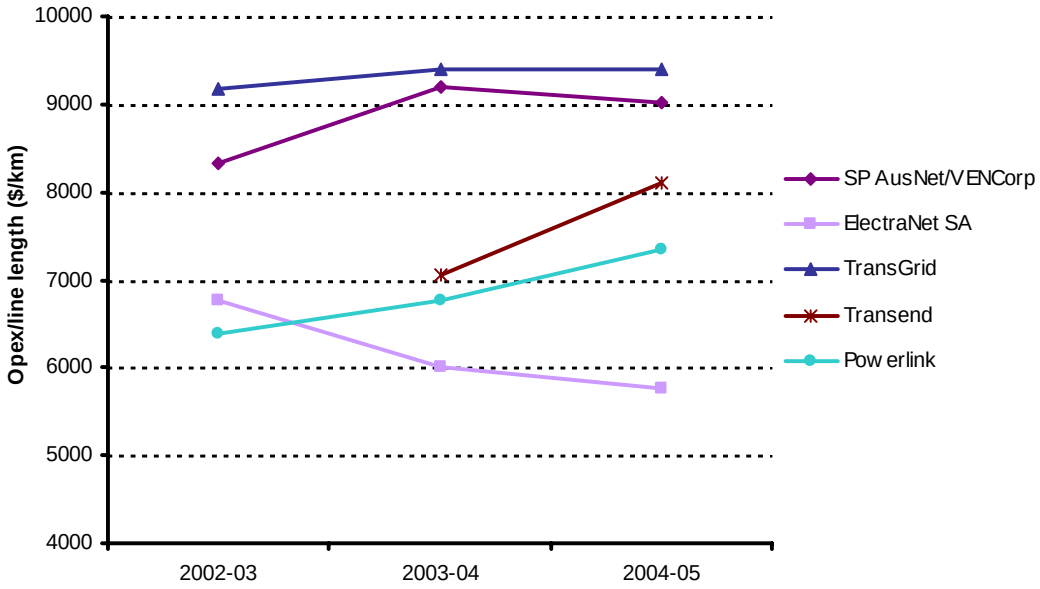
161 Powerlink application, p. 34.

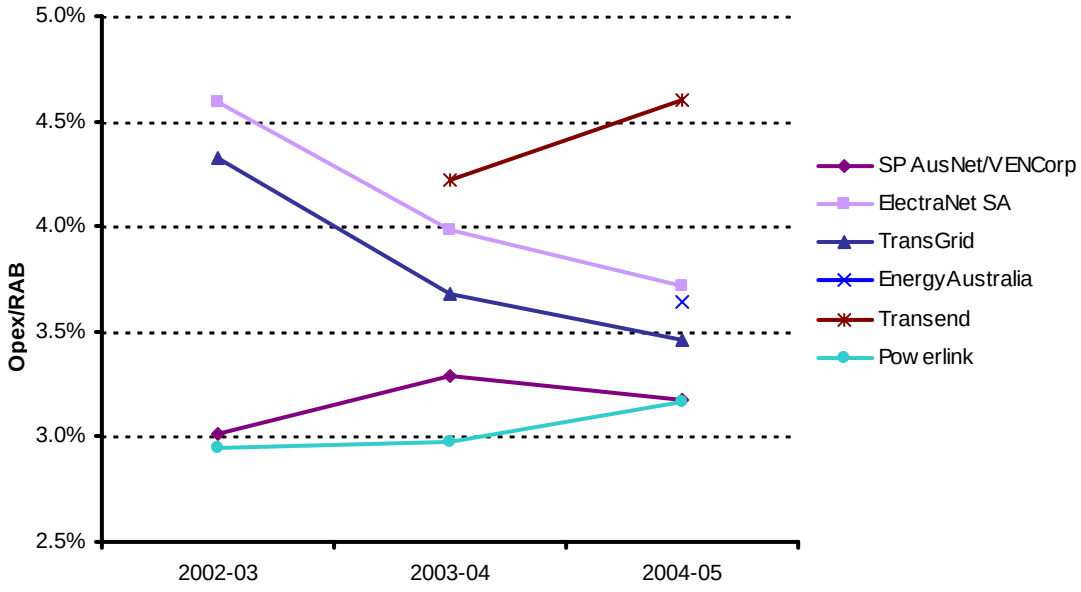
162 AER, *Transmission network service providers electricity regulatory report for 2004/05*, April 2006, pp. 53-57.

Figure 6.2 Actual opex/line length ratio



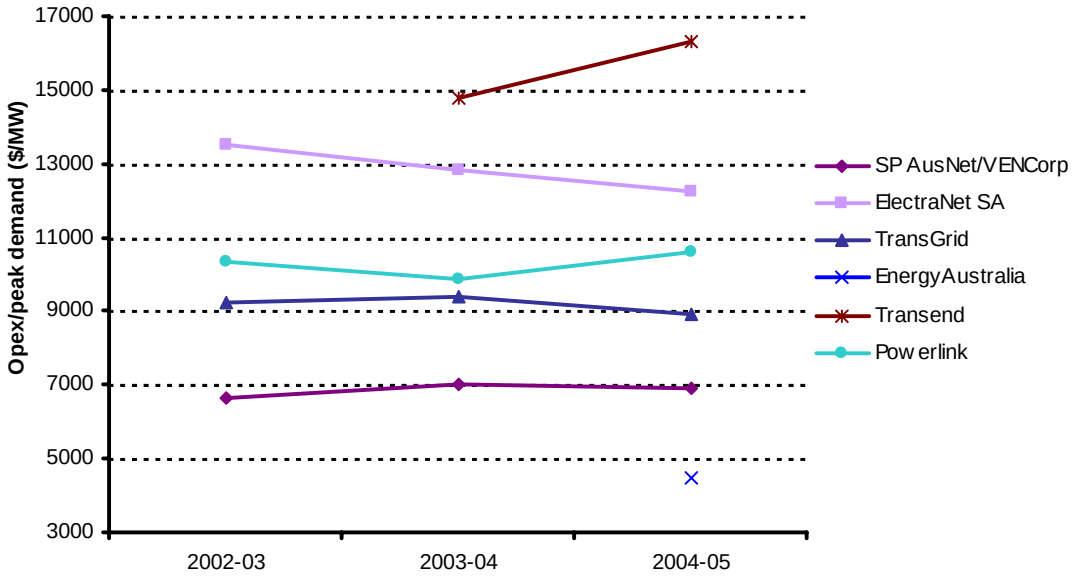
Note: Opex excludes network support. EnergyAustralia's ratio of $22115/km is not shown in the figure.

Figure 6.3 Actual opex/RAB ratio analysis



Note: Opex excludes network support.

Figure 6.4 Actual opex/MW demand peak



Note: Opex excludes network support.

The AER has compared Powerlink's actual opex in 2004–05 against the efficient amount forecast in the 2001 revenue cap decision. Powerlink's actual opex in 2004–05 is $6 million higher than the efficient forcast amount of $81.5 million.

PB confirmed that $4 million in one-off costs were removed from Powerlink's 2004–05 opex for forecasting purposes. The remaining $2 million of actual opex above the forecast level is included in the base year opex. This represents around 2 per cent of Powerlink's base year opex. PB noted that the cost increases that have influenced opex in the base year (except for the one-off costs already identified) are within normal forecasting accuracies.

Of the $2 million remaining in the base year, the AER considers that in view of PB having recommended such variation to be within normal forecasting inaccuracies, Powerlink's relative efficiency as demonstrated through benchmarking studies, and the immateriality of the amount, there is no basis for making a further adjustment to Powerlink's proposed base year opex. The opex of $83.5 million represents an efficient base year amount from which to forecast opex Powerlink's requirements for the next regulatory period.[163]

6.6.2 Cost drivers—labour

Powerlink's application

Powerlink stated that labour cost increases are a key driver of its forecast opex. The escalation factors that it has used for labour costs contain a step increase in the years 2005–06 to 2007–08 and increases of 5.6 per cent throughout the next regulatory period.

[163] $83.5m equals $87.5m less $4.0m, where $87.5m is Powerlink's actual opex 2004-05, and $4.0m is the one-off amounts excluded from the base year.

Table 6.5 shows Powerlink's proposed labour escalation factors for the next regulatory period.

Table 6.5 Powerlink's proposed labour cost escalation factors (%)

	2004–5	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Labour cost escalator	Base year	12.20	7.69	5.83	5.60	5.60	5.60	5.60

The step increases in 2005–06, 2006–07 and 2007–08 reflect Powerlink's current EBA with wage rises negotiated to achieve wage parity with NSW TNSPs. This is to retain its current work force and attract new staff given the strong demand for skilled workers in Queensland. From 2008-09 the labour cost escalation factors match the wage rises in the current EBAs of other TNSPs.

Retention

Powerlink claimed that it lost skilled workers to the mining industry and to NSW NSPs. Anecdotal evidence suggests that the mining industry is attracting skilled workers from the agricultural and engineering sectors, because it is offering both better pay and working conditions.[164]

Similarly, in southern Queensland in particular, skilled workers can consider working for NSW based network service providers, rather than for Powerlink, with minimal relocation requirements. However, other information suggests that as wages in Queensland achieve parity with the southern states more workers from other states may consider moving to Queensland.[165]

Powerlink obtains information on competition for its workers from departing employees and recruitment agencies. Its new EBA includes higher wage rates and other allowances. Powerlink stated these changes are a direct result of staff moving to the mining sector where the salary packages were more attractive.

Powerlink has provided information on staff turnover, showing an increase from 2 per cent to 3 per cent prior to 2003, to its current level of around 5 per cent. Powerlink indicates that the turnover rate has now stabilised, due mainly to the higher pay rates and improved conditions in its new EBA.

Submissions

The EUAA and MEU stated that firms in a competitive environment must make efficiency and productivity gains in the face of cost increases and hence labour cost increases should be absorbed by Powerlink.

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164 Courier Mail, Liliana Molina, *Farms face staff crisis— Cashed-up mines offer incentives*, 1 Jun 2006, p16
Courier Mail, Carmel Audsley, *Tapping into natural resources*, 31 May 2006, p. 13.

ABC On-line news, *Demand for mining workers set to soar*, 15 October 2006, http://www.abc.net.au/news/newsitems/200610/s1765163.htm.

165 Courier Mail, Edwina Cameron, *Workers under the hammer*, 22 Jul 2006, p. E96;
Media statement: Premier of Queensland, The Honourable Peter Beattie, *QLD the place for skilled workers to live work and play*, 7 August 2006.

PB's review

PB indicated that the market for experienced electricity workers will be very tight in the short-term and consequently it believed that above average wage rate increases will be negotiated for at least the next four to five years. However, PB stated that given the cyclical nature of labour markets it is unlikely that labour costs will increase by 5 per cent to 6 per cent compounding every year for the next seven years.

PB reviewed Australian Bureau of Statistics (ABS) and other data to determine a reasonable estimate of long–term wages growth. It noted that actuarial studies have applied long-term wage deflators of 3.75 per cent to 4 per cent, but Queensland full time adult workers' total earnings over the last 10 years have increased by 4.6 per cent.[166]

PB also noted that the electricity industry has responded to the current labour shortage by substantially increasing the recruitment of apprentices and other trainees, which should alleviate skills shortages once these trainees qualify and gain field experience. Therefore, PB recommended that Powerlink's proposed labour escalation factors of 5.83 per cent in 2007–08, 5.6 per cent for 2008–09 and 2009–10 are reasonable, but 4.6 per cent is appropriate for the final two years of the next regulatory period.

AER's considerations

The AER has considered PB's findings; information on the Queensland labour market; ABS data, Powerlink's training and development strategies, and electricity industry EBAs. This information has influenced the AER's opinion on appropriate labour escalation factors to be applied in forecasting Powerlink's opex over the next regulatory period.

Powerlink's workforce

Powerlink's workforce has increased by around 45 per cent between 2001–02 and 2005–06, from 499 full time equivalent (FTE) employees to 726 FTE employees.[167] PB notes that staff numbers are expected to grow by a further 30 per cent between 2007–08 and 2011–12, from 830 FTE employees to 1080 FTE employees.[168]

Queensland labour market

A significant amount of publicly available information confirms that there is a skills shortage in Queensland, particularly in the agricultural, engineering and mining sectors.[169] In addition, information from the Australian Government Department of Employment and Workplace Relations (DEWR) indicates that there is a state-wide shortage in engineering professions, electrical trades and construction trades.[170]

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166 PB report, p. 155.

167 Powerlink Queensland, *Annual reports*, Notes to the financial statements, 2002–03, 2003–04, 2004–05, 2005–06.

168 PB report, p. 118.

169 Courier Mail, Liliana Molina, *Farms face staff crisis—Cashed-up mines offer incentives*, 1 June 2006, p. 16. Courier Mail, Carmel Audsley, *Tapping into natural resources*, 31 May 2006, p. 13.

170 http://www.workplace.gov.au/NR/rdonlyres/BF83E4CC-1E8F-4630-95C7-D9F3A6108A9A/0/SkillsinDemandMarch2006.pdf

The Queensland government has been highlighting and attempting to address skilled labour shortages in Queensland for at least the past five years. For example, in February 2000 the Queensland government announced a $10 million program to increase skills, particularly in the building and construction, electrical and electronics, information technology, and tourism and hospitality industries.[171]

The AER understands that the high demand for skilled labour in Queensland is reflected across the country, and most network service providers have, or are in the process of, developing strategies to deal with the shortage. For example, ETSA Utilities recently provided an outline of its recruitment and retention policies aimed at addressing the skilled labour shortages they face between now and 2010.[172] The Somerville Report notes these issues also apply to electricity distribution companies in Queensland.[173] The report recommended that the Queensland distribution companies take immediate steps to implement better training arrangements, particularly for their electrical tradesmen, and formulate resource strategies with a five to 10 year focus.

Wages growth

PB noted that ABS data on average weekly earnings (AWE) shows the average compound increase for Queensland full-time adult workers' total earnings is 4.6 per cent over the decade to February 2006.

Access Economics also provides forecasts of wages growth.[174] The AER commissioned Access Economics to provide advice on wage growth forecasts for the utilities sector in Queensland, and other Australian States and Territories. To develop its forecasts, Access Economics took into account inflation, productivity and other cyclical factors that impact on wages. Access Economics stated that it expects the impact of skills shortages in the utilities industry to decline across the next three years.[175] The forecasts for wages growth in Queensland are shown in table 6.6. The Access Economics report is available on the AER's web site.

Table 6.6 Wages forecast growth for QLD utilities sector, 2006–07 to 2011–12 (%)

	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Wages growth	5.60	5.80	5.30	3.50	3.50	4.00

Training and development

Powerlink participates in a Queensland electricity transmission and distribution initiative that allocates eight bursaries to students at Queensland's universities. It also has a development scheme to provide training and development opportunities for

171 Department of Employment, Training and industrial relations, The Honourable Paul Braddy, *$10 million program to upskill Queensland workers*, 10 February 2000.

172 Jeff Bament, ETSA Utilities, *Non recruiting strategies for skilled labour shortages*, Queensland Power Conference, October 2005.

173 *Report of the independent panel for electricity distribution and service delivery for the 21st century*, 19 July 2004.

174 Access Economics is an economic and advisory consultant that uses modelling to forecast economic variables for the economy generally and for specific consultancies. See http://www.accesseconomics.com.au

175 Access Economics, *Wage growth forecasts in the utilities sector*, 17 November 2006, p. 6.

graduate engineers. Powerlink has other development schemes with 41 trainees across engineering, information technology and administration areas.

The Queensland Government has also recently announced a further policy to reduce skills shortages, with a proposal to increase the number of training places available over the next five years.[176]

Appropriate labour cost escalators

The AER is aware that the current resources boom, and associated public and private infrastructure projects, is driving the demand for skilled labour in Queensland. Measures are in place to address the current skills shortage in Queensland. These measures should ease the skills shortage over the next three to five years, as apprentices become sufficiently experienced to undertake unsupervised work, and new training positions are taken up. Further, many firms in Queensland, including Powerlink are considering recruiting from overseas. Coupled with this is the expected downturn in the resources boom, increasing the likelihood of the skills shortage improving.

Powerlink's proposed labour escalators for 2005–06, 2006–07 and 2007–08 reflect its current EBA where the wage rises aim to achieve wage parity with NSW TNSPs. The AER accepts that this is necessary in the short term in order for Powerlink to retain its current work force and attract new staff given the strong demand for skilled workers in Queensland.

However, given that the skills shortage should ease, and that parity with NSW TNSPs will be achieved over the life of the current EBA, Powerlink's claim of 5.6 per cent labour escalation factor in the final four years of the next regulatory period seems high. This view is supported by PB, who recommended reducing the labour escalation factor from 5.6 per cent to 4.6 per cent in the final two years of the next regulatory period, and by Access Economics whose wages growth forecasts reduce significantly across the next regulatory period.

The AER recognises that Powerlink is facing a skills shortage currently and will probably do so for the next few years. However, Powerlink's proposed labour force escalator does not appear to reflect likely changes in skilled labour supply, due to both supply side initiatives such as training and recruitment strategies, and demand side responses to increased wages.

The AER has therefore decided to apply the wage growth forecasts from Access Economics for the period 2008–09 to 2011–12 as the appropriate labour cost escalator in determining an efficient opex allowance. The forecast prepared by Access Economics highlights a strong correlation between wage outcome and expected labour force productivity.

A comparison of Powerlink's, PB's and the AER's proposed labour cost escalators are provided in table 6.7.

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176 Joint Statement: Premier of Queensland, The Honourable Peter Beattie and Minister for Employment, Training and Industrial Relations and Minister for Sport, The Honourable Tom Barton, *Billion dollar investment in Queensland skills blueprint*, 8 March 2006.

Table 6.7 Labour cost escalators (%)

	2004–5	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink	Base year	12.20	7.69	5.83	5.60	5.60	5.60	5.60
PB	Base year	12.20	7.69	5.83	5.60	5.60	4.60	4.60
AER	Base year	12.20	7.69	5.83	5.30	3.50	3.50	4.00

6.6.3 Cost drivers—maintenance materials

Powerlink's application

Powerlink has applied a cost escalation factor of 4 per cent per annum to forecast the cost of its maintenance materials for the remainder of the current regulatory period and throughout the next regulatory period. It pointed to major cost increases in materials such as steel, copper, aluminium and zinc and stated that aluminium is a major component of transmission line conductors and steel is used in towers and poles as well as substation structures.

Powerlink also stated one of its major equipment suppliers has forecast electrical equipment prices to increase by between one and 10 per cent for the foreseeable future due to input cost increases.[177]

Submissions

The MEU noted that Powerlink could use hedging to control its exposure to fluctuations in materials costs.

PB's review

PB stated that it is common for network service providers to model material costs to increase in line with inflation, refering to recent examples of ETSA Utilities and EnergyAustralia. However, it noted that Powerlink has proposed a maintenance materials escalation factor of 4 per cent per annum to forecast its controllable opex requirement. PB stated that Powerlink has not attempted to determine its weighted average material annual cost increase and that 4 per cent appeared to be its high level best estimate. PB also noted that the maintenance materials cost escalator that Powerlink has used to forecast its controllable opex is not consistent with the materials cost escalator it has used to develop its capex forecast (that is the Consumer Price Index).

PB observed that volatility in raw material prices is driving the recent volatility in the price of electrical equipment. It considered that this volatility may indicate that prices are at or near the maximum for the current cycle and that this was supported by the fact that forward prices for metals, particularly copper, now indicate sharp declines from their recent highs. PB also indicated that the Australian Government's current budget incorporates an assumption that commodity prices will fall significantly in the next two to three years.[178]

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177 Powerlink application, p. 77.

178 PB report, p. 157.

On balance, PB considered that by the start of the next regulatory period, current high prices for both base materials and manufactured equipment could well have dropped back to more historical levels and that future price increases would more likely increase in line with the CPI. PB noted that this view also captures the current high material prices to the extent that they are reflected in the base year (2004–05) opex costs. This would also align the maintenance materials escalator with the materials escalator that Powerlink has used to develop its capex forecasts.

PB recommended that Powerlink's maintenance materials be escalated at CPI in Powerlink's opex forecasting model for the next regulatory period and the final years of the current regulatory period. PB estimates the impact of this recommendation to be a reduction of $3.2 million to Powerlink's controllable opex.

AER's considerations

Powerlink has identified increasing materials costs as one of the key challenges it faces. Information on base metal prices shows that materials costs, including aluminium and steel costs, are affecting many industries.[179] Powerlink stated that substantial cost increases in construction and maintenance materials such as steel, aluminium, zinc and copper are occurring. It also stated that it expects cost increases for materials to persist throughout the next regulatory period.

The AER's analysis of base metal prices confirms significant price increases in the latter years of the current regulatory period.[180] However, according to the Australian Bureau of Agricultural and Resource Economics (ABARE) there is considerable evidence to suggest that base metal prices will ease in the medium term as stock levels rise to meet the current high demand.[181] This trend has occurred historically and it is reasonable to assume that the same trend will occur over Powerlink's next regulatory period. Similarly, the International Monetary Fund (IMF) noted that price increases for base metals have largely been driven by strong demand as well as supply bottlenecks. However, metals prices are expected to come down over the medium term as new production comes on stream to meet rising demand.[182]

Table 6.8 shows the medium term outlook for aluminium, copper and zinc prices. These metals are key components of the plant and equipment used by Powerlink. In all three cases, increasing stock levels and a consequent reduction in prices are forecast during the next regulatory period.

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179 David Uren & Andrew Trounson, *Reserve on Rates Alert as Costs Rise*, The Australian, 25 July 2006.

180 London Metals Exchange. See http://www.lme.co.uk

181 ABARE, *Australian commodities, Vol.13, No. 1*, March Quarter 2006.

182 IMF, *World economic outlook—financial systems and economic outlook*, September 2006.

Table 6.8 Medium term outlook for aluminium, copper and zinc ($US/tonne, nominal)

	2004	2005	2006	2007	2008	2009	2010	2011
Aluminium	1716	1898	2094	1945	1851	1790	1713	1630
Copper	2866	3678	4719	3717	2950	2550	2700	2800
Zinc	1047	1380	1863	1768	1630	1355	1260	1143

Source: ABARE, *Australian commodities, Vol. 13, No. 1, March quarter*, pp. 145, 151, 157.

Based on historical trends, projections from ABARE and other respected sources such as the IMF, it is reasonable to assume that in the medium term, the cost of raw materials will fall from their current high levels.

The MEU requested information on Powerlink's hedging arrangements, which can be used to reduce exposure to higher materials prices. The AER considers hedging to be an internal management issue for Powerlink. Placing forward orders for materials or entering into hedge contracts may or may not produce savings for Powerlink. That said PB noted that Powerlink is a member of the Asia Pacific Utilities Group (APUG), an organisation that aims to deliver cost savings to its members through collaboration on supply chain processes, such as accreditation of suppliers and consolidation of emergency equipment supplies. Participation in APUG can result in savings of around 10–15 per cent for equipment purchases.[183] Membership of APUG should help Powerlink to continue to achieve efficiencies in its materials costs.

Powerlink's application does not use the same escalation values for materials in the opex and capex forecasts. Powerlink has assumed that maintenance materials (opex) will escalate by a factor of 4 per cent per annum for the next regulatory period while construction materials (capex) will escalate by CPI.[184] Powerlink has not provided any supporting information to justify this inconsistency.

PB recommended that the escalation values for materials used for opex forecasts be adjusted so that they are consistent with those used for capex forecasts, stating that CPI is a more usual escalator used by network service providers.[185]

The AER considers that it is appropriate to apply an escalation factor to maintenance materials of CPI. This reflects the projected decline in base metal prices and maintains consistency with the capex materials escalator. The escalation of maintenance materials by CPI is also considered to be less arbitrary than the escalation factor of 4 per cent proposed by Powerlink. Table 6.9 shows the revised materials cost escalators.

183 Asia Pacific Utilities Group, *Fact sheet*, www.apug.com.

184 CPI is assumed to be 2.91 per cent per annum.

185 PB Report, p 156

Table 6.9 Maintenance materials cost driver (%)

	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink	Base year	4.00	4.00	4.00	4.00	4.00	4.00	4.00
PB	Base year	2.90	2.70	2.91	2.91	2.91	2.91	2.91
AER	Base year	2.90	2.70	2.91	2.91	2.91	2.91	2.91

6.6.4 Cost drivers—new workplace health and safety requirements

Powerlink's application

Powerlink has proposed an increase in controllable opex of around $10 million over the next regulatory period due to amendments to the *Workplace Health and Safety Act 1995* (Act), *Workplace Health and Safety Regulation 1997* and the *Electrical Safety Act 2002 (Qld)*. It stated that the primary change has been to the definition of construction work to incorporate all repairs, refurbishment and augmentation works. This type of work was not previously covered under the legislation.

The changes have resulted in both one-off and ongoing costs for Powerlink. The one-off costs amount to less than $0.2 million in 2006–07 for Powerlink to conduct a workplace health and safety (WH&S) and electrical safety management system review to ensure compliance with the amendments and that it has appropriate procedures.

Ongoing costs identified by Powerlink included construction levies payable per project, training, auditing and operational requirements, equipment safety checks and costs relating to revised climbing methodologies. The most significant are for new climbing methods and fall prevention requirements, which Powerlink has estimated will cost $0.9 million per annum.

PB's review

PB reviewed the proposed costs associated with changes to work practices and found them to be reasonable and noted that:

- the major effect of the amendments was to broaden the definition of construction work
- one-off costs of $0.2 million in 2006–07 were not included in the forecast for the next regulatory period
- ongoing maintenance cost projections are affected by proposed labour and materials escalations.

AER's considerations

The AER is satisfied with PB's assessment of cost increases due to changes to workplace health and safety legislation and that Powerlink's forecast costs are reasonable and consistent with the changes resulting from the amendments.

It also notes that the forecast cost increases only relate to additional workplace health and electrical safety obligations, rather than existing obligations, and that one-off costs have not been used to develop opex forecasts.

6.6.5 Cost drivers—vegetation management

Powerlink's application

Powerlink claimed that amendments to the *Vegetation Management Act 1999(Qld)*, *Vegetation Management and Other Legislation Amendment Act 2004 (Qld)* (the amended VMA) and the *Electrical Safety Act 2002 (Qld)* have established more onerous vegetation control practices that result in higher opex requirements.

Powerlink claimed that the new vegetation management requirements are more labour intensive and have increased the amount of work effort required to maintain easements.[186] Costs resulting from the amended VMA include: increased supervisory costs associated with endangered species identification; increased cycle times (that is, more frequent maintenance); selective pruning requirements; and increased easement access costs. Powerlink also claimed that the changes have resulted in an increase in the number of required field and management staff.

Amendments to the *Electrical Safety Act 2002 (Qld)* include changes to minimum approach distances for a live conductors from 4.5 metres to 6 metres and that only trained linespeople can trim trees that encroach within 6 metres of the line.

To account for increasing vegetation management work effort over the next regulatory period Powerlink has forecast vegetation management costs to increase at a compounding rate of 6 per cent per annum between 2005–06 and 2011–2012. Powerlink has then applied an efficiency discount of 3.5 per cent. This results in a net increase of 2.5 per cent per annum over the regulatory period. These cost increases are in addition to the effect of network growth, and labour and material cost increases on vegetation management costs.

PB's review

PB found that about 20 per cent of Powerlink's easements were affected by the amended VMA. It noted that during the initial implementation of the amended VMA vegetation management costs would be higher. However, these costs should reduce over time as:

- unsuitable trees are removed, reducing overall growth rates
- vegetation managers gain experience
- offsetting cost savings, such as reduced vegetation removal, are obtained.

PB stated that the total cost of the new requirements would not be fully understood until additional experience was obtained.

PB confirmed that changes to the *Electrical Safety Act 2002* increased trimming frequencies and the work effort to maintain the required 6 metre clearances from live conductors.

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[186] Powerlink claimed that the changes have increased the number of person hours per hectare from approximately 3 to 10 person hours per hectare.

PB did not agree that vegetation management costs would compound at 2.5 per cent per annum over the next regulatory period. It considered that a more probable outcome would be for the work to compound, possibly at a higher level than 2.5 per cent for three years from the 2004–05 base year and then for the required work effort to remain relatively constant for the remainder of the next regulatory period.

PB therefore recommended that the work effort associated with vegetation management be increased by 6 per cent in 2005–06, 4 per cent in 2006–07, 2 per cent in 2007–08 and one per cent per annum thereafter for the remainder of the next regulatory period. It considered that this would capture the significant increases in work effort resulting from the introduction of the amended VMA as well as recognising that this effort will not continue to increase at the same rate over time.

PB estimated that its recommendation would reduce Powerlink's proposed controllable opex by $2.3 million during the next regulatory period.

AER's considerations

The AER has assessed Powerlink's claims regarding the new vegetation management requirements. These changes include the phasing out the use of broad scale clearing of remnant or native vegetation in Queensland by December 2006.[187] As noted by PB these changes are expected to have a direct impact on Powerlink's vegetation management activities on those easements covered by the amended VMA in the short term. However the AER agrees with PB that long term efficiencies are likely to be achieved with appropriate species management and specialised pruning.

The AER also notes that changes to the *Electrical Safety Act 2002 (Qld)* have implications for Powerlink's vegetation management program.[188] However, the effect of these changes is likely to be minor if managed as part of a comprehensive program including appropriate management of cycle times to prevent vegetation encroachments.

The AER will adopt the escalation rates for vegetation management costs proposed by PB as shown in table 6.10.

Table 6.10 Vegetation management cost escalators (%)

	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink	2.5	2.5	2.5	2.5	2.5	2.5	2.5
PB	6.0	4.0	2.0	1.0	1.0	1.0	1.0
AER	6.0	4.0	2.0	1.0	1.0	1.0	1.0

187 Under the amended VMA the clearing of native vegetation on freehold land, leasehold land and other state lands now requires a development approval or permit from the Queensland Department of Natural Resources, Mines and Water. As an electricity transmission entity Powerlink is able to obtain exemptions for specified activities that can be carried out without the need for an approval or permit.

188 Section 64, *Electrical Safety Regulation 2002 (Qld)*.

6.6.6 Cost drivers—asset growth

Powerlink's application

Powerlink forecasts that its RAB will increase by approximately 46 per cent by the end of the next regulatory period.[189] In its opex forecasting model Powerlink has escalated its 2004–05 year opex to account for the growth in its RAB over the next regulatory period. This is because a larger network requires greater opex to operate and maintain.

While Powerlink has accounted for asset growth in its opex model, it has acknowledged that this will not always result in a one-for-one increase in opex. This is due to the existence of economies of scale, which allow Powerlink to obtain efficiencies resulting from a larger network. Powerlink has therefore applied economies of scale factors (scale factors) which reduce the underlying growth in the RAB by the factors shown in table 6.11. The scale factors are based on Powerlink's judgement.

Table 6.11 Powerlink's proposed scale factors for asset growth (%)

Activity	Scale factor	Rationale
Field maintenance	95	There is almost a one-for-one increase in maintenance effort but some efficiencies should be achievable.
Maintenance support	25	Significant economies of scale is possible through efficient management of this activity.
Direct costs	100	This covers expenditure such as land rates, where no efficiencies are possible.
Operations	25	Significant economies of scale is possible through efficient management of this activity.
Asset management support	10	Substantial economies of scale is available and recognised.
Corporate support	10	Substantial economies of scale is available and recognised.
Insurance	–	Not applicable as insurance costs are based on a broker estimate.

Submissions

The MEU has requested that a savings factor be applied to Powerlink's opex claim to acknowledge the opex savings that should arise from the large capex program.

PB's review

PB reviewed Powerlink's asset growth scale factors to see how they could affect future operating costs. While acknowledging that the factors are based on judgement, PB agreed with the factors proposed by Powerlink, apart from the field maintenance factor.

PB did not agree with Powerlink's proposal to apply a scale factor of 95 per cent to all forms of field maintenance. While it was considered that this scale factor should be applied to routine, emergency and routine/deferred maintenance, PB did not agree that this factor should be applied to condition based maintenance expenditure for the duration of the next regulatory period.

[189] Powerlink application, table 10.4, p. 124.

PB therefore recommended that condition based maintenance expenditures should not be adjusted for asset growth and base year costs should be held constant over the regulatory period. PB accepted that all other categories of field maintenance should be increased by a factor of 95 per cent of asset growth to reflect the almost direct relationship between maintenance effort and asset base size.

PB considered that Powerlink's opex model addressed the opex/capex trade-off issue. The model reduces the forecast total annual growth in asset value by the average portion related to the replacement of existing assets, before it applies the asset growth escalation factors to establish forecast costs. While asset growth is a key driver of opex forecasts, the driver only refers to new assets being commissioned and not total capital expenditure. The revised data then has scale factors applied, in order to derive opex forecasts.

Powerlink predicted the percentage reduction for each asset category related to asset replacement by costing each job in their projected five-year asset replacement plan. PB considered that this approach ensures that only additional assets are accounted for when applying the scale factors, shown in table 6.11, to establish opex forecasts for the next regulatory period.

AER's considerations

Scale factors

Based on advice from PB, the AER considers Powerlink's proposed asset growth scale factors are generally reasonable for forecasting the opex requirements for the next regulatory period. However, the AER accepts PB's recommendation that condition based maintenance category should not be escalated by the growth in the asset base, but rather be held constant over the next regulatory period. This is based on PB's advice that new assets should not require conditioned based maintenance for at least five years from the date they are commissioned.

Capex/opex trade-off

The MEU argued that the large increase in Powerlink's capex should result in significant opex savings. Powerlink has addressed this issue in its opex modelling by reducing the total annual growth in asset value by its forecast asset replacement expenditure. Powerlink then applied asset growth factors to the reduced amount. PB has reviewed this methodology and concluded that only additional assets are allowed for when applying the asset growth escalation factors to the opex estimates. The AER considers that this methodology adequately ensures the opex modelling takes the impact of Powerlink's capex program into account.

Capitalisation profile

In the forecast capex chapter (section 4.6), the AER considered that several adjustments should be made to Powerlink's forecast capex. These adjustments have affected

Powerlink's capitalisation profile for the next regulatory period.[190] This is shown in table 6.12.

The adjusted capitalisation profile has been used as an input in Powerlink's opex model to account for the lower than proposed asset growth, and this results in a reduction in Powerlink's proposed opex during the next regulatory period. This adjustment ensures that Powerlink's allowed opex is consistent with its capitalisation profile.

Table 6.12 Proposed asset capitalisation profile ($m, nominal)

	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12
Powerlink	198.49	212.71	542.21	497.06	476.07	493.87	565.35
AER	186.05	229.64	539.17	441.10	377.14	389.44	515.40

6.6.7 Controllable opex—network maintenance

Network maintenance is the largest component of Powerlink's forecast opex. It accounts for almost 60 per cent of total controllable opex. As shown in table 6.2 these costs increase at an average rate of 10 per cent per annum over the next regulatory period.

Powerlink's application

The maintenance and operation of Powerlink's assets is managed under an asset manager/service provider model, where the asset manager sets the strategy and requirements of performance and the service providers manage delivery of these requirements. Powerlink (as the asset manager) has established long-term service level agreements (SLA) with field maintenance and operations service providers.

Powerlink's network is divided into three service delivery regions (southern, central and northern), with a service provider responsible for maintenance services within each region.

Due to the limited number of service providers who are able to carry out such maintenance work, Powerlink does not tender for maintenance contractors. Rather, it has strategic alliances with:

- Ergon Energy—to provide network services in its northern and central regions
- Aeropower—to carry out helicopter patrols in all regions.

In addition, Powerlink employs an in house maintenance group (Network Field Services), to undertake the majority of the routine and preventative maintenance in the southern region.

Powerlink relies on international benchmarking to confirm that its forecast expenditure for maintenance is efficient. Powerlink also compares the costs of the SLAs with Ergon and Aeropower against its Service Level Agreement with its own Network Field Services group, to assess if the costs of each maintenance provider are reasonable.

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[190] Following a request from the AER, Powerlink has provided updated 2005–06 (actual) and 2006–07 (forecast) capitalisation values. The AER has applied the updated values to Powerlink's opex model.

PB's review

PB reviewed the arrangements Powerlink has established with its service providers and the differences in maintenance costs in the three service delivery regions.

PB relied on a comparison of the work unit costs of Powerlink's internal and external service providers to assess efficiency and reasonableness. It found that for the common work units, including communications, lines, substations and secondary systems, Powerlink's internal network field services costs compared favourably with Ergon Energy's costs in the central region. However, it found that the costs in the northern region are higher due to the longer distances between Powerlink's assets and the depot, incurring additional travelling time and accommodation costs.

PB indicated that Ergon Energy is the only organisation that is currently capable of providing 24 hours planned and unplanned maintenance services in central and northern Queensland. It also noted that the SLA with Ergon Energy avoids the need for Powerlink to fully fund depot, storage and supervisory functions. PB does not believe that outsourcing these services through a competitive tender process would significantly reduce costs and that the current practice of negotiating SLAs with internal and external service providers offers a reasonable approach to manage costs and identify and leverage efficiencies.

PB noted that since Aeropower is the only provider of aerial maintenance services in Australia, competitive tender prices are not available to determine the efficiency of this agreement. The contract with Aeropower is based on a schedule of rates and Powerlink benchmarks service costs against the costs of providing these services by local ground staff. Powerlink advised that costs for helicopter maintenance and patrol services are similar to the cost of providing these services by ground staff but that helicopter services have the key advantage of faster service provision.

PB also noted that benchmarking indicates that Powerlink's current opex appears efficient relative to other TNSPs both in Australia and overseas, primarily because of its arrangements with Ergon. On balance, PB considered that the increase in Powerlink's current work unit costs reflect a combination of factors such as increasing labour and materials costs. It recommended that the cost increases associated with maintenance services are reasonable.

AER's considerations

The AER accepts that there are limited alternatives to outsourcing maintenance in Queensland, and in that context considers Powerlink's arrangements with its external service providers are efficient. PB has reviewed the costs and arrangements and considered that Powerlink's maintenance costs are efficient, reflecting the SLAs it has negotiated with Ergon Energy and Aeropower. It also noted that Powerlink benchmarks well against its peers in Australia and internationally in its overall opex costs. The AER accepts Powerlink's network maintenance cost estimates, for the purpose of determining its opex requirement.

Labour escalators in SLAs

The SLAs are used to derive network maintenance costs for Powerlink. In forecasting these costs, a labour escalation factor has been applied to the SLAs, effectively representing the forecast labour costs of Ergon and Aeropower.

Since Ergon and Aeropower will be competing for skilled labour in the same labour market as Powerlink, the AER considers that the labour escalators should be the same as that applied to Powerlink's internal labour costs. See section 6.6.2 for further discussion on Powerlink's labour escalators.

6.6.8 Controllable opex—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. Operational refurbishment is more extensive than general maintenance and is often undertaken as a preventative measure to reduce ongoing maintenance needs.

Powerlink's application

Powerlink's 2005 *Network operational refurbishment plan* (refurbishment plan) forms the basis of its refurbishment expenditure forecast. Operational refurbishment costs are included as a component of Powerlink's total network maintenance costs.

Powerlink's proposed operational refurbishment expenditures total $103.5 million ($2006–07) over the next regulatory period and make up around 16 per cent of its forecast opex.

PB's review

PB found that Powerlink classifies its assets at very high plant levels. For example, 'transmission lines overhead' and 'transmission lines underground'. Similarly, high plant level asset categories are used for substation assets, where a substation bay, including circuit breakers, bus work, structures, isolating and earth switches are the lowest level to which assets are disaggregated.

PB reviewed Powerlink's refurbishment plan to determine whether operational refurbishment costs had been correctly allocated between opex and capex. It noted that the replacement of an item of equipment such as a circuit breaker within a substation bay is treated by Powerlink as operational refurbishment and expensed rather than capitalised. Powerlink justifies this on the basis that it does not involve the replacement of a complete asset in its asset register.

PB indicated that this approach is not generally followed by other network service providers as many break their asset base down into much smaller asset categories. It considered that many of the substantial asset replacement and refurbishment projects that are categorised by Powerlink as operational refurbishment should be capitalised rather than expensed. It reached this conclusion on the basis that these projects extend the service life of the asset base and are therefore capital in nature.

PB recommended that the operational refurbishment expenditures it considered to be capital in nature, set out in table 6.14, be transferred from the controllable opex forecast to the capex forecast. The value of the projects that PB recommended be capitalised is $48 million.

Table 6.14 Adjustment to operational refurbishment forecast ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Forecast operational refurbishment	18.73	19.97	20.69	22.67	23.04	105.10[1]
Capex component	7.30	8.96	10.42	11.15	10.52	48.35

[1] PB noted that this figure differs from that contained in Powerlink's opex proposal as it is based on the actual works contained in Powerlink's refurbishment plan whereas the figure in Powerlink's opex proposal has been produced using an algorithm developed by Powerlink.

PB indicated that it had calculated the capital component of operational refurbishment by converting the nominal project estimates contained in Powerlink's refurbishment plan to real (2006–07) dollars using the CPI assumptions in Powerlink's opex model.

AER's considerations

The AER has reviewed Powerlink's refurbishment plan, its *Financial management practices manual* and PB's findings. Based on PB's findings, Powerlink appears to classify its assets at a higher level compared to other network service providers. Consequently, Powerlink expenses refurbishment expenditures that may be treated as capital works by other network service providers. The AER sought accounting advice from Deloitte Growth Solutions Pty Limited (Deloitte), on whether Powerlink's treatment of refurbishment expenditure is consistent with accounting standards.[191]

Although Deloitte found Powerlink's capitalisation policy to be broadly consistent with accounting standards it noted that this did not necessarily mean that Powerlink's approach to the treatment of operational refurbishment expenditures was also in line with the accounting standards. It considered the critical issue to be whether or not the items on which the expenditures are to be incurred meet the asset recognition criterion of Australian Accounting Standards Board 116 'Property, plant and equipment'. Deloitte indicated that in order to assess this, the components that comprise recorded assets would need to be reviewed to see if they are significant, whether their costs can be reasonably measured, and whether they have useful lives different to the broader asset to which they relate.

The level at which Powerlink classifies its assets was established by the Queensland Government when Powerlink was corporatised and this approach has been maintained since then. The AER considers that this would have been a more significant issue if, in view of Deloitte's advice, Powerlink had recently changed the level at which it classifies its assets. In such circumstances the AER would have commissioned a more detailed study of the type outlined by Deloitte to inform its decision.

[191] Deloitte is a professional services firm that provides audit, tax, consulting, and financial advisory services. Deloitte refers to the Australian partnership of Deloitte Touche Tohmatsu and its subsidiaries. See http://www.deloitte.com.au

Powerlink has not recently changed its approach to the classification of assets and there is no evidence to suggest that Powerlink's approach is inconsistent with accounting standards. Hence, the AER has decided not to require Powerlink to capitalise any of its proposed operational refurbishment expenditures.

The AER, however, notes that it may choose to review the level at which assets are classified by network service providers in the future to determine whether the approaches adopted are consistent with accounting standards.

6.6.9 Controllable opex—insurance

Powerlink's proposed insurance costs are $26 million over the next regulatory period, representing 4.2 per cent of total controllable opex. Powerlink's self insurance allowance of $6.5 million makes up around one per cent of total controllable opex. The SRP states that insurance is a legitimate cost of doing business and hence the AER will recognise an efficient allowance for insurance in its revenue cap decisions.[192] This includes an allowance for self insurance if applicable.

Powerlink's application

Powerlink obtains insurance, through a broker, to cover risks associated with its operations, when possible. If insurance is unavailable or uneconomic, Powerlink has proposed the inclusion of a self insurance allowance in its forecast opex.

Powerlink's annual insurance allowance, including self insurance is outlined in table 6.15.

Table 6.15 Powerlink's proposed insurance allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Insurance	3.67	3.82	3.99	4.15	4.29	19.92
Self insurance	1.26	1.28	1.30	1.30	1.31	6.45
Total	4.93	5.10	5.29	5.45	5.60	26.37

PB's review

PB reviewed the report from Powerlink's insurance broker and the underlying assumptions incorporated into its forecasts. PB found these assumptions to be reasonable.

PB found that escalators had been applied to actual 2005–06 premiums to estimate future insurance premiums. It requested additional information from Powerlink's broker on the escalators used. The broker advised PB that the power and utility industry is unique and only attracts a limited number of insurers willing to write this type of business. The broker stated that it expected to see an increase in premium rates, from Powerlink's risk profile, and due to both industrial special risks and public liability insurance premium increases as insurers incurred major losses in 2005 due to claims worldwide. The extent of any additional increase would be dependent on worldwide

[192] ACCC, *Statement of regulatory principles for the regulation of electricity transmission revenues–background paper*, 8 December 2004, p. 69.

utility/energy losses incurred in 2006. It was also noted that Powerlink's increasing asset base impacts the level of future premiums.

On balance, PB considered that the projected insurance premiums included in Powerlink's application were reasonable.

AER considerations

Powerlink's total forecast insurance costs include a step increase of 47 per cent in the first year of the next regulatory period, followed by a 3.5 per cent per annum increase over the remainder of the regulatory period. The step increase arises from the inclusion of self insurance costs, which were not sought by Powerlink in the current regulatory period.

Powerlink's premiums are also likely to increase because of its changing risk exposure for public liability and special risks. Public liability and special risk premiums account for around 87 per cent of Powerlink's total insurance premiums.

PB's recommendation to accept Powerlink's forecast allowance for insurance premiums is based on its review of the broker's report, which underpins Powerlink's insurance premium forecast. The AER considers that the forecast insurance premiums allowance represents an efficient estimate of Powerlink's likely insurance premiums costs.

Further, when Powerlink's actual insurance costs differ materially from insurance forecasts, the new chapter 6A rules provide for Powerlink to pass through the cost differences to its customers. This is discussed further in chapter 8 of this draft decision.

6.6.10 Controllable opex—self insurance

The SRP states that self insurance is a legitimate tool for managing risk and the AER will recognise an efficient allowance in revenue cap decisions. The SRP sets out the requirements for self insurance to be recognised, including:

- a board resolution to self insure (i.e. a copy of the signed minutes recording resolution made by the board)
- self insurance details setting out the specific risks for which the TNSP has resolved to self insure
- a report from an appropriately qualified actuary or risk specialist verifying the calculation of risks and corresponding insurance premiums.

Powerlink's application

Powerlink has proposed the inclusion of a self insurance allowance in its forecast opex. Its self insurance allowance represents around 25 per cent of its overall insurance costs, and around one per cent of total controllable opex.

Powerlink developed its self insurance forecast based on an actuarial study undertaken by Finity Consulting Pty Ltd (Finity).[193] Finity's study contains estimates of the annual cost of the following uninsured property losses:

- uninsurable risks—transmission structures and lines
- uninsured losses—'below deductible' claims on substations that are insured, but where Powerlink holds a material level of risk.[194]

Powerlink provided a Board resolution regarding self insurance for the following risks:

- uninsurable losses—transmission structures and lines
- below deductible claims on insured items
- insurable losses on which premiums are considered uncommercial—machinery breakdown.

Powerlink has proposed a self insurance reserve to cover uninsurable losses (transmission structures and lines) and insurable losses for which Powerlink could not obtain commercially acceptable insurance (machinery breakdown).

Powerlink's proposed treatment of self insurance in the regulatory accounts includes:

- 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
- the arrangement will be independently verified and Powerlink will provide a certified formal statement that figures provided to the AER are an accurate representation of Powerlink's situation.

PB's review

PB reviewed the Finity report, methodology, source information and data used to estimate Powerlink's self insurance forecast. PB considered the forecast to be reasonable.

AER considerations

The AER reviewed Powerlink's forecast self insurance costs and the actuarial study prepared by Finity. The estimates in the report are based on best estimate assumptions and represent Finity's assessment of the future outlook for Powerlink's risk

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193 Finity Consulting Pty Ltd is a firm of general insurance specialists. See http://www.finity.com.au

194 Most insurance policies include a deductible amount—the deductible is the amount of an insurance claim above which the insurance company pays out and below which the insured party must cover the loss. Uninsured losses refer to claims against insured property (in this case substations) where the level of the claim is less than the deductible amount—hence 'below deductible' claims.

management. In preparing its report, Finity stated that it relied upon the accuracy and completeness of information provided to it by Powerlink.

Uninsurable risks—transmission structures and lines

The AER notes Finity's cost estimate for 2007–08 has been developed using assumptions about risks to transmission lines and structures. PB endorsed the assumptions used by Finity and considered the cost estimate for 2007–08 was reasonable.

The estimated costs for 2007–08 were then projected forward based on the growth of Powerlink's transmission network.

The information provided to the AER does not identify the transmission growth estimates used by Finity. However, the AER was able to estimate forecast costs based on its own modelling of transmission asset growth. The AER's cost forecasts were similar to Finity's forecasts. The AER considers the self insurance allowance proposed by Powerlink for uninsurable losses affecting transmission lines and structures is reasonable.

Insurable losses on which premiums are uncommercial

The AER has reviewed the confidential information in the Powerlink Board paper regarding self insurance where premiums are considered uncommercial and considers the allowance proposed by Powerlink is reasonable.

Insurance pass through arrangements

Powerlink has proposed a pass through arrangement for insurance events including:

- any material increase or decrease in premiums compared to that provided for in the revenue cap in relation to that risk
- any material deductible incurred by Powerlink, as no allowance for deductibles is included in either the insurance or self insurance allowance
- changes in the insurance market such as, but not limited to insurance becoming unavailable or becoming available or terms materially different from those at the time of this proposal.

The AER notes that these proposed insurance events are covered by the pass through arrangements in the new rules, and this is discussed further in chapter 8.

Uninsured losses—below deductible claims

The self insurance amount for uninsured losses is only for substations, and was developed by Finity using Powerlink's actual claims history. Finity has based its estimates on a separate analysis for large and small losses, where small losses are defined as less than $0.1 million and large losses include machinery breakdowns.

The AER considers the self insurance allowance proposed by Powerlink for uninsured losses affecting substations is reasonable, noting that the methodology was supported by PB, and the forecasts are based on Powerlink's actual claims history.

Summary

The AER is satisfied that Finity has provided estimates of the costs of Powerlink's foreseeable risks to the best of its knowledge.

The AER has viewed Powerlink's Board resolution to self insure for the above risks and considers that Powerlink has met the requirements of the SRP and its forecast self insurance costs are reasonable.

The AER considers that Powerlink's proposed reporting arrangement satisfies the need for transparency, and accepts the following reporting requirements proposed by Powerlink:

- 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
- when a claim is made, an appropriate deduction to the self insurance reserve will be recorded
- the arrangement will be independently audited and Powerlink will provide a certified formal statement that the figures provided to the AER are an accurate representation of Powerlink's situation.

6.6.11 Network support

Powerlink has proposed a total network (grid) support allowance of $80 million ($2006–07) for the next regulatory period, coupled with a pass through mechanism to account for variations from the forecast allowance.

Powerlink is one of the largest purchasers of network support in the NEM. In the current regulatory period Powerlink has requested, and been granted, approval for a number of network support pass through amounts, in addition to the forecast allowance included in its current revenue cap. Table 6.16 shows the variations in network support costs for the 2001–02 to 2006–07, and demonstrates the significant fluctuations in network support costs over these years. Average forecast network support costs for 2007–08 to 2011–12 are around $16 million per annum, compared with average costs of around $14 million per annum in the current regulatory period.

Table 6.16 Powerlink's network support variation amounts ($m, nominal)

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	Total
Network support forecast[1]	3.69	5.20	16.62	15.43	0.70	2.26	43.90
Network support cost approvals	16.56	5.48	– 5.72	– 0.68	20.75	14.09	50.48
Actual network support costs	20.25	10.67	10.90	14.75	21.45	16.35	94.37

[1] ACCC, *Queensland transmission network revenue cap, 2002–2006/07: decision*, 1 November 2002.

There are two key issues in relation to network support costs:

- the efficiency and appropriateness of Powerlink's proposed allowance over the next regulatory period

- management of differences between the forecast and actual network support cost requirements.

Network support typically involves a TNSP sourcing local generation or non network options to address constraints in its network. Contracting directly with generators or other non-network providers for network support to maintain system reliability may sometimes be more cost effective than augmenting the network.

Powerlink's forecast network support allowance for the next regulatory period is shown in table 6.17. Powerlink stated the pass through arrangement is necessary as there is considerable variability in potential network support requirements, particularly in north Queensland, due to factors beyond its control, such as weather, electricity demand and generator outputs.

Table 6.17 Powerlink's forecast network support allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Network support allowance	24.03	17.34	22.15	8.22	8.30	79.99

Submissions

EUAA stated that to some extent, Powerlink can influence the cost of some events, such as network support. As such, it considered that the AER should implement measures to ensure efficient negotiations occur with suppliers. It further considered that cost pass throughs of such events should be symmetric.

PB's review

PB reviewed Powerlink's model for forecasting network support requirements. PB considered that the methodology used by Powerlink to estimate its likely network support requirements over the next regulatory period was sound and that the range of possible outcomes was reasonable.

Further, PB noted the need for Powerlink to manage the significant variability in its network support costs and supported the use of a pass through mechanism to manage this uncertainty.

AER's considerations

Forecast network support costs

Powerlink purchases the bulk of its required network support in north Queensland (NQ) with a small amount also required in south east Queensland (SEQ).

In North Queensland, Powerlink has applied the regulatory test to resolve network constraints and uses network support options if that option ranked first in the majority of scenarios considered under the regulatory test. PB noted that the modelling provides 648 unique combinations of factors, and showed that the average conditions scenario selected by Powerlink is at the lower end of the range of possible outcomes.[195]

[195] PB report, figure 5-12, p. 167.

There is limited competition for supplying network support in North Queensland, but the AER considers the regulatory test process provides an open and transparent process for selecting the least-cost option.

In SEQ, Powerlink claimed that significant quantities of reactive power are required to ensure transmission voltages remain stable at times of peak demand. Powerlink has not yet applied the regulatory test to the SEQ constraint. Instead it has used preliminary cost estimates derived from negotiations with generators to determine its network support forecasts for SEQ.

Given the current and future negotiations for network support, it is clear that Powerlink is facing some uncertainty around price outcomes when forecasting its network support costs. However, the most significant factor affecting network support costs is the volume of network support needed. The volume required is largely influenced by events in NQ, such as rainfall patterns, electricity demand, hydro generation and base load generation. These events are largely beyond Powerlink's control. Under these circumstances, and taking into account PB's recommendations, the AER considers that Powerlink's forecast network support in the next regulatory period, is appropriate.

Pass through mechanism

Powerlink has proposed a symmetrical pass through arrangement be implemented to manage the difference between the allowance and actual network support expenditure in the next regulatory period. Powerlink's proposal substantially reflects the network support arrangements put forward under the new rules.

Under clause 11.6.12(j)(1) of the Powerlink transitional provisions, the AER must implement the new rules on network support pass through arrangements. Clause 6A.7.2 of the new rules allows for under or over recoveries of network support payments by Powerlink within a specified time period, at the end of each regulatory year.

The transitional provisions allow the AER to set out the processes applying to the calculation, presentation and approval of network support pass throughs.

The new rules do not include a materiality threshold for network support events, thereby ensuring that all under and over recoveries of network support payments are subject to the pass through provisions. For administrative purposes, without limiting the pass through amounts, the AER intends to impose a threshold on network support pass throughs.

For network support pass through amounts less than one per cent of Powerlink's MAR in a regulatory year, Powerlink may adjust its MAR in the following year, without seeking approval from the AER. If the network support pass through amount is greater than one per cent of its MAR, Powerlink must seek the approval of the AER to pass through the amount, in accordance with clause 6A.7.2 of the new rules.

6.6.12 Other opex issues

General efficiency factor

The AER notes the MEU's suggestion to apply a general efficiency factor to Powerlink's opex allowance. Regulators apply such a factor to take into account

productivity gains that the TNSP could achieve in a regulatory period. Such productivity gains occur alongside efficiencies that arise due to the increased size of the network.

In this draft decision, the AER has decided not to apply a general efficiency factor to Powerlink's opex allowance. This is because productivity gains have already been factored into the labour cost escalator as forecast by Access Economics (see section 6.6.2), and for several of Powerlink's maintenance practices, including reliability centred maintenance, live line work and use of helicopters for maintenance. This approach is consistent with the ACCC's 2005 EnergyAustralia revenue cap decision in which it identified specific cost drivers where scope for efficiency gains could be achieved and considered that applying a general efficiency factor was not required.

Regulated versus non–regulated allocation

The AER's revenue cap relates only to Powerlink's regulated activities and the estimates used to forecast opex requirements should not include costs associated with the provision of non-regulated activities. If such costs are included then Powerlink's regulated revenue will be greater than required to efficiently provide its regulated activities.

Powerlink stated in its application that it 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.[196]

Powerlink also claimed that its RAB does not include assets used to provide non-regulated services and the total revenue proposal relates only to regulated activities.

PB reviewed Powerlink's overhead allocation process to ensure the appropriate allocation of costs between the regulated and unregulated components of its business, commenting on the effectiveness of the allocation process. PB stated:

> We consider that the cost allocation between the regulated and non-regulated businesses is well controlled within the business. The process is mature, robust and auditable.[197]

The AER has found no evidence of double counting of assets or costs between the regulated and non-regulated activities of Powerlink. Therefore it does not propose making any adjustments to Powerlink's forecast opex requirements.

Recovery of negotiated TUOS charges

The rules enable TNSPs to negotiate on the services and prices they offer those who wish to connect to their networks. When TNSPs offer price discounts to customers, they may sometimes recover the amount of the discount from other customers.[198]

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196 Powerlink application, p. 22.

197 PB report, p. 166.

198 AER, *Compendium of electricity transmission regulatory guidelines*, 22 August 2005, *Guidelines for the recovery of negotiated TUOS charges.*

During the current regulatory period Powerlink has offered some of its customers a discount on TUOS charges and recovered the amount of the discounts offered from its other customers. In accordance with its discount guidelines the AER reviews such arrangements at the time of each revenue reset. The number, size and specific parties to whom discounts are offered is commercially sensitive and therefore remains confidential.

The AER has reviewed Powerlink's existing discounting arrangements relevant to this revenue cap decision and has found that they meet the AER's discount guidelines.

Capex efficiencies

As outlined in chapter 2, the AER will provide Powerlink with an allowance of $3.2 million ($2006–07) per annum during the next regulatory period for the QNI capex efficiency. However, Powerlink's proposed capex efficiency claim for the Gold Coast transmission reinforcement has not been accepted.

Debt management costs

As outlined in chapter 5, the AER will provide an allowance to Powerlink for benchmark debt raising costs, averaging about $2 million ($2006–07) per annum during the next regulatory period. However, for the reasons set out in chapter 5, no allowance has been provided for Powerlink in relation to debt refinancing and interest rate risk hedging costs.

Equity raising costs

As explained in chapter 5, the AER will not provide Powerlink with an allowance for equity raising costs.

6.7 AER's conclusion

The AER's conclusion is to provide an opex allowance of $713 million for Powerlink during the next regulatory period. This equals an average annual opex allowance of $143 million ($2006–07), compared with Powerlink's proposed average annual opex of $157 million. Table 6.18 shows the AER's and Powerlink's proposed total opex allowance. This amount is $75 million less than Powerlink's proposed opex allowance for the next regulatory period.

Table 6.18 AER's conclusion on Powerlink's opex allowance ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's controllable opex	113.11	119.48	126.52	135.61	140.12	634.85
Capex efficiencies	7.70	7.70	7.70	7.70	7.70	38.50
Debt management costs	4.89	4.20	4.28	4.40	3.79	21.56
Equity raising costs	2.47	2.47	2.47	2.47	2.47	12.35
Network support costs[1]	24.03	17.34	22.15	8.22	8.30	80.04
Powerlink's total opex	152.20	151.19	163.12	158.40	162.38	787.30
AER's controllable opex allowance	112.04	117.01	121.20	127.12	128.94	606.32
Capex efficiencies	3.19	3.19	3.19	3.19	3.19	15.94
Debt raising costs	1.78	1.95	2.08	2.17	2.29	10.27
Equity raising costs	–	–	–	–	–	–
Network support costs[1]	24.03	17.34	22.15	8.22	8.30	80.04
AER's total opex allowance	141.04	139.49	148.61	140.70	142.72	712.56

[1] The network support costs are forecasts. Network support costs may be subject to additional pass through during the next regulatory period.

Of the adjustments made by the AER, around $29 million relate to controllable opex. Table 6.19 sets out the impact of the AER's adjustments on Powerlink's controllable opex.

Table 6.19 Adjustments to Powerlink's controllable opex ($m, 2006–07)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Powerlink's controllable opex	113.11	119.48	126.52	135.61	140.12	634.85
Adjustment to asset growth	0.05	–0.35	–0.78	–1.33	–1.73	–4.14
Adjustments to condition based maintenance	–1.14	–1.68	–2.15	–2.54	–3.04	–10.55
Subtotal	111.99	117.35	123.40	131.42	134.88	619.05
Adjustments to labour, materials, vegetation management escalations	0.03	–0.44	–2.40	–4.62	–6.41	–13.84
AER's controllable opex allowance	112.04	117.01	121.20	127.12	128.94	606.32

7 Service standards

7.1 Introduction

The AER's service standards incentive scheme aims to encourage transmission network service providers (TNSPs) to maintain or improve the quality of service provided to customers. This chapter sets out Powerlink's application, PB's review and the AER's considerations on the service standards scheme and values to be applied to Powerlink for the next regulatory period.

Under a revenue cap regime, TNSPs are unable to increase their revenue above the maximum allowed revenue (MAR). The only way TNSPs can increase their profits for regulated activities is by reducing their operating costs. Such cost reductions could result from efficiency gains or by allowing service levels to decline. The latter imposes costs on other market participants. The AER's service standards scheme provides an incentive to address this potential decline in service levels.

7.2 Regulatory requirements

7.2.1 Rules requirements

The old rules state that the AER determines a revenue cap based on the services that the TNSP provides and the level of service provided.

Clause 6.2.4(a) of the old rules provides that the form of economic regulation to be applied to transmission services may take into account the performance of a TNSP under service standards imposed by the rules or by the AER.

The old rules also provide that, in setting a revenue cap, the AER is required to have regard to:

- the demand growth that the TNSP is expected to service (sub-pargraph 6.2.4(c)(1))
- any service standards imposed by the rules, by the AER or by agreement between a TNSP and a user (sub-paragraph 6.2.4(c)(2))
- the potential for the TNSP to realise efficiency gains in expected operating, maintenance and capital costs, accounting for the expected demand growth and service standards noted in sub-paragraphs 6.2.4(c)(1), 6.2.4(c)(2) and 6.2.4(c)(3).

Clause 6.5.7(b) of the old rules requires each TNSP to publish its service standards results based on the parameters set out in their revenue cap decision.

7.2.2 Service standards guidelines

In November 2003, the ACCC released its service standards decision and service standards guidelines (the guidelines). The guidelines have since been included in the AER's compendium of electricity transmission regulatory guidelines.[199]

The guidelines outline the framework for applying service standards incentives to TNSPs. They also set out the service standards information that TNSPs must provide to the AER in their revenue cap applications and for annual reporting purposes. The framework is based on a 2003 consultancy report by Sinclair Knight Merz (SKM).[200]

The scheme is based on five core performance measures:

- circuit availability
- loss of supply event frequency
- average outage duration
- intra-regional constraint
- inter-regional constraint.

Inter or intra-regional constraint measures are referred to as market impact performance measures. These measures are still being developed by the AER and will not be applied to Powerlink in this revenue cap decision.

Each performance measure has performance targets against which a TNSP's annual performance is measured. TNSPs receive financial rewards for improvements in service standards above the performance targets and are penalised for deteriorations in service standards below the targets. Historical data over at least a three to five-year period is used in setting these targets.

For all existing revenue cap decisions, the maximum reward or penalty is currently set at 1 per cent of a TNSP's allowed revenue.

The guidelines require TNSPs to report their service standards performance on a calendar year basis. This approach allows any reward or penalty to be included in a TNSP's revenues for the subsequent financial year.

7.3 Powerlink's application

Powerlink proposed a service standards incentive scheme to apply to it over the next regulatory period. The scheme is based on the framework recommended by SKM and the guidelines.

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199 AER, *Compendium of electricity transmission regulatory guidelines*, August 2005.

200 Sinclair Knight Merz, *Transmission Network Service Provider—Service standards, final report*, March 2003.

The proposed scheme applies service standards incentives to the following three performance measures:

- circuit availability
- loss of supply event frequency
- average outage duration.[201]

In addition to the proposed performance measures, Powerlink proposed weightings, targets, caps and collars for each measure. The proposed parameters for each element of the scheme are listed in table 7.1.

Table 7.1 Powerlink's proposed service standards incentive scheme

Measure	Unit	Weighting	Max. penalty (collar)	Start penalty	Target	Start bonus	Max. bonus (cap)
Circuit availability—critical elements	%	15.5	96.55	97.15	97.15	97.15	97.65
Circuit availability—non-critical elements	%	8.5	96.33	97.98	97.98	97.98	98.33
Circuit availability—peak hours	%	15.5	96.65	97.45	97.45	97.45	98.15
Loss of supply > 0.2 system minutes	No.	15.5	6	4	4	3	1
Loss of supply > 1.0 system minutes	No.	30.0	3	2	1	1	0
Average outage duration (capped at 7 days)	Mins.	15.0	1200	800	800	700	300

Powerlink also proposed variations to the standard performance measure definitions and the timetable for reporting annual service standards performance and the resulting MAR adjustments.

7.4 Submissions

The EUAA welcomed the implementation of the service standards incentive scheme for Powerlink but requested further development of the scheme to create an effective and meaningful system of incentives.

7.5 PB's review

PB was engaged by the AER to provide expert opinion on Powerlink's proposed service standards incentive scheme, particularly to:

[201] Powerlink's scheme does not propose any market impact performance measures due to their ongoing development by the AER.

- recommend appropriate performance measures, targets and weightings to be applied to Powerlink over the next regulatory period based on the guidelines
- assess the consistency of Powerlink's proposed performance measures, definitions and exclusions, with the guidelines
- review Powerlink's proposed targets (including any caps, collars or deadbands) and measure weightings and consider their appropriateness. If the values or measure weightings were not considered appropriate, PB was required to recommend appropriate alternatives.

PB recommended that the AER accept the performance measures and weightings proposed by Powerlink but recommended changes to Powerlink's proposed targets, caps and collars. PB's recommended scheme parameters are listed in table 7.2.

Table 7.2 PB's recommended service standards incentive scheme

Measure	Unit	Weighting	Max. penalty (collar)	Target	Max. bonus (cap)
Circuit availability—critical elements	%	15.5	97.92	99.12	99.71
Circuit availability—non-critical elements	%	8.5	98.19	98.52	98.85
Circuit availability—peak hours	%	15.5	97.93	98.29	98.65
Loss of supply > 0.2 system minutes	No.	15.5	7.5	5.0	2.5
Loss of supply > 1.0 system minutes	No.	30.0	2.9	0.9	0
Average outage duration (capped at 7 days)	Mins.	15.0	1520	939	358

7.6 Issues and AER's considerations

7.6.1 Selection of performance measures

Powerlink's application

Powerlink proposed three performance measures and five related sub-measures to apply to its service standards incentive scheme. These are:

- circuit availability:
  - peak circuit availability (between 7 am to 10 pm week days)
  - critical circuit availability (primarily the 275/330 kV network)
  - non-critical circuit availability (132/110 kV network and below)
- loss of supply event frequency:

- events greater than 0.2 system minutes
- events greater than 1.0 system minutes.

- forced outage duration.

Submissions

The EUAA stated that TNSPs should be subject to incentives relating to the market impact of transmission outages. They claimed that such outages increased the risks faced by customers and resulted in higher premiums due to high hedging costs.

PB's review

PB recommended that the AER accept the performance measures proposed by Powerlink as they relied on a robust data set and noted that Powerlink had not proposed any alternate performance measures from those proposed in the guidelines.

For the market impact performance measures, including inter and intra-regional constraints, PB recommended that Powerlink should be required to collect relevant data over the next regulatory period.

AER's considerations

The AER considers the three performance measures proposed by Powerlink are consistent with the guidelines and contribute to an effective framework of incentives.

The performance measures and sub-measures proposed are network-based, provide incentives for Powerlink's operational decisions and aim to reduce the detrimental impact such decisions could have on the level of service delivered to customers.

The AER recognises that these measures specifically encourage Powerlink to:

- maximise circuit availability and minimise outages, in particular, at peak times and on critical parts of the network

- minimise the number of moderate to large loss of supply events

- ensure that system operation is restored as promptly as possible after an outage.

The proposed measures are appropriately structured and the inclusion of sub-measures enhances the scheme. The sub-measures increase the sensitivity of the incentive regime to customer expectations by encouraging Powerlink to maintain levels of service at the times and on the parts of the network which are most valued by customers.

The performance measures proposed by Powerlink are also supported by at least three to five years of data. This is consistent with the requirements of the guidelines.

7.6.2 Measure definitions

Powerlink's application

The proposed performance measures are largely based on the guidelines. However, they contain a number of variations to the standard definitions to align the scheme with the

operational definitions and reporting standards Powerlink has used to collect its historical performance data.

The primary variations relate to the circuit availability measure. Powerlink proposed that the availability measure should recognise outage events that affect primary plant and equipment on its network but should exclude outage events on its secondary systems and other assets. Powerlink also proposed that outages originating from Powerlink owned equipment that affect primary plant or equipment owned by a distributor, connected customer or a generator should also be included in the performance measure.

Other minor variations proposed by Powerlink were to the:

- definition of a circuit element
- definition of a critical circuit element
- methodology for determining system minutes relating to loss of supply events
- seven-day cap (10080 minutes) for single events relating to average outage duration.

PB's review

PB recommended accepting the proposed changes to circuit availability, as the inclusion of only primary plant and equipment owned by Powerlink created a robust and auditable measure. PB recognised that some outages resulting from faults in secondary systems would be overlooked under the measure definitions but considered such outages to be infrequent and could be subject to negotiated service levels in customer connection agreements.

PB recommended accepting that outages resulting from Powerlink owned equipment affecting third parties should be included in its performance results. The affected assets would not be part of the total number of circuit hours. However, because of a possible interruption of supply to customers, such events should affect Powerlink's annual performance. PB also recommended that outages resulting from assets not owned by Powerlink on a third party system should be excluded from the performance measures.

For the remaining definitional variations, PB recommended that the AER accept Powerlink's definitional inclusions and method for measuring system minutes during an outage (i.e. loss of supply measure). PB also recommended that a seven day cap be applied to average outage duration events to limit the impact of any one event upon the average outage duration measure.

AER's considerations

The definitions proposed by Powerlink are generally consistent with the TNSP specific definitions outlined in the guidelines.

Powerlink's proposal to include outages resulting from Powerlink owned assets that interrupt a third party system is an addition to the definitions established by the guidelines. The AER considers this variation strengthens the incentives upon Powerlink

to minimise outages on assets under its ownership and on those affecting third party assets that result in supply interruptions to customers. This variation also maintains the consistency of definitions used to collect historical circuit availability data.

The AER also considers the inclusion of only primary plant and equipment in the circuit availability measure is appropriate. This is because of the infrequency with which secondary system events affect supply and because such outages could be subject to negotiated service levels in customer connection agreements.

The AER therefore agrees with PB's recommendations and accepts the variations to the standard measure definitions proposed by Powerlink. The changes are appropriate and ensure clarity and consistency of the measure definitions with historical recording processes. These variations are also consistent with the flexible approach to applying the scheme to TNSPs contained in the guidelines.[202]

7.6.3 Performance targets

Powerlink's application

Powerlink stated that the unique nature of its network needs to be considered when setting its performance targets. In particular, its large capex program would result in more outages associated with construction and connection of new works. Powerlink considered that the target levels for the circuit availability and loss of supply event measures should reflect the large capex program.

Powerlink's proposed targets for each performance measure and sub-measure are based on the targets proposed by SKM (see table 7.1). Powerlink proposed that target dead bands, as opposed to single data points, be applied for the loss of supply events > 0.2 system minutes and average outage duration measures.

Submissions

The EUAA stated that service improvements resulting from increased capex and opex should not be rewarded by the incentive scheme as customers have already paid for improvements through the funding of capex and opex. It suggested that 'stretch factors' be applied to ensure that TNSPs do not benefit from these network improvements.

PB's review

PB examined the targets proposed by Powerlink. It found that they were the same as those contained in the 2003 SKM report and were therefore based on performance data available before 2002. PB showed that if the targets set by SKM had been used as part of an incentive scheme between 2002 and 2005, they would not have resulted in a revenue neutral outcome.

PB recommended that Powerlink's performance targets for the next regulatory period be based on the historical average of the most recent and reliable performance data available. Table 7.3 contains Powerlink's annual performance data by year and Powerlink's confidence in the data.

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202 ACCC, *Service standards guidelines—decision*, 12 November 2003, p. 6.

Table 7.3 Powerlink's actual reliability performance

	Measure	Circuit avail.—total (%)	Circuit avail.—critical (%)	Circuit avail.—non-critical (%)	Circuit avail.—peak (%)	Loss of supply events > 0.2 system mins.	Loss of supply events > 1.0 system mins.	Average outage duration mins.
Actual performance	**1996–97**	99.35	–	–	–	2	0	970
	1997–98	99.15	–	–	–	4	0	2027
	1998–99	99.28	–	–	–	2	1	625
	1999–00	98.84	–	–	–	3	1	518
	2000–01	–	98.37	98.71	98.30	6	2	183
	2001–02	–	98.18	98.69	98.42	4[1]	2[1]	286
	2002[2]	98.86	99.80	98.70	98.70	9	3	743
	2003	98.68	98.50	98.70	98.60	8 (6)[3]	1	701
	2004	99.06	99.40	99.00	99.00	4	0	794
	2005	–	99.70	98.60	98.70	3	0	1517
Average	**1996–2005**	–	–	–	–	4.6 (4.3)[3]	0.9	–
	2002–2005	–	99.36	98.76	98.74	–	–	939

Note: Shading indicates that Powerlink has low confidence in the data.
[1] Averages omit data for the 2001–02 financial year, effectively omitting July–December 2001 from the average.
[2] Data from 2002 is on a calendar year basis in accordance with the *Service standards guidelines*.
[3] Figures in brackets have been adjusted to align with the exclusion requirements of the *Service standards guidelines*.

Based on Powerlink's low level of confidence in the reliability of certain annual performance data (as shown in table 7.3), PB recommended that the targets be based on the following average of historical performance:

- circuit availability—historical average between 2002 and 2005
- loss of supply event—historical average between 1996–97 to 2005
- average outage duration—historical average between 2002 to 2005.

PB made adjustments to Powerlink's historical averages to develop its recommended performance targets.

PB investigated Powerlink's claims that targets should be adjusted for increased outages due to new works. Powerlink extrapolated historical data to support this claim. PB recommended that the circuit availability targets for the critical and non-critical sub-measures should be reduced by 0.24 per cent below the recommended historical average. For the peak circuit availability sub-measure, PB recommended reducing the target by 0.45 per cent.

PB recommended that the target for the loss of supply events greater than 0.2 system minutes should be increased by 0.67 events to account for the proposed increase in new works. No adjustment was recommended to the loss of supply events greater than 1.0 system minutes, as the evidence did not suggest that new works affected this measure.

PB also recommended that the targets for the frequency of off-supply events measures be set without dead bands. It considered that dead bands smear the target across a range and reduce the accuracy, or sharpness, of a given measure.

PB also analysed the events that Powerlink had excluded from historical performance data. It recommended some minor adjustments based on this analysis as shown in table 7.4.

Table 7.4 PB's recommended targets

Measure	Historical average	Adjustment	Recommended target
Circuit availability—critical elements	99.36	–0.24	99.12
Circuit availability—non-critical elements	98.76	–0.24	98.52
Circuit availability—peak hours	98.74	–0.45	98.29
Loss of supply events > 0.2 system minutes	4.3[1]	0.67	5.0
Loss of supply events > 1.0 system minutes	0.9	n/a	0.9
Average outage duration (capped at 7 days)	939	n/a	939

[1] This figure has been adjusted to align with the exclusion requirements of the *Service Standards Guidelines*.

PB also advised that the planned capex was not expected to result in an improvement in the service level. In general, it found that the capex projects were focussed on maintaining, rather than improving service delivery.

AER's considerations

TNSP performance targets should be based on the most reliable and recent information available. The guidelines state that historical averages should guide performance targets and should be based on at least three to five years of data.

The AER considers the performance targets proposed by Powerlink to be inappropriate as the targets:

- do not result in a revenue neutral outcome if applied between 2002 to 2005[203]
- are based potentially inaccurate, inconsistent or unreliable data for the circuit availability and average outage duration measures.

The use of the most recent and reliable historical data is a more relevant and accurate basis for setting Powerlink's targets than those proposed by Powerlink.

[203] Revenue is neutral when there have been no improvements or diminutions of underlying performance. By setting targets at a revenue neutral point, this ensures that the scheme does not advantage, or adversely affect, the TNSP or customers for maintaining levels of service.

The AER considers that using single data points as targets, rather than target dead bands, is appropriate for Powerlink's loss of supply events and average outage duration measures. It notes PB's concerns about uncertainty created by dead bands and therefore prefers the use of single data points for these measures. The AER does recognise that this preference for single data points may not always be appropriate in applying the service standards incentive scheme and will continue to assess their use case-by-case.

The AER agrees with PB's recommendation to adjust circuit availability and loss of supply event targets to account for the effect of new works on performance targets over the next regulatory period. This results in a 0.24 per cent reduction in targets below the historical average for the critical and non-critical circuit availability and a 0.45 per cent reduction for the peak circuit availability. In addition, the target for the loss of supply events greater than 0.2 system minutes should be increased by 0.67 events to account for the effect of new works.

In relation to the EUAA's request to apply stretch factors, the AER agrees that the service standards scheme should not reward improvements in service resulting from increased capex. However, based on PB's advice, the AER does not consider that Powerlink's forecast capex will allow it to extract windfall gains because it is focussed on maintaining rather than improving service quality. Accordingly, the AER will not apply stretch factors or any adjustment to the targets to account for performance improvements associated with Powerlink's capex program.

The AER will adopt PB's recommended targets as these are considered to be based on more relevant and accurate data for the purposes of comparing Powerlink's future service standards performance.

7.6.4 Caps and collars

Caps and collars along with performance targets form the incentive curve which determines the rate at which a TNSP receives a bonus or penalty based on its annual performance. The cap is the performance value that results in the maximum positive financial reward. The collar is the performance value that results in the maximum negative financial penalty.

Powerlink's application

As shown in table 7.5, Powerlink's proposed caps and collars are based on SKM's 2003 recommendations.

PB's review

The difference between the cap and collar values should be sufficiently wide to allow for natural variations in the measure relating to exogenous shocks. PB recommended that, when possible, cap and collar values should be two standard deviations from the performance target. A comparison of Powerlink's and PB's recommended caps and collars are shown in table 7.5.

Table 7.5 Comparison of Powerlink's and PB's proposed caps and collars

Measure	Actual performance		Powerlink's proposal			PB's recommendation		
	Range	Standard deviation	Collar	Target	Cap	Collar	Target	Cap
Circuit availability—critical elements	1.30	0.60	96.55	97.15	97.65	97.92	99.12	99.71
Circuit availability—non-critical elements	0.37	0.17	96.33	97.98	98.33	98.19	98.52	98.85
Circuit availability—peak hours	0.40	0.18	96.65	97.45	98.15	97.93	98.29	98.65
Loss of supply events > 0.2 system minutes	7	2.3	6	4	1	7.5	5.0	2.5
Loss of supply events > 1.0 system minutes	3	1.1	3	1	0	2.9	0.9	0
Average outage duration (capped at 7 days)	1162	387	1200	800	300	1520	939	358

Note: Range and standard deviation of circuit availability measures and average outage duration are based on 2002 to 2005 data. Range and standard deviation of loss of supply events are based on 1996–97 to 2005 data.

PB did not recommend that the historical range of 7 events be adopted for the loss of supply events greater than 0.2 system minutes measure because it was not considered to represent a naturally occurring range for this measure as a result of the inclusion of outlier data in 2002. Instead, PB recommended a range of 5 events to ensure a more appropriate variation between the measure's cap and collar values.

PB also adjusted cap and collar values which were less than two standard deviations from the target levels when a performance measure approached the maximum possible result. PB adopted this approach for the loss of supply events greater than 1.0 system minutes measure.

AER's considerations

It is appropriate to adjust the caps and collars to account for the AER's revised performance targets.

PB has recommended a reasonable methodology to establish the caps and collars that determine the rate at which Powerlink receives a reward or penalty. This methodology allows for natural variations in the performance that will balance incentives and encourage improvement without risking large losses or gains due to statistical anomalies. The AER agrees with PB's recommendations on the appropriate cap and collar values to be applied to Powerlink's service standards incentive scheme.

7.6.5 Weightings

Powerlink's application

Powerlink proposed weightings for each performance measure and sub-measures are based on SKM's 2003 recommendations. These are shown in table 7.1 and are based on the perceived value of each measure or sub-measure to customers.

PB's review

PB recommended that, since there had been no material change to the structure of the performance measures, the weightings proposed by Powerlink were appropriate.

AER's considerations

The weightings proposed by Powerlink are reasonable and appropriate to apply to Powerlink in the next regulatory period. The weightings are structured to ensure that services more highly valued by the market are given a greater weighting. Such services include critical circuits, services during peak periods and large loss of supply events.

The AER is satisfied that the proposed weightings will provide incentives for Powerlink to plan and minimise outages at times and to assets highly valued by customers. For example, peak circuit availability has a greater weighting than off-peak circuit availability as availability during peak periods is when customers most value reliable service. Similarly, critical circuit availability is more highly weighted to recognise that an outage event on certain parts of the network would have a greater effect on customers. This is consistent with the aims of the scheme.

7.6.6 Timing of service standards scheme

Powerlink's application

Powerlink has proposed to report performance against its service standards targets from 1 January 2006 in the current regulatory period until 31 December 2010 in the next regulatory period. The resulting MAR adjustments, based on Powerlink's reported performance, would occur between 1 July 2007 to 30 June 2012.

Powerlink claimed that this proposal is in line with the timing applied to other TNSPs.

PB's review

PB was not required to make a recommendation in relation to the timing of the service standards scheme applied to Powerlink, however, it noted that the AER has not previously assessed performance in accordance with the scheme until the regulatory period has begun.

AER's considerations

Powerlink has proposed that its service standards performance be measured from 1 January 2006 in the current regulatory period. However, Powerlink's current revenue cap decision does not include a service standards scheme. Under Powerlink's proposal the scheme established in this revenue cap decision would apply retrospectively to the last year of the current regulatory period as well as prospectively to part of the next regulatory period.

Powerlink's proposal maintains a lagged timing between performance and revenue impact as required by the guidelines. The AER is concerned that the proposed timing:

- does not allow Powerlink to properly respond in 2006 to the service standards scheme established by the AER
- is not consistent with the timing applied to other TNSPs.

The AER's service standards incentive scheme is set out in its guidelines and established under a TNSP's revenue cap decision.[204] The scheme is forward-looking and uses targets based on historical performance to compare future performance by a TNSP within a regulatory period. Following the measurement of performance against the established service standards targets, a TNSP's MAR can be adjusted by the prescribed amount.

The AER does not consider Powerlink's proposal to be consistent with the design of its scheme. For the incentive scheme to operate effectively, a TNSP's targets and other values should be known in advance. This is consistent with the forward-looking nature of the scheme, and also allows sufficient time for the TNSP to respond to the relevant incentives.

The AER has so far applied the service standards regime to seven transmission entities. In all cases, the AER has aligned the performance reporting timetable with the relevant regulatory period.

The AER therefore does not accept Powerlink's timing proposal. Instead, Powerlink should report its performance against its service standards between 1 July 2007 and 30 June 2012 of the next regulatory period. The resulting financial incentive adjustments would apply to Powerlink's MAR from 1 July 2008 to 30 June 2014.

Table 7.6 outlines the AER's proposed timing for Powerlink's reporting of service standards and the application of any resulting financial incentive to Powerlink's allowed revenue.

Table 7.6 Timing of Powerlink's service standards incentive reporting

Performance reporting period	Period	Financial incentive applied to AR
1 July 2007–31 December 2007	6 months	1 July 2008–30 June 2009
1 January 2008–31 December 2008	1 year	1 July 2009–30 June 2010
1 January 2009–31 December 2009	1 year	1 July 2010–30 June 2011
1 January 2010–31 December 2010	1 year	1 July 2011–30 June 2012
1 January 2011–31 December 2011	1 year	1 July 2012–30 June 2013
1 January 2012–30 June 2012	6 months	1 July 2013–30 June 2014

[204] ACCC, *Service standards guidelines—decision*, 12 November 2003, p. 6.

7.6.7 Data collection and reporting

PB's review

PB reviewed Powerlink's data collection and reporting systems and processes. It found that Powerlink's data collection and reporting systems are reliant on some manual inputs and adjustment of data. However, it considered that these processes were robust and repeatable and provided an appropriate framework for measuring historical and future performance. As such, the systems and processes were considered suitable for use in the performance incentive scheme.

AER's considerations

The AER accepts that the recording processes and reporting systems established by Powerlink to record service standards performance data are appropriate. However, Powerlink should advise the AER of any material changes to the systems, definitions or processes used to collect or report performance data as part of its annual compliance reporting.

The AER also expects that Powerlink will follow developments with market based indicators and begin collecting relevant data to assist develop the service standards incentive scheme to be applied to it during its 2012–13 to 2016–17 regulatory period.

7.6.8 Financial incentive

Powerlink's application

Powerlink proposed to place 1 per cent of revenue at risk through the scheme.

Submissions

The EUAA stated that the amount of revenue at risk should be raised above 1 per cent to increase the service standards incentives for TNSPs.

AER's considerations

The AER will limit the revenue at risk under the service standards scheme to 1 per cent of Powerlink's annual revenue. This is the present limit outlined in the guidelines and applied to all TNSPs, except SP AusNet, under the scheme.

It is noted that the new chapter 6A rules allow the revenue at risk to be set between 1 and 5 per cent of a TNSP's allowed revenue. As this decision is being undertaken substantially under the old rules and SRP, the AER will limit the revenue at risk for Powerlink to 1 per cent of its allowed revenue consistent with the guidelines.

7.7 AER's conclusion

The AER considers it appropriate to apply the service standards incentive scheme to Powerlink over the next regulatory period. The weightings and values to be applied to Powerlink are set out in table 7.7.

Table 7.7 AER's service standards incentive weightings and values for Powerlink

Measure	Unit	Weighting (%)	Max. penalty	Target	Max. bonus
Circuit availability—critical elements	%	15.5	97.92	99.12	99.71
Circuit availability—non-critical elements	%	8.5	98.19	98.52	98.85
Circuit availability—peak hours	%	15.5	97.93	98.29	98.65
Loss of supply > 0.2 system minutes	Number	15.5	7.5	5.0	2.5
Loss of supply > 1.0 system minutes	Number	30	2.9	0.9	0
Average outage duration (capped at 7 days)	Minutes	15	1520	939	358

Appendix F provides further details of the service standards scheme to apply as part of Powerlink's revenue cap, including measure definitions, formulae and reporting requirements.

8 Pass through mechanism

8.1 Introduction

The AER is required under the old rules to administer an incentive-based regulatory regime for transmission network service providers (TNSPs) that provides a fair and reasonable risk-adjusted rate of return on efficient investment. However, actual expenditure during the regulatory period may differ from forecasts as a result of events outside the TNSP's control. A cost pass through mechanism provides some protection for TNSPs from the effect of unforseeable changes in costs by enabling the adjustment of the TNSP's maximum allowed revenue (MAR) during a regulatory period. Previous revenue cap decisions made by the ACCC and the AER have included cost pass through mechanisms.

This chapter discusses the relevant clauses of the Powerlink transitional provisions and the new chapter 6A rules that deal with cost pass throughs. It also addresses several issues raised by Powerlink on the cost pass through mechanism to apply to it over the next regulatory period. The AER's treatment of network support costs is discussed in section 6.6.11.

8.2 Regulatory requirements

8.2.1 Rules requirements

Clause 11.6.12(j)(3) of the Powerlink transitional provisions states that for the duration of the next regulatory period the relevant new chapter 6A rules apply to any positive or negative pass through event, with any modifications that are necessary to apply the relevant provisions to this decision.

Clause 6A.7.3 of the new rules outlines the criteria for cost pass through that applies to Powerlink. Three basic preconditions restrict the use of the mechanism: the event must not already be provided for in the TNSP's allowance; there must be a significant increase or decrease in its costs as a result of the event; and the change in costs must be outside of the TNSP's control.

The cost pass through mechanism permits Powerlink to pass through a positive or negative amount to transmission network users if a *positive change event* or *negative change event* occurs.[205] Change events include *pass through events*, which are any of the following:

- an easements tax change event
- an insurance event
- a regulatory change event

[205] Positive change event and negative change event are defined in Schedule 3 of AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006.

- a service standard event
- a tax change event
- a terrorism event.[206]

A definition of each pass through event is provided in the definitions section of the new rules.[207]

The procedure for dealing with applications for positive pass through events is contained in clauses 6A.7.3(c), (d) and (e). A positive pass through event is deemed to occur when a TNSP incurs materially higher costs in providing prescribed transmission services than it would have incurred but for that event. Negative cost pass throughs, which arise when a TNSP incurs materially lower costs in providing prescribed transmission services, are described in clauses 6A.7.3, (f), (g), and (h). If the TNSP does not apply for a negative pass through, the AER is able to initiate an application and make a determination.

The AER must make a cost pass through determination within 60 business days from the date the TNSP applies for approval to pass through a positive amount. As with the pass through process adopted by the AER/ACCC in previous revenue cap decisions, the AER is permitted to conduct public consultation in accordance with clause 6A.7.3(i). The rules also contain a non-exhaustive list of matters that the AER must take into consideration when making a determination. These are set out in clause 6A.7.3(j).

8.3 Powerlink's application

Powerlink stated that there was a need to consider the impact of exogenous events for which the financial impact cannot be reasonably forecast at the time of its revenue reset. It stated that adjustments to the revenue allowance may be required for such events.

As its revenue cap application was submitted on 3 April 2006, Powerlink noted that the AEMC had commenced its review of the economic regulation of transmission services and that the AEMC's initial rules proposal codified pass through arrangements to apply to all TNSPs.[208] Powerlink also noted that the AEMC's pass through arrangements were substantially the same as the AER's existing arrangements.

In relation to an insurance event, Powerlink expressly proposed that its pass through arrangements provide for:[209]

- any material increase or decrease in premiums compared to that provided for in the revenue cap in relation to that risk

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206 The mechanism does not include network support events. The procedure for pass through of network support events is contained in clause 6A.7.2 of the new rules.

207 Schedule 3 of AEMC, *National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006 No.18*, 16 November 2006.

208 AEMC, *Draft proposal report and accompanying draft rule*, 16 February 2006.

209 Powerlink application, p. 108.

- any material deductible incurred by Powerlink
- 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 its application.

Powerlink's preference was that, in relation to insurance events, materiality be assessed cumulatively over the regulatory period.[210]

8.4 Issues and AER's considerations

8.4.1 Pass through events

The range of events encompassed by the pass through mechanism contained in the new chapter 6A rules is effectively the same as that contained in pass through arrangements adopted in previous revenue cap decisions by the ACCC and the AER.[211] However, the definition of pass through event has been expanded by the AEMC to include an easements tax change event and a regulatory change event. The definition of an insurance event in the new rules includes the three elements that Powerlink proposed in its application.

8.4.2 Assessment of materiality

Powerlink has proposed that, specifically for an insurance event, materiality be assessed cumulatively over the regulatory period.

To pass through costs for a *positive* or *negative change event* the TNSP must incur materially higher or lower costs. The new rules define 'materially' as a change in costs, as a result of an event, that exceeds 1 per cent of the MAR for the TNSP for that regulatory year. This threshold applies to both a positive or negative change in costs.

The AER considers there is no need to modify the arrangements in the new chapter 6A rules to allow materiality for insurance events to be assessed cumulatively over Powerlink's next regulatory period. The purpose of imposing a materiality threshold is to limit the applications that may be made under the mechanism, so that only substantive changes in costs are passed through.[212] If materiality was assessed cumulatively over the regulatory period, this may result in insignificant cost changes in a regulatory year being passed through to users.

8.5 AER's conclusion

Consistent with the Powerlink transitional provisions, the AER will adopt the cost pass through mechanism set out in clause 6A.7.3 of the new rules without modification.

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210 Powerlink application, p. 108.

211 See, for example, AER, *Directlink Joint Venturers' application for conversion and revenue cap— decision*, 3 March 2006.

212 AEMC, *Draft National Electricity Amendment (Economic Regulation of Transmission Services) Rule 2006— rule proposal report*, 16 February 2006, p. 80.

9 Maximum allowed revenue

9.1 Introduction

This chapter sets out the AER's calculation of Powerlink's maximum allowed revenue (MAR) for the next regulatory period in accordance with the building block approach. The chapter also discusses the revenue cap re-opener provision under the new rules and the AER's consideration of the regulatory accounting methodology for recognising Powerlink's forecast capital expenditure (capex).

9.2 Regulatory requirements

Clause 6.2 of the old rules requires the AER to set a revenue cap with an incentive mechanism for non-contestable transmission network services. To this end, clauses 6.2.2 to 6.2.4 specify the objectives of the regulatory regime to be administered by the AER, including the principles and mechanism for regulation of transmission revenues. In particular, clause 6.2.4(b) states that:

> … the AER must set a revenue cap to apply to each Transmission Network Service Provider for the regulatory control period, which must be a period of not less than five years ...

The AER's role as economic regulator is limited to determining a transmission network service provider's (TNSP) MAR. In accordance with the principles contained in part C of chapter 6 of the old rules, TNSPs are responsible for calculating the transmission charges payable by their customers. TNSPs are required to publish, by 15 May each year, the transmission charges that are to apply for the following financial year. The annual revenue that a TNSP recovers through these charges must not exceed the MAR set by the AER. Any over or under-recoveries must be offset against a TNSP's revenue in the following financial year.

9.3 The accrual building block approach

The MAR for each year of the regulatory period is determined in accordance with the accrual building block approach:

Revenue	=	return on capital + return of capital + opex + tax
	=	(WACC × WDV) + D + opex + tax

where:

WACC	=	the nominal vanilla weighted average cost of capital
WDV	=	the written-down (depreciated) value of the asset base
D	=	depreciation
opex	=	operating and maintenance expenditure
tax	=	the expected business income tax payable.

The revenue allowance can vary over the regulatory period. To avoid such variations, the revenues are smoothed within a regulatory period while maintaining the principle of cost recovery under the building block approach. Smoothing requires diverting some of the cost recovery to adjacent years within the regulatory period so that the net present value (NPV) of the smoothed revenues is equal to the NPV of the unsmoothed revenue stream. That is, a smoothed profile of the TNSP's allowed revenue (AR) is determined for the regulatory period under the CPI – X mechanism.

The MAR for the first year is set equivalent to the AR for the first year of the revenue cap:

$$MAR_1 = AR_1$$

where:

MAR_1 = the maximum allowed revenue for year 1

AR_1 = the allowed revenue for year 1.

The MAR for the subsequent year of the regulatory period requires an annual adjustment based on the previous year's AR. That is, the subsequent year's AR is determined by adjusting the previous year's AR for actual inflation and the X factor:

$$AR_t = AR_{t-1} \times (1 + \Delta CPI) \times (1 - X)$$

where:

AR = the allowed revenue

t = time period/financial year (for $t = 2, 3, 4, 5$)

ΔCPI = the annual percentage change in the Consumer Price Index All Groups, Weighted Average of Eight Capital Cities from march in year $t - 2$ to March in year $t - 1$

X = the smoothing factor.

The MAR is determined annually by adding to (or deducting from) the allowed revenue, the service standards incentive (or penalty) and any approved pass through amounts (see table 9.1 for timing of calculating the AR and financial incentive):

MAR_t = (allowed revenue) + (financial incentive) + (pass through)

$$= AR_t + \left(\frac{(AR_{t-1} + AR_{t-2})}{2} \times S_{ct} \right) + P_t$$

where:

MAR = the maximum allowed revenue

AR = the allowed revenue

S = the service standards factor determined in accordance with the performance incentive scheme set out in chapter 7/appendix F

P	=	the pass-through amount that the AER has determined in accordance with the pass-through mechanisms set out in section 6.6.11 and chapter 8
t	=	time period/financial year (for *t* = 2, 3, 4, 5)
ct	=	time period/calendar year (for *ct* = 2, 3, 4, 5).

Table 9.1 Timing of the calculation of allowed revenues and the financial incentive

t	Allowed revenue (financial year)	*ct*	Financial incentive (calendar year)
-	1 July 2007–30 June 2008	-	Not applicable
2	1 July 2008–30 June 2009	2	1 July 2007–31 December 2007[1]
3	1 July 2009–30 June 2010	3	1 January 2008–31 December 2008
4	1 July 2010–30 June 2011	4	1 January 2009–31 December 2009
5	1 July 2011–30 June 2012	5	1 January 2010–31 December 2010

[1] The AER's service standards scheme for Powerlink applies from the start of the next regulatory period (1 July 2007). Therefore, the financial incentive calculation will be based on the number of days remaining after 1 July 2007 in the calendar year (i.e. half a calendar year).

9.4 Powerlink's application

Powerlink stated in its application that it had used the post-tax building block approach to calculate its revenue proposal. It proposed that the calculation of the revenue be determined for a five-year regulatory period. Powerlink's proposed revenue was determined on the basis of an opening RAB of $3796 million. It requested nominal unsmoothed revenues of $540 million in 2007–08, increasing to $751 million in 2011–12. Powerlink's MAR for 2006–07 is $508 million. Table 9.2 summarises Powerlink's total proposed unsmoothed revenues for the next regulatory period.

Table 9.2 Powerlink's proposed unsmoothed regulated revenue ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Return on capital	316.69	361.54	406.88	446.11	487.43	2018.65
Return of capital	48.02	55.51	47.56	49.83	52.09	253.01
Operational expenditure	156.11	159.49	177.05	176.83	186.45	855.93
Net taxes payable	19.38	21.30	21.72	23.37	25.33	111.10
Unsmoothed revenue	540.20	597.84	653.22	696.14	751.30	3238.70

Powerlink stated that the AER's preference for recognising capex under the as-incurred approach would require assets under construction to be rolled into the RAB as at 1 July 2007 and results in a step increase in the return on capital component of the MAR in the initial year 2007–08. It stated that there would be a 10 per cent step increase in its revenue (and transmission use of system (TUOS) charges) for the initial year, followed by five and a half per cent average annual increases during the remainder of the next regulatory period.

Powerlink considered that the determination of its smoothed revenues was dependent on the AER's decision on how to reflect the step increase. Therefore, Powerlink did not propose a smoothed revenue path.

9.5 Regulatory accounting methodology for recognising capex

It was noted in the *Statement of principles for the regulation of electricity transmission revenues* (SRP) that a view had not been formed on when capex should be recognised and that TNSPs were able to adopt either the as-commissioned or the as-incurred approach. However, in its *Regulatory accounting methodologies* draft position paper (September 2005), the AER indicated a preference for recognising capex on an as-incurred basis which requires modelling the return on and return of capital when that expenditure is incurred.

9.5.1 Powerlink's application

As part of the AER's consultation process on the regulatory accounting methodologies, Powerlink had previously indicated that depreciation of actual capex is administratively onerous due to difficulties associated with allocating assets under construction to different asset classes.[213] In addition, it stated that this approach was inconsistent with accounting standards and results in additional audit requirements for regulatory accounts. Therefore, in its revenue cap application, Powerlink has modelled the return on capital under the as-incurred approach and the return of capital under the as-commissioned approach. The AER refers to this as the hybrid approach.

In support of the hybrid approach, Powerlink stated that price increases associated with changing to this approach for recognising capex would not be as significant as under the as-incurred approach because the return of capex is recognised on an as-commissioned approach. It stated that, under the as-incurred approach, depreciation of assets under construction is included in the revenue modelling, which would advance cash flows and result in a greater step price increase.

9.5.2 Submissions

The Energy Users Association of Australia (EUAA) and the Major Energy Users in Queensland (MEU) expressed concern over the inclusion of depreciation of assets under construction in the calculation of the revenues. They stated that this capitalisation policy does not comply with accounting standards.

The EUAA stated that there is a logical inconsistency with assets under construction being depreciated before they have been completed and commissioned (placed in service). As a result, customers are required to pay for assets before they are commissioned.

The EUAA considered that any change to recognising capex on an as-incurred basis should be accompanied by the removal of finance during construction (FDC) costs.

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213 Powerlink, *Submission on regulatory accounting methodology*, 9 November 2005.

9.5.3 AER's considerations

In its *Regulatory accounting methodologies* draft position paper, the AER noted that under the ex ante capex framework the as-incurred approach was considered to provide stronger efficiency incentives than the as-commissioned approach. This is because the returns on and of capital associated with assets under construction would form part of the incentive when capex targets are established. It was recognised that a transition from an as-commissioned approach to either the hybrid or as-incurred approach would advance the recognition of capex in the RAB and therefore result in a one-off step increase in the revenue profile by bringing forward expenditure. In particular, as part of the transition, a proportion of expenditure associated with projects expected to be commissioned in the next regulatory period needs to be included in the TNSP's RAB at the end of the current regulatory period.

However, while the transition results in a one-off impact to the revenues, in present value terms over the life of the asset the financial impact of whether capex is recognised on an as-incurred, hybrid or as-commissioned approach is not affected. That is, the present value of the returns on and of capital is the same regardless of the approach used to recognise capex. To the extent that a change in the recognition of capex results in a material step increase to revenues during the next regulatory period, the AER notes that this can be managed by additional smoothing within the regulatory period.

To accommodate any developments arising from the AEMC's review of economic regulation of transmission services and to consult further on issues raised in response to the AER's preliminary position, the AER has delayed finalising its decision on the methodology for recognising capex. Consequently, in the interest of providing certainty for Powerlink and its customers, the AER considers it is reasonable to adopt the hybrid approach for the recognition of capex for this draft decision. Therefore, the AER's modelling of Powerlink's forecast capex will provide the return on capital under the as-incurred approach and the return of capital under the as-commissioned approach.

Given the change to recognising capex under the hybrid approach and as noted by the EUAA, Powerlink's forecast capex requirements do not include an allowance for the cost of financing a project during its contruction to its commissioning date (referred to as FDC1). However, an allowance to compensate for the average six-month period before capex is included in the RAB (referred to as FDC2) is still applicable and is therefore provided in the AER's post-tax revenue model (PTRM). It should be noted, however, that an adjustment to the PTRM has been made so that a half-year's real rate of return (instead of nominal) is added to capex for FDC2. This is to ensure that a consistent framework is applied because the capex values are in real terms. Otherwise, there would be double compensation for inflation during the six-month period.

9.6 AER's assessment of the building blocks

9.6.1 Opening asset base and roll forward

The basic method underlying the roll forward of Powerlink's asset base over the next regulatory period is that the closing value of the asset base from year to year is constructed by taking the opening value, converting it to a nominal figure by adding an inflation adjustment, adding any capex and subtracting disposals and depreciation for

the year. The closing value for one year's asset base then becomes the opening value for the following year's asset base.

As explained in chapter 3, the AER has determined the opening value of Powerlink's RAB to be $3781 million as at 1 July 2007. The AER has modelled Powerlink's asset base over the next regulatory period as shown in table 9.3. The AER's modelling indicates that Powerlink's RAB increases by 54 per cent over the next regulatory period.

Table 9.3 AER's roll forward of Powerlink's regulated asset base ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12
Opening asset base	3781.37	4273.00	4688.92	5061.44	5508.45
Capital expenditure	531.85	464.93	415.47	493.13	373.84
Return of capital	40.22	49.01	42.95	46.11	46.38
Closing asset value	4273.00	4688.92	5061.44	5508.45	5835.91

9.6.2 Forecast capital expenditure

As explained in chapter 4, the AER has provided Powerlink with a forecast capex allowance of $2032 million ($2006–07) during the next regulatory period. The annual allowance ($nominal) is shown in table 9.3 and is used to calculate the roll forward value of Powerlink's RAB.

9.6.3 Depreciation

Using a post-tax nominal framework, the AER has made allowances for nominal (economic) depreciation. Economic depreciation adds the (negative) straight-line depreciation with the (positive) annual inflation effect on the asset base. Economic depreciation has been used to model the nominal asset values over the regulatory period and to determine the depreciation allowance. In modelling the applicable straight-line depreciation component, the AER has based its calculation on the remaining life per asset class. Table 9.3 shows the resulting figures (referred to as the return of capital).

9.6.4 Weighted average cost of capital

To establish the appropriate return on capital as shown in table 9.4, the AER multiplied Powerlink's opening RAB (over the length of the regulatory period) by the WACC (estimated in chapter 5).

The AER's nominal vanilla WACC of 8.76 per cent is based on a post-tax nominal return on equity of 11.68 per cent and a pre-tax nominal cost of debt of 6.82 per cent.

9.6.5 Operating and maintenance expenditure

As explained in chapter 6, the AER has provided an opex allowance of $712 million ($2006–07) during the next regulatory period. The annual allowance is shown in table 9.4 and equates to an average amount of $156 million per annum in nominal terms.

9.6.6 Estimated taxes payable

Tax estimates relate to Powerlink's regulated activities only. The AER has modelled Powerlink's income tax payable during the next regulatory period, based on its tax depreciation/expense profile. The AER's assessment of taxes payable are based on the 60 per cent gearing assumed in the WACC framework, rather than the actual gearing of Powerlink. Table 9.4 shows the AER's estimate of Powerlink's tax payments.

9.7 AER's draft decision

9.7.1 Maximum allowed revenue

Based on its assessment of the building block components and using the PTRM, the AER has determined the appropriate unsmoothed revenue for Powerlink. The AER's draft decision is to provide a nominal unsmoothed revenue allowance that increases from $536 million in 2007–08 to $720 million in 2011–12 as shown in table 9.4. This is, on average, around 3 per cent less than Powerlink's requested unsmoothed revenue allowance of $540 million in 2007–08 increasing to $751 million in 2011–12.

Table 9.4 AER's draft decision on unsmoothed revenues ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Return on capital	331.40	374.49	410.94	443.58	482.76	2043.17
Return of capital	40.22	49.01	42.95	46.11	46.38	224.72
Operational expenditure	145.49	148.42	163.12	159.30	166.68	783.01
Net taxes payable	18.95	20.68	20.59	21.95	23.75	105.92
Unsmoothed revenue	536.05	592.59	637.59	670.95	719.58	3156.77

The NPV of unsmoothed revenue for the next regulatory period was calculated to be $2442 million. Based on this NPV amount, the AER has determined a nominal smoothed allowed revenue for Powerlink that increases from $536 million in 2007–08 to $736 million in 2011–12, as shown in table 9.5 (based on a smoothing factor of –4.95 per cent). Powerlink's allowed revenue during the next regulatory period is calculated based on the formula described in section 9.3.

Table 9.5 AER's draft decision on smoothed allowed revenue ($m, nominal)

	2007–08	2008–09	2009–10	2010–11	2011–12	Total
Smoothed allowed revenue	536.05	580.33	628.27	680.17	736.35	3161.18

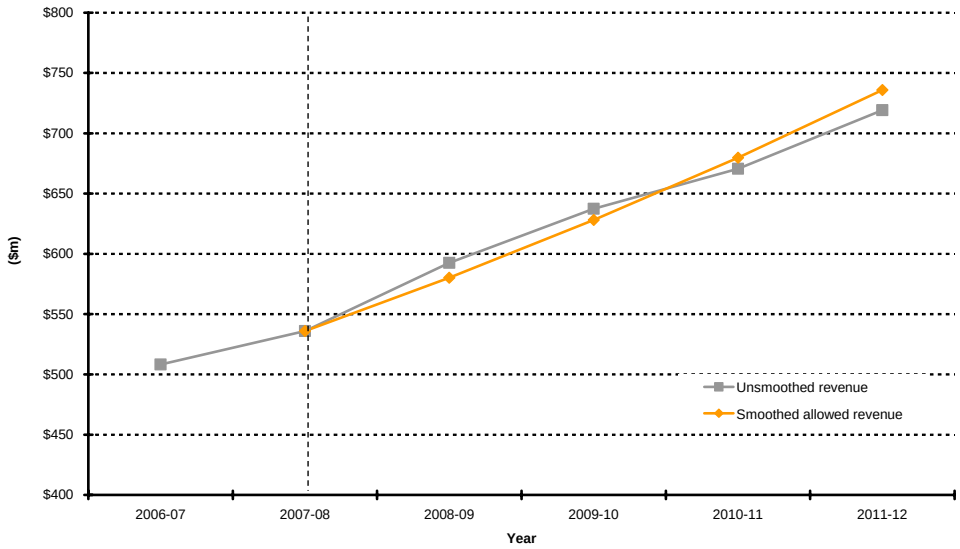
The revenue increase during the next regulatory period consists of:

- An initial increase of 5 per cent (nominal) from 2006–07 to 2007–08. Given the size of the initial increase, the AER considers that there is no need to undertake additional smoothing within the next regulatory period.
- A subsequent average annual increase of 8 per cent (nominal) during the remainder of the next regulatory period.

The AER has calculated that the change in recognition of capex results in a 6 per cent (nominal) increase to Powerlink's 2007–08 revenue (i.e. [(536 ÷ 506) – 1]×100). If assets under construction were not included in the RAB due to the change in recognition of capex, Powerlink's allowed revenue would be $506 million in 2007–08.

Figure 9.1 shows the revenue path allowed by this draft decision (both smoothed and unsmoothed).

Figure 9.1 Revenue path from 2006–07 to 2011–12 ($m, nominal)



In reaching this draft decision, the AER considers that the smoothed allowed revenue it has provided for Powerlink is consistent with rules, in that it provides a fair and reasonable risk-adjusted cash flow rate of return on efficient investment. The draft decision also provides an acceptable balancing of the interests of a TNSP and users in accordance with the objectives of the rules.

9.7.2 Transmission charges

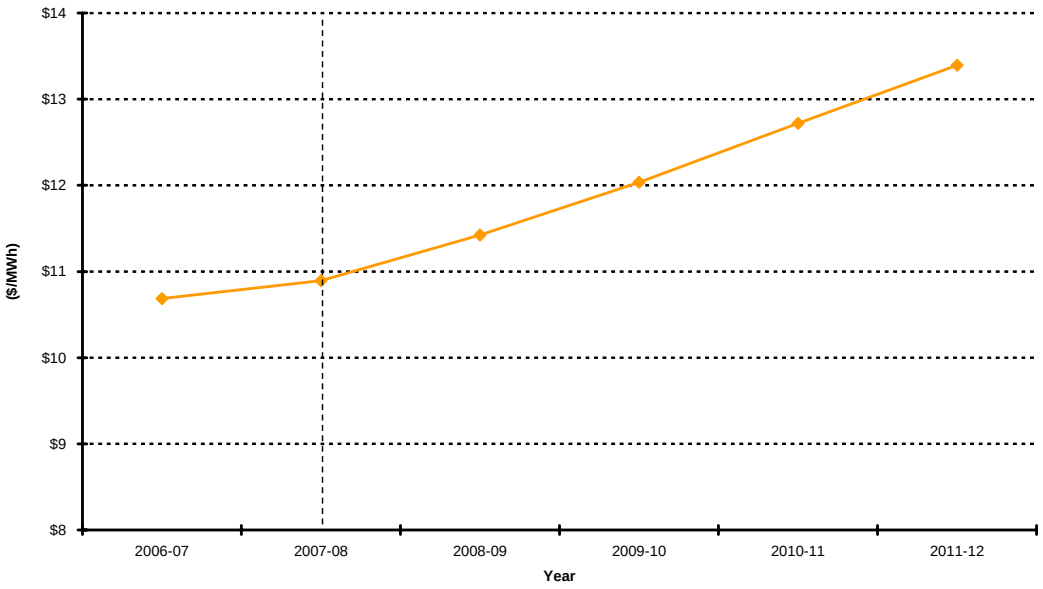
Powerlink determines its transmission charges based on the AER's approved revenues and the pricing principles contained in the rules. The effect of the AER's draft decision on average transmission charges can be estimated by taking the allowed revenues and dividing them by forecast energy delivered in Queensland. Based on this approach, the AER estimates that this draft decision will result in an increase of around 2 per cent (nominal) in average transmission charges in 2007–08, and an average 5 per cent per annum (nominal) increase during the remainder of the next regulatory period.[214] The increases in average transmission charges are less than the increases in revenues (see section 9.7.1) as a result of forecast energy delivered increasing at a faster rate than revenues.

Figure 9.2 shows the resulting average price path of this draft decision during the next regulatory period compared with the average price for the final year of the current

[214] The forecast energy delivered figures were obtained from Powerlink's revenue cap application.

regulatory period (2006–07). It shows average transmission charges increasing from around $10.90 per MWh in 2007–08 to $13.40 per MWh in 2011–12. Transmission charges represent approximately 8 per cent on average of end user electricity charges in Queensland.

Figure 9.2 Price path from 2006–07 to 2011–12 ($/MWh, nominal)



9.7.3 Revenue cap re-opener

Clause 11.6.12(m) of the Powerlink transitional provisions specifies that the revenue cap re-opener mechanism contained in the new chapter 6A rules will apply to Powerlink for the next regulatory period. Clause 6A.7.1 of the new rules allows for the re-opening of a revenue cap during a regulatory period where an event occurs that sufficiently impacts on the financial viability of the TNSP or its scope to respond to unforeseeable circumstances. Specifically, the re-opener mechanism only allows the revenue cap to be re-opened if:

- an event that could not have been foreseen by the TNSP has occurred
- in response to that event, the TNSP must invest in a project in order for network reliability or system security to not be compromised
- the project requires capex exceeding 5 per cent of the TNSP's RAB in the year of the event
- the project requires capex that the TNSP cannot otherwise reasonably fund during the regulatory period
- there is no existing allowance (including in the contingent projects allowance) for that project.

The AER will apply this revenue cap re-opener mechanism to Powerlink during its next regulatory period.

Appendix A Powerlink transitional provisions

11.6.12 Powerlink transitional provisions

Definitions

(a) In clause 11.6.12:

contingent project means a project identified in the transitional revenue determination as a contingent project.

Powerlink means the Queensland Electricity Transmission Corporation Limited (ACN 078 849 233), trading as Powerlink Queensland

t**ransitional regulatory control period** means the regulatory control period commencing on 1 July 2007 and ending on 30 June 2012.

transitional revenue determination means a final revenue determination by the AER for the Powerlink transmission network, in respect of the transitional regulatory control period.

trigger means the unique investment driver identified in the transitional revenue determination as a trigger for a contingent project.

Scope and application

(b) This clause 11.6.12:

(1) applies only in respect of the Powerlink transmission network and applies only until 30 June 2012; and

(2) prevails, to the extent of any inconsistency, over any other clause in the Rules.

Transitional revenue determination

(c) Except as provided in this clause 11.6.12, and despite any changes to the old Chapter 6:

(1) the old Chapter 6 continues to apply in respect of the AER setting the revenue cap for the transitional regulatory control period for the Powerlink transmission network; and

(2) in setting the revenue cap for the transitional regulatory control period, the AER must substantially adhere to the Statement of Regulatory Principles including the ex ante approach to setting the revenue cap set out in the statement.

(d) The AER must calculate the weighted average cost of capital for the transitional regulatory control period, in accordance with the values, methodologies or benchmarks in the new Chapter 6A, in respect of the following items:

(1) the nominal risk free rate including the maturity period and source of the benchmark;

(2) the debt risk premium including the maturity period and source of the benchmark;

(3) the equity beta;

(4) the market risk premium; and

(5) the ratio of the market value of debt as a proportion of the market value of equity and debt.

(e) In calculating the WACC for the transitional regulatory control period, the AER must use an average gamma of 0.5

Contingent projects

(f) Where the trigger event identified in respect of a contingent project occurs prior to 30 June 2012, the AER must, in accordance with the transitional revenue determination:

(1) determine:

(i) the amount of capital and incremental operating expenditure for that contingent project for each remaining regulatory year of the transitional regulatory control period, which the AER considers is reasonably required for the purpose of undertaking the contingent project;

(ii) the likely commencement and completion dates for the contingent project;

(iii) the incremental revenue which is likely to be earned by Powerlink in each remaining regulatory year of the transitional regulatory control period as a result of the contingent project being undertaken; and

(iv) the maximum allowed revenue for each regulatory year in the remainder of the transitional regulatory control period by adding the incremental revenue for that regulatory year; and

(2) calculate the estimate referred to in subparagraph (1)(iii):

(i) on the basis of the rate of return for Powerlink for the transitional regulatory control period in accordance with the transitional revenue determination; and

(ii) consistently with the manner in which depreciation is calculated under the transitional revenue determination; and

(3) amend the transitional revenue determination to apply for the remainder of the transitional regulatory control period in accordance with paragraph (g).

(g) The AER may only vary the transitional revenue determination to the extent necessary:

(1) to adjust the forecast capital expenditure for the transitional regulatory control period to accommodate the amount of additional capital expenditure determined under paragraph (f)(1)(i); and

(2) to adjust the forecast operating expenditure for the current regulatory control period to accommodate the amount of additional operating expenditure determined under paragraph (f)(1)(i); and

(3) to reflect the effect of any resultant increase in forecast capital expenditure and incremental operating expenditure on the maximum allowed revenue for each regulatory year in the remainder of the transitional regulatory control period.

(h) An application for approval of a contingent project may only be made if the intended date for commencing the contingent project is during the transitional regulatory control period.

(i) For the first regulatory control period after the transitional regulatory control period, the forecast of capital expenditure for that first regulatory control period must be determined by applying the provisions of clause 6A.6.7 of the new Chapter 6A, in respect of the capital expenditure for a contingent project, with such modifications as are necessary to properly apply clause 6A.6.7.

Cost pass-through

(j) For the duration of the transitional regulatory control period:

(1) subject to paragraph (2), clause 6A.7.2 of the new Chapter 6A applies to a network support event under the transitional revenue determination;

(2) the process to apply to the calculation, presentation and approval of pass through resulting from network support event is as set out in the transitional revenue determination; and

(3) in respect of any positive change event or negative change event, the new Chapter 6A applies, with any modifications that are necessary to apply the relevant provisions to the transitional revenue determination.

Roll forward of regulatory asset base

(k) For the avoidance of doubt, in making a revenue determination for the first regulatory control period after the transitional regulatory control period, the value of the regulatory asset base at the beginning of the first regulatory year of that period calculated in accordance with clause S6A.2.1(f), may be adjusted having regard to the transitional revenue determination and any other arrangements agreed between the AER and Powerlink.

Application of efficiency benefit sharing scheme

(l) The efficiency benefit sharing scheme in force under clause 6A.6.5 applies to Powerlink during the transitional regulatory control period.

Power to re-open transitional revenue determination

(m) Clause 6A.7.1 of the Rules applies to the transitional revenue determination, and a reference in the clause to:

(1) "revenue determination" is taken to be a reference to the transitional revenue determination;

(2) "regulatory control period" is taken to be a reference to the transitional regulatory control period;

(3) "contingent project" has the meaning referred to in paragraph (a);

(4) "X factor" has the same meaning as in the transitional revenue determination.

Appendix B Review process and submissions

The following review process has been undertaken in assessing Powerlink's application.

3 April 2006	Powerlink submitted its revenue cap application to the AER.
20 April 2006	The AER held a public forum on Powerlink's revenue cap application. Copies of the agenda, minutes and presentations are available on the AER's website.[215]
13 June 2006	Submissions on Powerlink's revenue cap application closed. Five submissions were received and are available on the AER's website.
30 August 2006	Powerlink provided a submission that responded to issues raised by an interested party in relation to its application.
10 November 2006	The AER received PB Associates' report which reviewed key elements of Powerlink's revenue cap application.
17 November 2006	The AER received Access Economics' report on the wage growth forecasts in the utilities sector.
8 December 2006	The AER made its draft decision. The draft decision and consultancy reports are available on the AER's website.

Copies of Powerlink's application, consultancy reports and submissions are available on the AER's website.

The following interested parties provided submissions on Powerlink's revenue cap application:

- SP AusNet
- Energy Users Association of Australia
- Ergon Energy
- Major Energy Users
- Energy Action Group.

[215] http://www.aer.gov.au

Appendix C Detailed review of forecast capital expenditure projects

This appendix sets out the AER's considerations of PB's recommendations based on its detailed review of a sample of Powerlink's forecast capex projects. The project cost estimates are based on the median timing of each project in all 40 probabilistic scenarios and are in 2006–07 dollar terms.

While the AER has accepted PB's recommended adjustments in relation to a number of projects, it notes that Powerlink is not obliged to construct the adjusted project. In general, Powerlink is able to construct any suite of projects it believes are necessary over the next regulatory period. However, as part of the capex incentive framework, should Powerlink exceed the allowance set by the AER it would forgo both return on and of capital associated with the overspend within the regulatory period. Conversely should Powerlink spend less than the allowance set by the AER, it would benefit from the return on and of capital associated with the underspend within the regulatory period.

PB's discussion of its detailed reviews of forecast load driven projects and replacement projects can be found in appendices H and I of its report. PB's review of forecast security and compliance projects and non-network projects can be found in sections 4.5.2 and 4.6 of PB's report.

C.1 Strathmore to Ross 275 kV double circuit line (CP.01512/A)

Powerlink's information templates indicated that this project has a cost of $138 million and a probability of 28 per cent of proceeding during the next regulatory period. The timing for commissioning of the project is October 2010 under medium growth scenarios and October 2009 under high growth scenarios.

The project involves the construction of approximately 190 kilometres of 275 kV double circuit transmission line from Strathmore to Ross (double circuit twin sulphur conductors), substation works at either end of the line and five new 275 kV circuit breakers. The project has undergone the regulatory test.[216]

PB stated that:

- the need for the project is driven by Powerlink's mandated reliability obligations to supply demand under N–G–1 conditions in the Ross and Far North zones
- generation in this area is subject to considerable uncertainty due to the age, mix and type of available plant
- the only alternatives considered to the recommended options were the construction of a line at a higher AC voltage or a DC link.

[216] Powerlink, *Final report: final recommendation to address forecast reliability of supply requirements in 2007–10: North and far North Queensland*, November 2005.

Although PB was satisfied of the need for the project in 2010–11 under the medium growth scenarios, it made two recommendations in relation to this project. First, it was not satisfied that the project was needed under any of the high growth scenarios on the basis that it was assumed by Powerlink (under its probabilistic methodology) that a generator would commence operating in this area in the following year, removing any further benefits of the line until the next regulatory period. It did not consider that it was prudent or efficient for such a large project to be constructed to avoid one year of potential and marginal (approximately 107 per cent) overloads. PB indicated that should the high growth scenario be realised Powerlink could negotiate with one of its connected parties for a temporary lesser supply standard, implement a control scheme or consider various small scale demand side responses. On this basis, PB recommended that the probability of the line being needed in the next regulatory period be reduced from 28.1 per cent to 21.8 per cent because of the removal of the high growth scenarios.

Second, PB considered that the scope of the proposed project was not efficient. It considered that the use of a double circuit tower with a single low capacity circuit, combined with some additional shunt capacitor compensation, would be a more efficient option. It noted that if Powerlink still considered it needed the second circuit, it could be strung on the towers in the 2012–2017 regulatory period during times of low demand. Based on this and the removal of the high growth scenarios, PB recommended that the probability weighted cost of this project should be reduced by $17 million.

CHC supported PB's recommendation that the line should not be constructed in the next regulatory period for those high growth scenarios in which sufficient generation would be installed in the following year, thus relieving the potential marginal overloads.

The AER accepts PB's recommendation on the removal of the probability weighted expenditure associated with the high demand growth scenarios. The AER notes that it is efficient to defer a major augmentation if a new generator is expected to be operational in the year following a marginal potential overload. If the overload occurred, Powerlink could still meet its obligations under its Transmission Authority by negotiating an agreement with connected parties to provide lesser supply.

In relation to PB's recommendation that the project scope be changed, CHC observed that Powerlink had analysed the impact of two alternatives to its recommended option of constructing a double circuit twin sulphur conductor.[217] CHC noted that this analysis indicated that the costs of the two alternatives would exceed the cost of Powerlink's preferred option.

CHC also noted that PB had proposed a different option to those considered by Powerlink, involving twin phosphorous conductors and to string only one circuit initially. It considered that the question was whether the savings through the choice of a smaller conductor and deferral of stringing the second circuit would be greater than the calculated increased grid support costs.

CHC noted that PB had proposed a capital cost for the first stage (one circuit strung) of $100 million, compared with $138 million for Powerlink's double circuit proposal.

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[217] The two alternatives included a double circuit line with sulphur 'paw paw' conductor and a single circuit line with single 'paw paw' conductor, with another single circuit line constructed later (2016 if no generation).

Based on an interpolation of Powerlink's figures to account for a larger conductor than that analysed by Powerlink when considering the two alternatives, CHC considered that the differential cost of grid support would probably be less than $20 million, but the cost of the second circuit still needs to be considered. Consequently, CHC considered that the difference would be small, and therefore the prudence of PB's recommended scope change was not clear.

The AER has considered comments from PB, Powerlink and CHC. It accepts PB's recommendation that the project should not be constructed in any of the high growth scenarios on the basis that a new generator would be planted in the following year removing any benefits of the line until beyond the next regulatory period. It also acknowledges CHC's views that the prudence of PB's proposed changes to the scope of the project are unclear. As such, the AER seeks further information from Powerlink that its recommended option is more efficient than that proposed by PB. However, for its draft decision, the AER accepts PB's recommendation. Powerlink advised the AER that this would reduce forecast capex by $18 million.

C.2 Larcom Creek 275/132 kV substation establishment (CP.01958)

Powerlink's information templates indicated that this project has an estimated cost of $48 million and a probability of 89 per cent. The timing for commissioning of the project is July 2009.

The project involves the construction of a new substation designed for full breaker and half layout across eight switchbays with eight 275 kV circuit breakers and two 275/132 kV (375 MVA) transformers. It also includes the establishment of a remote 132 kV switchyard site via 7.7 kilometres of 275 kV double circuit transmission line (initially operated at 132 kV). The project has undergone the regulatory test.[218]

PB stated that:

- the need for the project was driven by Powerlink's mandated reliability obligations to supply all demand under N–1 transmission conditions within the Gladstone zone
- it was satisfied with the need for the project and that the general timing of the project had been triggered by the commitment of a new coal terminal at Wiggins Island. However, PB was unclear why the project was specifically required in July 2009
- it was satisfied that Powerlink had considered a number of network and non-network alternatives to the development of Larcom Creek and that none of these options provided the same level of flexibility and strategic benefits.

Powerlink's design of the substation takes into account the expected industrial developments in the Gladstone State Development Area (GSDA). Powerlink stated that given the size of the GSDA industrial precinct, load in the Gladstone area could increase by as much as 2500 MW above the forecast demand levels over the next 15 to

[218] Powerlink, *Proposed new large network assets, Gladstone area, final report*, November 2005.

20 years.[219] To accommodate this potential growth, Powerlink has provided for three key strategic aspects in its design of the substation. Powerlink is

- developing a 7.7 kilometres 275 kV transmission line to the remote 132 kV switchyard but operating it at 132 kV until it builds another 132 kV line when the capacity is required for a 275 kV line
- building Larcom Creek across eight switch bays to allow for ease of future augmentation when additional 275 kV lines are connected to it
- installing high capacity 375 MVA transformers at the substation for a radially supplied load that could range from 40 to 200 MW.

PB stated that although each of these strategic decisions reflected good consideration of future requirements, it considered there is a low likelihood of these industrial developments taking place in the next regulatory period and that only some aspects of Powerlink's proposed scope are efficient in the short term. PB recommended an allowance for this project based on:

1. a 132 kV transmission line instead of a 275 kV line
2. the 275 kV switchyard be developed with only three switchbays and seven circuit breakers
3. the transformer capacity be reduced from 375 MVA to 200 MVA
4. the project being deferred by three months.

PB considered that Powerlink could readily accommodate the extension of the 275 kV substation as required when and if the new lines were constructed to Larcom Creek, and that 200 MVA transformers would provide sufficient headroom for local load growth and the connection of some new customers to this new radial network.

Powerlink noted that with 200 MVA transformers, Larcom Creek substation would have a firm capacity of approximately 250 MVA. It stated that while no additional projects (with the exception of Wiggins Island) had been committed, it would seem reasonable, given the size of the GSDA to exceed 250 MVA.

In relation to four aspects of the project that PB commented on, CHC provided the following advice:

- Timing of project for October rather than July—while generally October is chosen for projects that are driven by summer load growth, projects driven by spot industrial developments are normally targeted for the agreed commissioning date of the load.

[219] Powerlink, *Final report: Proposed new large network assets, Gladstone area*, November 2005, p. 11.

- Choice of 275 kV construction for the line to the remote switchyard—Powerlink appears to have given no explanation as to how the line would be used at 275 kV, consequently PB's recommendation is reasonable.

- That the 275 kV switchyard be developed with only three switchbays—due to a number of factors (e.g. site levelling, fencing and need to build the additional bays with the substation live) the reductions thought possible by PB may not be achievable.

- Transformer capacity be reduced to 200 MVA rather than 375 MVA—changing transformers to a larger design is not a trivial exercise, as foundations are built specifically for each design and auxiliary plant and cabling would also need to be changed. Powerlink indicated that the larger size should be used if it will be needed in 12 years and this appears reasonable. The critical total demand to require this larger capacity would be only 200 MW and this seems very likely to be exceeded. The choice of 375 MVA transformers therefore appears prudent.

Overall, CHC considered that in principle the points made by PB were valid and that some reduction was warranted.

The AER has considered comments by PB, Powerlink and CHC. It acknowledges that the larger transformers appear to be prudent and there are difficulties associated with building further switchbays in a live substation environment. The AER seeks further information from Powerlink on its choice of 275 kV construction for the line to the remote switchyard and what date the new coal terminal at Wiggins Island is planned to begin operations. However, for its draft decision the AER accepts PB's recommendation that an allowance for this project be based on: a 132 kV line to the remote switchyard; that the 275 kV switchyard be based on only three switchbays and seven circuit breakers; and that the project be deferred until October 2009. Powerlink advised the AER that this would reduce forecast capex by $0.4 million.

C.3 Larapinta 275/110 kV substation establishment (CP.01195/A)

Powerlink's information templates indicated that this project has an expected cost of $55 million and is certain to proceed during the next regulatory period. The timing for commissioning of the project is October 2008 for the high growth scenarios, October 2010 for the medium growth scenarios and October 2011 for the low growth scenarios.

The project involves the construction of a new substation with a full breaker and half layout across three switchbays with seven 275 kV circuit breakers, two 275/110 kV (375 MVA) transformers, two 110/33 kV (100 MVA) transformers, and the construction of six kilometres of high capacity 110 kV line out of Larapinta (which includes some underground cable). The project has resulted from a joint planning exercise with Energex. Based on its review of this project PB stated:

- it was satisfied with the need and timing of the project, given the technical complexity of the network, the various constraints and general load growth in the fast developing southern Brisbane area

- Powerlink had considered a number of alternatives to the development of the Larapinta substation, including grid support and demand side initiatives but none of these provided the same level of flexibility and strategic benefits

- detailed NPV calculations for a number of alternatives have been considered and these support the decision on the preferred alternative.

In general, PB found that the scope of works was an effective and efficient approach to the forthcoming reliability constraints but that the cost of the 110 kV line out of Larapinta was too high. PB stated that there was insufficient evidence to substantiate the need to underground cables and recommended that the estimate be based on a reduced cable length and more overhead construction. PB also recommended that the BPO for the 110 kV line be reduced by 13 per cent to bring it into line with its estimate of a reasonable cost for a high capacity double circuit 110 kV line. PB indicated that its recommendation would reduce expenditure on this project by $6.1 million.

CHC noted that, from the material provided, Powerlink has proposed pole construction for the line, instead of cheaper lattice steel towers, and this may explain the reason for the higher cost of the 110kV line, in addition to a short line cost loading. CHC advised that the use of poles rather than towers is an attempt to reduce the visual impact of a line, particularly in residential areas and that this approach is generally considered by industry to be socially responsible, if not good industry practice.

The AER acknowledges that PB was satisfied with the need and timing of this project and that the scope of works represented an efficient and effective approach. However, PB found the cost of the project to be overstated due to the high cost of the line and the inclusion of underground cables. In relation to the use of poles rather than towers, the AER accepts the advice of CHC that such practice is considered to be good industry practice. Further, Powerlink has provided information which shows that the location is in a space restricted residential area. For this reason the AER does not accept PB's recommendation to reduce the cost of above ground 110 kV lines by 13 per cent.

In relation to the recommendation by PB that the undergrounding costs associated with this project be reduced, the AER has proposed treating undergrounding costs as contingent projects, with the trigger being the provision of a legal, regulatory or administrative requirement for the undergrounding. No such formal requirement for this project has been provided to the AER. As such, for its draft decision, the AER will include the efficient cost of an overhead line construction. However, it will treat the undergrounding costs as a contingent project. Powerlink advised the AER that this would reduce the ex ante allowance by $9 million.

C.4 275 kV double circuit line into Larapinta (CP.01771/B)

Powerlink's information templates indicated that this project has an estimated cost of $88 million and a 76 per cent probability of proceeding during the next regulatory period. The timing for commissioning of the project is September 2008 under high growth scenarios and September 2012 under medium growth scenarios.

The project involves the construction of high capacity 275 kV double circuit line into Larapinta, which includes some underground cable. Both high capacity lines will be

utilised at 275 kV operation. Substation works will be required at either end to allow the new lines to be switched, monitored and protected from faults. Three 275 kV and two 110 kV circuit breakers are also required.

Based on its review of this project PB stated that:

- it was generally satisfied with the need of the project, given the multiple contingencies leading to constraints and the nature of load growth in the south Brisbane area, even under the medium growth scenario

- Powerlink had considered a number of alternatives to the development of high capacity double circuit lines into Larapinta, including uprating and restringing the existing lines and options to lay the second underground cables at a later date

- detailed NPV calculations for a number of alternatives had been considered given the timing of various anticipated projects and these supported the preferred option.

In general, PB considered that the scope of works and the costs associated with this project represented an effective and efficient approach to the forthcoming reliability constraints. However, it noted that Powerlink had previously been able to defer this project via the transfer of load on the distribution network. Given this, and the relatively small potential overload forecast in summer 2011–12 of 102.6 per cent, PB considered that there may be an opportunity to defer the project by a further year by negotiating with one of its connected parties for a temporary lesser supply standard or through small scale demand side responses.

On the basis that the risk to Powerlink of deferring the project by one year would not be significant, PB recommended that the allowance for this project be halved and allocated to the last year of the next regulatory period. PB considered that this single year deferral would have the impact of pushing the majority of the required capex into the 2012–2017 regulatory period. It estimated the impact of its recommendation would be to reduce forecast capex by $33 million.

CHC noted that this project is the result of joint planning and already incorporates a deferral through the assumed transfer of load on the distribution network in the event of a contingency. CHC considered that it was possible that this has exhausted the negotiation option, as Energex also has an obligation to plan for full supply. CHC also considered that the other proposed demand side management option could be particularly difficult and expensive to acquire for just one year due to establishment costs.

The AER accepts that the scope of works and costs associated with this project represent an efficient and effective response to the emerging constraints. It also acknowledges the difficulties raised by CHC in deferring this project, however, it seeks further evidence from Powerlink that it is not able to negotiate with one of its customers for a temporary lesser supply standard and that demand side management is not a viable option. Therefore, for this draft decision, the AER accepts PB's recommendation that the timing of this project should be deferred by one year due to the high cost of this project, its proximity to the end of the next regulatory period and the relatively small

potential overload forecast in 2011–12. Powerlink advised the AER that this would reduce forecast capex by $32 million.

C.5 Molendinar 275/110 kV transformer augmentation project (CP.01528/A)

Powerlink's information templates indicated that this project has an estimated cost of $18 million and is certain to proceed during the period. The timing for commissioning of the project is March 2008 under the high growth scenarios, March 2010 under the medium growth scenarios and March 2012 under the low growth scenarios. The project involves the purchase and installation of one 275/110 kV (375 MVA) transformer, establishment of three switchbays, eight new 275 kV circuit breakers and 110 kV switchyard works to connect the new transformer.

PB stated that:

- the need was driven by Powerlink's mandated reliability obligations to supply all demand under N–1 transmission conditions in the Gold Coast/Tweed zone and the risk is associated with the limited thermal capability of the existing Molendinar and Mudgeeraba 275/110 kV transformers

- Powerlink had considered a number of network and non-network alternatives, including staged replacement of transformers at Mudgeeraba, different switchyard arrangements at Molendinar and the strategic placement of reactive compensation

- the preferred option provides improved operational flexibility; allowed for the efficient future installation of reactive support; and adhered to Powerlink's stated policies

- the scope of works and its costs represented an effective and efficient approach to forthcoming reliability constraints.

The timing of the project is driven by general load growth in the Gold Coast/Tweed area. The specific commissioning time of March for the high growth scenario results from the need to install a third transformer during the shoulder periods when demand is low prior to the Greenbank–Mudgeeraba line rebuild (CP.01537). This timing is necessary to allow the demand to be reliably supplied during the rebuild of the Greenbank to Mudgeeraba line.[220] The date of commissioning of the Molendinar transformer augmentation project is also March for the medium and low growth scenarios.

Although agreeing with Powerlink that the project is required in March under the high growth scenarios, PB considered that the project could be deferred by seven months under the low and medium growth scenarios (that is, the project should be commissioned by October rather than by March). PB indicated that this is because the project is only required under the low and medium growth scenarios to meet peak summer demand and therefore should be commissioned in October.

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[220] The line rebuild project is an augmentation project with a commissioning date of September 2008 under a high growth scenario.

CHC noted that PB had reviewed Powerlink's strategy of staggering the commissioning of lower value projects throughout a year and noted the practical necessity of this. Given that Molendinar falls within the classes of projects that could be advanced, CHC considered that the timing of the project should not be deferred.

The AER has reviewed comments from PB, Powerlink and CHC and has decided not to alter the timing of the Molendinar transformer project as:

- the approach in commissioning the Molendinar transformer in March under the high growth scenario appears prudent given the risks posed by the Greenbank–Mudgeeraba line rebuild
- the approach in commissioning this project is consistent with Powerlink's strategy of staggering lower cost projects within a year
- PB's recommendation does not result in a material change in forecast capex.

Therefore, the AER has not accepted PB's recommendation that the project be commissioned by 31 October rather than 31 March in each year that it is needed.

C.6 Central Queensland to South Queensland review of projects

In reviewing the Halys substation and second Calvale to Halys 275 kV double circuit transmission line (CP.00369/A), PB also examined a package of projects to improve the transfer capability from Central Queensland to South Queensland (CQ–SQ).[221] The projects had a probability weighted expenditure of $110 million. The package of projects are not mutually exclusive, and are staggered in timing and application across the scenarios assessed.

The CQ–SQ transmission capability is designed to ensure that any shortfall of load in South Queensland is met under N–G–1 credible contingency conditions, allowing for maximum power flows into Queensland from NSW via QNI and giving due consideration to the impact of Directlink flows on the secure transfer limits on QNI. From its review of the CQ–SQ limit, PB stated that:

- The considerable growth in forecast flows, notching in the forecast and the tendency for the constraint to occur in one year but not in the next made it difficult to arrive at a definitive position on the preferred option and its timing.[222] Nevertheless PB considered that there was a genuine need for a project.
- Powerlink has considered a number of options to address the constraint and different scenarios resulted in different preferred solutions.

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221 CP.00369/A has an estimated cost of $217.53 million and a probability of proceeding during the next regulatory period of 25 per cent. It involves the construction of approximately 316 kilometres of overhead 275 kV double circuit line between Calvale and Halys (with only one circuit strung) and the establishment of a new substation at Halys.

222 Notching in the forecast refers to the forecasts power flow characteristics across Central Queensland to South Queensland which change significantly from one year to the next. There is a gradual increase over time but the exposure from year to the next can vary substantially. This characteristic is primarily dictated by the decisions by ROAM to locate and size generation developments for the given scenario.

- Apart from including all of the scenarios with different outcomes in its weighted probabilistic assessment it was unclear how Powerlink would actually make a decision on the preferred augmentation for the CQ–SQ constraint.

During PB's review, Powerlink advised that it had re-examined the underlying assumptions it had made regarding the power flows across QNI and Directlink when assessing the CQ–SQ transfer limits. Powerlink's review resulted in a deferral of CQ–SQ augmentation projects from early in the regulatory period to later years and a net reduction in forecast capex of $41 million. However, Powerlink flagged that there may be a possibility that augmentations in the South West Queensland–South East Queensland transmission network may need to be advanced as a result of the reduced CQ–SQ transfer capability.[223]

PB noted that while it had limited opportunity to analyse the modified project program in detail, it has taken Powerlink's advice on the reduction in forecast capex at face value given the detailed analysis Powerlink undertook. PB also noted that, given the changing circumstances relating to the establishment of the Halys substation and the development of a double circuit 275 kV transmission line between the substation and Calvale, it had not been able to come to a definitive conclusion on what an appropriate allowance in Powerlink's forecast capex should be as it was not clear on what was now being sought.

The AER notes that Powerlink voluntarily provided the information on its findings of its review of CQ–SQ transfer limits and accepts the revised project timing and costs for the projects associated with the CQ-SQ limits. Powerlink advised the AER that this would result in a reduction in forecast capex of $41 million.

C.7 Halys to Blackwall 500 kV double circuit line (CP.01875)

Powerlink's information templates indicated that this project has an estimated cost of $193 million and a probability of 19 per cent of proceeding during the next regulatory period. The timing for commissioning of the project is October 2010 under the high growth scenarios and October 2013 under four of the medium growth scenarios.

The project involves the construction of approximately 153 kilometres of 500 kV double circuit quad conductor transmission line from Halys to Blackwall via Springdale. The line would initially be operated at 275 kV and be switched by four new circuit breakers at either end.

PB stated that:

- the need for the project was related to the need to increase the transfer capacity across the Tarong limit[224]

- it was satisfied of the need for augmentation, especially given the various contingencies that can result in thermal overloads

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223 Powerlink response to PB, Questions 1, 8 & 10 from 11 July 2006.

224 The Tarong limit is defined as the flow across seven 275 kV circuits. The limit is based on voltage stability after loss of one of the 275 kV circuits and thermal limits on the parallel circuit for a loss of the Milmerran to Middle Ridge circuit.

- Powerlink only compared the 500 kV development to a limited number of alternative projects

- Powerlink had advised that the approval to obtain two 500 kV double circuit easements from Halys to Springvale was granted in 1999-00 and that 500 kV circuits must be built on these last available easements.

PB considered that it was not sufficient to justify construction at 500 kV lines without further technical or economic justification. It considered that the level of assessment did not support the considerable investment and that other options such as construction at 275 kV or 330 kV, or even 500 kV double circuit line with only a single circuit strung may provide considerable reprieve from further constraints.

Given the likely growth in the forecast constraint, and pending further detailed studies, PB considered that a more efficient project would be a 275 kV twin sulphur double circuit line. On this basis, it recommended that Powerlink's forecast capex be reduced by $9 million. It considered that Powerlink would need to make greater efforts to identify the long term benefits of any proposed 500 kV line given that there are two easements and that at some later date a 500 kV double circuit could still be constructed.

CHC noted that in addition to its proposed solution, Powerlink had also analysed the same 500 kV construction with one circuit strung and staged stringing of a second 500 kV circuit.

CHC stated that it is clear that the stringing of only one circuit will result in a very short term relief of the constraint, irrespective of what line configuration is used, because the outage of that circuit becomes the critical contingency. Further, CHC noted that the operation of a new line at 275 kV will only give temporary relief and up-rating to 500 kV operation will soon be required. Overall, CHC considered that as there are only two easements available, and that they must be utilised at 500 kV construction, PB's argument to build additional 275 kV circuits in addition to the seven circuits already in place would be hard to sustain.

In addition, CHC noted that 500 kV is the natural choice for an 'overlay' voltage for a system with 220, 275 or 330 kV as the current maximum voltage. It stated that the staging for introduction of an overlay is always difficult and requires a long-term view. CHC speculated that Powerlink would build the two greenfield 500kV lines, and would then use the added capacity to provide opportunities to rebuild the existing lines. However, it noted that this would be well beyond the next regulatory period.

The AER has reviewed the comments from Powerlink, PB and CHC on this project. On balance, the AER does not consider that the construction of 275 kV double circuit towers is appropriate as:

- the operation of a new line at 275 kV will only give temporary relief and uprating to 500 kV operation will soon be required

- continued development at 275 kV would require two to three times as many 275 kV lines and lead to unmanageable fault levels

- Powerlink only have two existing easements into this area and these must be utilised at 500 kV.

On this basis, the AER does not accept PB's recommendation that an adjustment be made to Powerlink's proposed capex for this project.

C.8 Woolooga to North Coast 275 kV double circuit line and 275/132 kV transformer (CP.01264/A)

Powerlink's information templates indicated that this project has an estimated cost of $67 million and a probability of 76 per cent. The timing for commissioning of the project is October 2009 under the high growth scenarios and October 2011 under the medium growth scenarios.

The project has been planned jointly with Energex. It involves the construction of approximately 70 kilometres of 275 kV double circuit transmission line from Woolooga to the North Coast to be operated as a single paralleled circuit, with a 275/132 kV transformer directly connected at the North Coast end of the line. The development also requires one 275 kV circuit breaker at Woolooga and connection to an existing 132 kV switchyard at the North Coast end of the line.

From its review, PB found that:

- the project is related to load growth in the northern area of the Sunshine Coast and loading on Energex's Woolooga–Gympie 132 kV lines

- Powerlink and Energex had considered four network alternatives, including operating the line at 132 kV and development at 132 kV

- while the economic NPV analysis could have been presented in a more transparent and detailed manner, the approach taken was reasonable.

PB noted that Powerlink and Energex are proposing to establish 275 kV lines to the the North Coast (a distance of approximately 70 kilometres) but considered that a development to Gympie (a distance of approximately 30 kilometres) would sufficiently address the forecast reliability constraints. While acknowledging that the North Coast is a more central and strategic injection point to the region, PB considered that the development did not appear efficient in the short term and based on the particular constraint that triggers the project.

PB recommended that Powerlink's proposed capex for this project be reduced by $18 million to provide for the development of a 275 kV double circuit line from Woolooga to Gympie rather than to the North Coast and the installation of the transformer at this location. PB considered that a staged approach to the development would allow the remaining section of the line between Gympie and North Coast to be developed later, as economically and technically required.

CHC stated that PB's recommendation to reduce the scope of the project in this way would have implications for Energex and that additional costs may arise for electricity consumers. CHC considered that there was insufficient information about the nature of

the constraints in the northern Sunshine Coast to make an assessment of PB's recommendation.

The AER notes CHC's comments on this project and therefore seeks further information from Powerlink and Energex on the nature of the constraints in the northern Sunshine Coast area and the impact on customers resulting from PB's recommendation. However, for its draft decision, the AER accepts PB's recommendation that a shorter line project would represent a more efficient alternative to address the forecast reliability constraints. It is also noted that Powerlink would be able to develop the remaining section of the 275 kV line between Gympie and North Coast when it can be justified. Powerlink advised the AER that this would reduce forecast capex by $16 million.

C.9 Generic high growth scenario projects

While reviewing the Central Queensland No.1 132/33 kV transformer project (CP.01985) PB identifed a package of eleven generic projects that had been developed by Powerlink in joint planning studies with Ergon and Energex.[225] These projects have been specifically scoped to support the high load growth scenarios. They have an estimated cost of $65 million during the next regulatory period and a probability of 7 per cent of proceeding during the next regulatory period.[226] PB found that none of the projects had been identified with a specific trigger, constraint or need but instead had been developed based on trending techniques using similar projects from the medium growth scenario.

While appreciating Powerlink's and the DNSPs' attempts to capture risks associated with the high load growth scenarios, PB did not consider that there was sufficient evidence of either the need or timing of the projects, nor the efficiency of the approach. PB recommended that none of the projects be included in Powerlink's forecast capex allowance and therefore that Powerlink's proposed capex be reduced by $4.8 million.

CHC noted that joint planning between Powerlink, Energex and Ergon concentrates solely on the medium growth scenario. As a result, it states that there is a gap in the capex data for high growth scenarios, which Powerlink has attempted to address with these generic projects. CHC considered that these generic projects recognise that load growth is likely to be uneven across Queensland and therefore it is not possible to be definitive as to where the augmentations will be required.

The AER has reviewed PB's and CHC's comments and has decided not to accept PB's recommendation that the eleven generic projects should be removed from Powerlink's forecast capex. While acknowledging PB's concerns that the projects have no identified need, the AER considers that it is a reasonable methodology to trend the medium growth generic projects to capture the additional capex that would be required under the high growth scenario and that these projects should form part of the probabilistic forecast. On this basis, and in the absence of an alternative proposal by PB, Powerlink's

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225 The specific projects are: CP. 01976, CP.01977, CP. 01978, CP.01979, CP.01980, CP.01981, CP.01982, CP.01983, CP01984, CP.01985, CP01986. Five projects are augmentations and six are connections.

226 The aggregate value of the projects is just under $90 million but some of this will be incurred in the 2012–2017 regulatory period.

trending technique appears to be a reasonable methodology to capture possible capex requirements under high load growth scenarios.

C.10 South Coast 500 kV double circuit easement acquisition and compensation (CP.011865/A/B)

Powerlink's information templates indicated that the estimated cost of these two projects is $16 million. Both projects have been identified in all scenarios and are therefore certain to proceed. The timing of the completion of the acquisition component of the project is identified as October 2011, and for completion of the compensation component, it is October 2012 under all scenarios.

The project is a strategic easement to widen the existing easement into the Moreton South zone to assist with future support to the Gold Coast, Coomera and Beenleigh areas. The easement widening is 50 metres and the assumed length is 30 kilometres. The majority of the project cost is the compensation component.

Given the strategic nature of this project and its close proximity to the end of the next regulatory period, PB considered that it is prudent to defer it by a one year. It stated that this will have the effect of deferring the most expensive easement project into the subsequent regulatory period and provide for a much more even easement expenditure profile during the next regulatory period. PB estimated that its recommendation results in a $12 million reduction in forecast capex and will have minimum effect on the risk profile faced by Powerlink in acquiring what PB agrees is a strategic easement.

CHC supported PB's recommendation, stating that on the evidence presented the timing of the easement acquisition was not critical and construction was not imminent.

The AER accepts PB's recommendation that this project be deferred by one year on the basis of its strategic nature, its proximity to the end of the regulatory period and its relatively high cost. Powerlink advised the AER that this would reduce forecast capex by $11 million.

C.11 Substation security upgrade project

Powerlink's information templates indicated that this project has an estimated cost of $49 million over the next regulatory period and is certain to proceed. The scope of work includes a detailed risk assessment of each substation site and implementation of appropriate passive and active security measures in accordance with the *National guideline for the prevention of unauthorised access to electricity infrastructure*.[227] The average cost per substation is around $400 000.

PB considered that there was a genuine need for the project, that Powerlink had undertaken a reasonable approach in considering other alternatives, and that its costs are efficient. However, PB noted that Powerlink does not intend to initiate the project until the 2008–09 financial year. PB considered that given the importance of the project, Powerlink's proposed works should be advanced and that the capex be slightly redistributed over the next regulatory period.

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227 Energy Networks Association, *National guideline for the prevention of unauthorised access to electricity infrastructure*, August 2006.

The AER reviewed documentation provided by Powerlink and accepts PB's recommendations that there is a genuine need for the project and that the costs are efficient. The AER accepts PB's findings that, given the critical nature of substations, this project should be advanced to commence in 2007–08.

C.12 Transmission line security upgrade

Powerlink's information templates indicated that this project has an estimated cost of $49 million over the next regulatory period and is certain to proceed. The scope of the proposed works involves prioritising transmission towers and implementing specific security measures.

PB noted that most of the the security risks would be mitigated once 50 per cent of the proposed project scope had taken place. It also considered that many towers located in remote locations would be far less exposed to security related breaches and that the impact of any security breach would be limited in these circumstances. As Powerlink have discretion over the timing of the project, PB recommended that Powerlink should defer some of the timing of this project to the following regulatory period.

The AER examined documentation provided by Powerlink which states that the purpose of the project is to upgrade security measures on all transmission towers in its network. These additional measures are based on recent Federal and State Government strategies to protect critical infrastructure. The AER accepts PB's findings that some of this project could be deferred to the following regulatory period. PB advised the AER that this would reduce forecast capex by $13 million.

Appendix D Contingent projects and their triggers

This appendix sets out the drivers of the approved contingent projects, their scope and their specific trigger events. Before starting any assessment of the adjustment to be made to Powerlink's maximum allowed revenue (MAR) in relation to a contingent project, Powerlink will need to demonstrate to the AER's satisfaction that the relevant trigger event has occurred. It should also be noted that where the trigger event occurs, the scope of the contingent project must not include any projects (or associated project scope) contained in Powerlink's approved ex ante allowance.

D.1 QNI upgrade (Queensland component)

The driver for this project is the benefit to the market from increasing the capacity of the Queensland–New South Wales Interconnector (QNI). The limits that cause the constraints to occur on QNI arise from a range of complex factors, including: transient stability; oscillatory stability; voltage stability; and thermal limitations both within the Queensland and New South Wales networks.

The scope of the project involves the installation of: series compensation; dynamic shunt compensation using static var compensators and power control equipment; and uprating the existing Armidale to Tamworth 330 kV circuit. Based on a pre-feasibility study this upgrade would result in an increase of 150 to 200 MW to QNI's capacity.[228] Powerlink would only undertake investment on the section of the project that relates to its network. The indicative cost of this project is $100 million.

The trigger for this project is consistent with the ACCC's 2005 revenue cap decision for TransGrid.[229] The project needs to be justified against the net market benefit limb of the regulatory test.

D.2 Supply to Queensland Rail for rail link

The driver for this project is a decision by Queensland Rail to electrify a proposed track section connecting its northern and central coal haulage routes. Additional network investment would be required to extend the current electricity supply to Queensland Rail for this railway link. The scope of this project includes the development of substations in Newlands, Buckley, Collinsville and Goonyella and associated easement acquisitions. The indicative cost of the project is $70 million.

The trigger for this project is a commitment by the Queensland Rail to proceed with the electrification of the proposed railway track connecting its northern and central coal haulage routes.

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228 Powerlink and TransGrid, *QNI upgrade: upgrade benefits—a pre-feasibility study: a report on outcomes of the planning process*, April 2005, p. 2.

229 ACCC, NSW and *ACT transmission network revenue cap TransGrid 2004–05 to 2008–09*, April 2005, pp. 218-19.

D.3 Augmentation of supply to South East Queensland

The driver of this project is changes in generation patterns in South East Queensland (SEQ) which result in the requirement for additional dynamic reactive power source in the Brisbane area. The scope of the project includes two 350 MVAr SVCs in SEQ. The indicative cost of this project is $50 million.

The trigger for this project is significant changes in generation patterns in SEQ that require an additional dynamic reactive power source in the SEQ region. These changes to generation are different to the SEQ generation assumptions adopted in the probabilistic model. The project must be triggered prior to 30 June 2010.

D.4 Ebenezer 275/110 kV substation establishment

The driver for this project is a large industrial and commercial area flagged for future development in the Ipswich area and which has been included in the Energex Strategic Plan. The scope of the project includes the establishment of 275/110 kV substation; installation of two transformers; connection of two new 275 kV circuits to Greenbank and Blackwall; and establishment of 110 kV bus with one 110 kV transformer bay and two 110 kV feeder bays. The indicative cost of this project is $40 million.

The trigger for this project is an industrial load of 20 MW in the Ipswich area that would result in an overload of the Energex network.

D.5 Nebo to Moranbah 275 kV line

Ergon Energy has provided information to Powerlink on anticipated load growth from major mining customers in the Bowen Basin area. This information indicated that expansions would continue for at least the next five years in the coal industry.

The driver for this project is an additional 50 MW mining load in the Bowen Basin area.[230] The scope of this project is a 275 kV DCST transmission line between Nebo and Moranbah and associated substation works at Nebo. The indicative cost of this project is $90 million.

The trigger for this project is additional mining load of 50 MW in the Bowen Basin area that has the affect of overloading the 132 kV supply network between Central and North Queensland.

D.6 Nudgee establishment and 275 kV Nudgee to Murrarie line

The driver of this project is a change in reliability standard at Brisbane Airport to N–2. The possible scope of the project includes line works between Nudgee and Murarrie and substation work at Belmont, Murrarie and Nudgee. The indicative cost of the project is $100 million.

The trigger for this project is a change in reliability standard at Brisbane Airport to N–2 which has the effect of overloading the existing and planned transmission and sub-transmission networks supplying the Nudgee and Sandgate areas.

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[230] This is 50 MW higher than forecast in the 2005 APR. The APR only takes into account committed mining load that it known at the time of publication.

D.7 Desalination plant in South East Queensland

The driver for this project is a desalination plant in SEQ. Powerlink indicated that the Gold Coast City Council requested Energex to provide information on electricity supply availability for sites for a desalination plant. The scope of the project includes the establishment of a 275/110 kV substation in SEQ. The project has an indicative cost of $37 million.

The trigger for this project is final planning approval by the Gold Coast City Council for the development of a desalination plant in SEQ.

D.8 Gladstone major industrial development (M50++)

The driver for this project is a large industrial development in the Gladstone area of between 500 MW and 1000 MW. The scope of the project includes: the construction of transmission line from the Larcom Creek substation to industrial development sites; establishment of Auburn River switching station; the installation of 120 MVAr in the Gladstone area; and refurbishment of the Calvale 275 kV substation. The indicative cost of this project is $170 million.

The trigger for the project is an additional 500 MW industrial load development in the Gladstone area that has not been included in the 2005 APR demand forecasts. The project scope must not include any projects included in Powerlink's probabilistic assessment. To avoid any doubt, the Larcom Creek substation works should not be included in the scope of this contingent project as this has already been taken into consideration in the ex ante allowance.

D.9 Undergrounding costs

Powerlink's application includes 16 projects that contain limited sections of undergrounding. The specific details of these projects has not been included for confidentiality reasons. The AER will treat the undergrounding costs associated with these projects as contingent projects, unless the undergrounding is specifically required for technical reasons. For two of the 16 projects, undergrounding is required for technical reasons. The unweighted cost of the undergrounding associated with the remaining 14 projects is $233 million ($nominal).

The trigger for any undergrounding costs is a legal, regulatory or administrative determination made by a relevant authority or Minister indicating that the undergrounding is required for planning approval for the particular project to be granted. However, as discussed in section 4.6.7, to avoid any delays to the projects, the AER will undertake an advanced assessment of undergrounding contingent projects and make its determination conditional. This process is discussed further in appendix E.

Appendix E Process for invoking undergrounding contingent projects

The trigger event for undergrounding contingent projects is a legal, regulatory or administrative determination requiring a line or a portion of it to be undergrounded. In general, the AER's assessment process will be undertaken substantially in accordance with clause 6A.8.2 of the new chapter 6A rules. However, to avoid delaying the implementation of these projects, the AER will allow Powerlink to submit an undergrounding contingent project application prior to the trigger event occurring. The process the AER will undertake for an undergrounding contingent project is set out below.

E.1 Submission of an application

Powerlink may submit an application to the AER for an undergrounding contingent project when either:

(a) planning approval has been sought for the project (including the undergrounding element). For example, a request has been made to the Minister for designation of the project as community infrastructure; or

(b) Powerlink has commenced the economic evaluation of options, recommending implementation of a project involving undergrounding. For an augmentation, this is the regulatory test, otherwise it would be Powerlink's internal analysis of options.

The information in the application would conform to the requirements in clause 6A.8.2, except for those requirements related to the contingent project materiality threshold.

E.2 Evaluation of the application

The AER will evaluate Powerlink's application in accordance with clause 6A.8.2 of the new rules, except for assessment of the materiality threshold provisions. If planning approval and approval for construction has not been provided by the time the AER has completed its evaluation, the AER would make its determination conditional. The AER's determination would be conditional upon receiving formal notification that planning approval has been received and that approval to construct the project (including the undergrounding) has been given. For augmentation projects, approval to construct would be demonstration that the project has satisfied the regulatory test.

E.3 Formal notification that conditions have been met

Powerlink provides the AER with formal notification that planning approval has been received and that the project (including the undergrounding) has received approval to be constructed.[231] Upon provision of this notification the AER's determination would be implemented. In the case of an augmentation, approval to construct would be the project satisfying the regulatory test.

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[231] The AER requires notification that both planning approval and approval to construct have been obtained, however, only one may be required for this stage if the other has previously been provided with the undergrounding contingent project application.

Appendix F Service standards scheme

This appendix sets out the AER's conclusions on Powerlink's service standards incentive scheme for the next regulatory period.

F.1 Performance measures and definitions

Powerlink's performance is to be assessed against the following performance measures:

- circuit availability:
  - peak circuit availability (between 7 am to 10 pm week days)
  - critical circuit availability (primarily 275/330 kV network)
  - non-critical circuit availability (132/110 kV network and below)
- loss of supply events frequency:
  - events greater than 0.2 system minutes
  - events greater than 1.0 system minutes
- forced outage duration.

These measures are defined in tables F.1—F.3 below.

Table F.1 Measure 1—transmission circuit availability

Sub-measures	Transmission circuit availability (critical circuit elements). Transmission circuit availability (non-critical circuit elements). Transmission circuit availability (peak periods).
Unit of measure	Percentage of total possible hours available.
Source of data	TNSP outage reports and system for circuit availability. Agreed schedule of critical circuits and plant. Peak period—7:00 am to 10:00 pm weekdays. Off peak period—all other times.
Definition/formula	Formula: $\frac{\text{No. hrs per annum defined (critical/ non-critical/peak) circuits are available}}{\text{Total possible number of defined circuit hours}} \times 100$ Definition: The actual circuit hours available for defined (critical/non-critical) transmission circuits divided by the total possible defined circuit hours available. A circuit element is an item of primary transmission equipment including a line transformer, bus or line reactor, capacitor or voltage regulator but does not include individual circuit breakers and isolators or secondary systems.* A critical circuit element is an element of the 330 kV network, the 275 kV interconnected network that forms the backbone of the transmission system and interconnections to other jurisdictions. All other circuits are non-critical.* Powerlink should submit a list of critical circuits/system components annually as part of the AER's compliance review.
Exclusions	Unregulated transmission assets (e.g. some connection assets). Any outages shown to be caused by a fault or other event on a '3rd party system' e.g. intertrip signal, generator outage, customer installation. Force majeure events as per the Service Standards Guidelines. Any outage not affecting Powerlink's primary transmission equipment.*
Inclusions	'Circuits' includes overhead lines, underground cables, power transformers, phase shifting transformers, static var compensators, capacitor banks, and any other primary transmission equipment essential for the successful operation of the transmission system. Outages from all causes including planned, forced and emergency events, including extreme events. Faults originating from Powerlink owned equipment that affect primary plant or equipment owned by a distributor, connected customer or a generator.*

* These items were not included in the original definitions of the *Service standards guidelines*.

Table F.2 Measure 2—loss of supply event frequency index

Sub-measures	Number of events greater than 0.2 system minutes per annum. Number of events greater than 1.0 system minutes per annum.
Unit of measure	Number of significant events per annum.
Source of data	TNSP outage reports and system for circuit availability.
Definition/formula	Number of events greater than 0.2 system minutes or 1.0 system minutes where: $\text{System minute} = \frac{\text{Customer outage duration (minutes)} \times \text{load lost (MW)}}{\text{System maximum demand (MW)}}$ Definition of system minute: The customer outage duration (in minutes) times the load lost (in megawatts) divided by the highest system maximum demand (in megawatts) that has occurred prior to the time of the event.*
Exclusions	Unregulated transmission assets (e.g. some connection assets). Any outages shown to be caused by a fault or other event on a '3rd party system' e.g. intertrip signal, generator outage, customer installation. Planned outages. Force majeure events as per the Service Standards Guidelines.
Inclusions	All unplanned outages exceeding the specified impact (i.e. 0.2 system minutes and 1.0 system minutes). All parts of the regulated transmission system. Extreme events.

* These items were not included in the original definitions of the *Service standards guidelines*.

Table F.3 Measure 3—average outage duration

Unit of measure	Minutes.
Source of data	TNSP outage reporting system.
Definition/formula	Formula: $\frac{\text{Aggregate minutes duration of all unplanned outages}}{\text{Number of events}}$ Definition: The cumulative summation of the outage duration time for the period, divided by the number of outage events during the period. The start of each outage event is the time of the interruption of the first circuit element. The end of each outage event is the time that the last circuit element was restored to service.* The impact of each event is capped at 7 days.#
Exclusions	Planned outages. Momentary interruptions (duration of less than one minute). Force majeure events as per the Service Standards Guidelines.
Inclusions	Faults on all parts of the transmission system (connection assets, interconnected system assets). All forced and fault outages whether or not loss of supply occurs.

* These items were not included in the original definitions of the *Service standards guidelines*.
# The 7 day cap applied to Powerlink was based on SKM's original recommendations but was not included in the standard definitions.

F.2 Definition of force majeure

For the purpose of applying the service standards incentive scheme, 'force majeure events' means any event, act or circumstance or combination of events, acts and circumstances which (despite the observance of good electricity industry practice) is beyond the reasonable control of the party affected by any such event, which may include, without limitation, the following:

- fire, lightning, explosion, flood, earthquake, storm, cyclone, action of the elements, riots, civil commotion, malicious damage, natural disaster, sabotage, act of a public enemy, act of God, war (declared or undeclared), blockage, revolution, radioactive contamination, toxic or dangerous chemical contamination or force of nature

- action or inaction by a court, government agency (including denial, refusal or failure to grant any authorisation, despite timely best endeavour to obtain same)

- strikes, lockouts, industrial and/or labour disputes and/or difficulties, work bans, blockades or picketing

- acts or omissions (other than a failure to pay money) of a party other than the TNSP which party either is connected to or uses the high voltage grid or is directly connected to or uses a system for the supply of electricity which in turn is connected to the high voltage grid

- where those acts or omissions affect the ability of the TNSP to perform its obligations under the service standard by virtue of that direct or indirect connection to or use of the high voltage grid.

In determining what force majeure events should be 'Excluded force majeure events' the AER will consider the following:

- Was the event unforeseeable and its impact extraordinary, uncontrollable and not manageable?

- Does the event occur frequently? If so how did the impact of the particular event differ?

- Could the TNSP, in practice, have prevented the impact (not necessarily the event itself)?

- Could the TNSP have effectively reduced the impact of the event by adopting better practices?

F.3 Calculation of performance

The following tables and figures represent the scale of the financial penalty or reward (y–axis) resulting from Powerlink's performance measure of circuit availability (x–axis). Tables F.4—F.9 show the set of linear equations that are represented in figures F.1—F.6.

The final s-factor result for each calendar year should be determined by the following formula:

$$S_{ct} = S_1 + S_2 + S_3 + S_4 + S_5 + S_6$$

where:

S_{ct} = the total service standards factor (s-factor)

ct = the time period/calendar year

S_1 = s-factor for peak circuit availability

S_2 = s-factor for critical circuit availability

S_3 = s-factor for non-critical circuit availability

S_4 = s-factor for loss of supply events greater than 0.2 system minutes

S_5 = s-factor for loss of supply events greater than 1.0 system minutes

S_6 = average outage duration.

Figure F.1 Circuit availability—critical elements

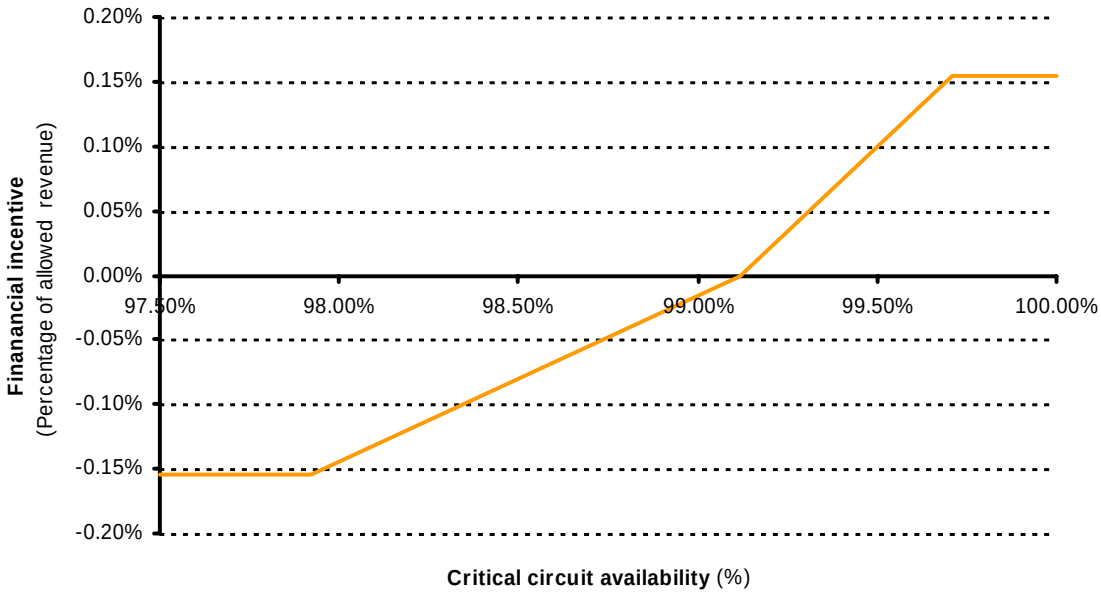

Table F.4 Circuit availability—critical elements

						Where:					
S1	=	–0.00155						Availability	<	97.92%	
S1	=	0.129167	x	Availability	+	–0.128030	97.92%	≤	Availability	≤	99.12%
S1	=	0.262712	x	Availability	+	–0.260400	99.12%	≤	Availability	≤	99.71%
S1	=	0.001550					99.71%	<	Availability		

Figure F.2 Circuit availability—non-critical elements

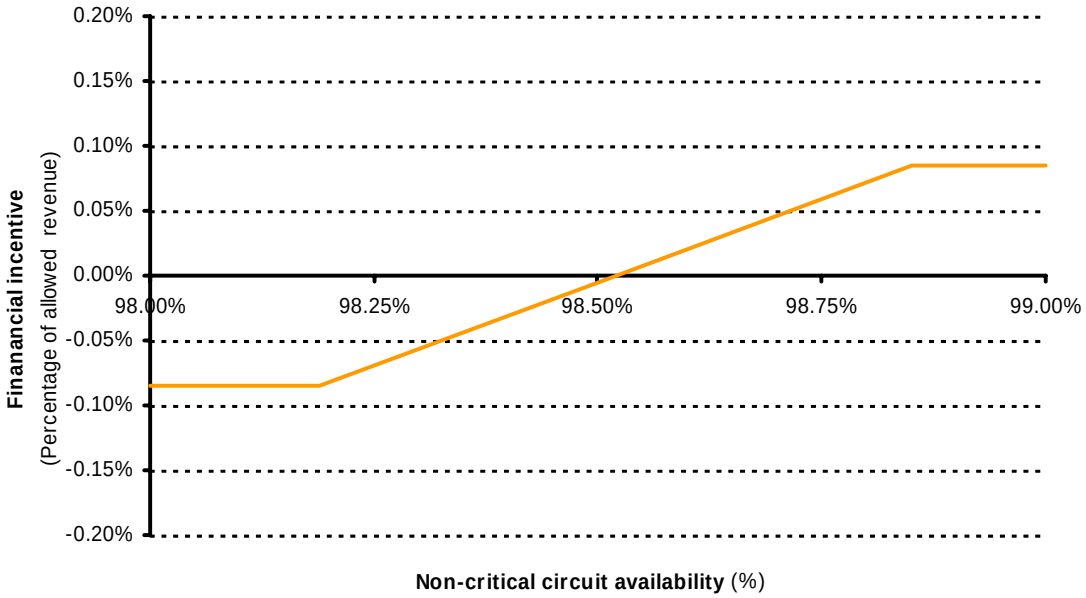

Table F.5 Circuit availability—non-critical elements

							Where:					
S2	=	–0.000850							Availability	<	98.19%	
S2	=	0.257576	x	Availability	+	–0.253764	98.19%	≤	Availability	≤	98.52%	
S2	=	0.257576	x	Availability	+	–0.253764	98.52%	≤	Availability	≤	98.85%	
S2	=	0.000850					98.85%	<	Availability			

Figure F.3 Circuit availability—peak hours

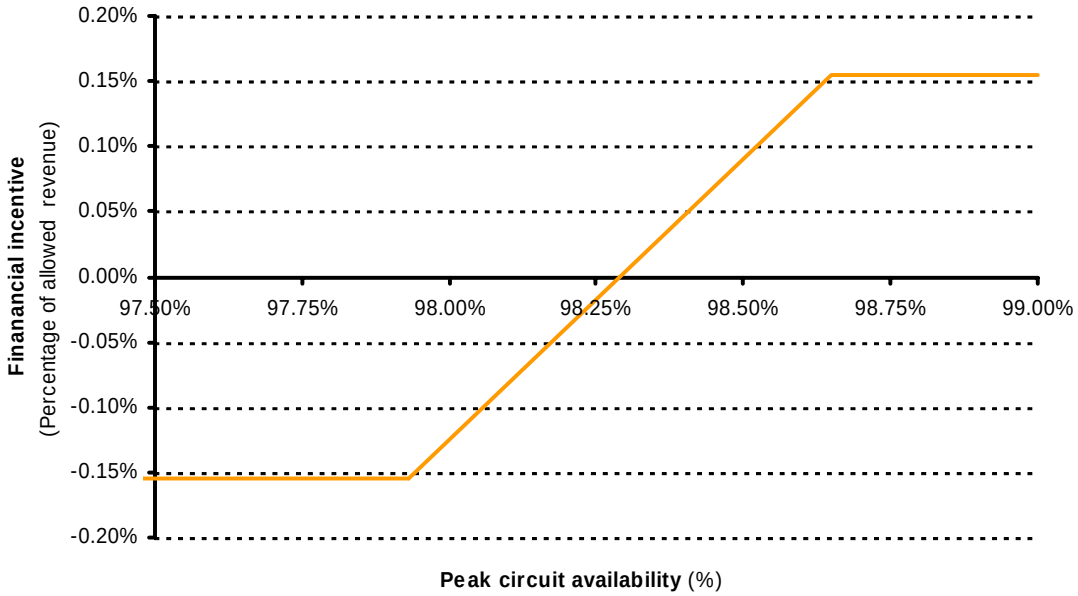

Table F.6 Circuit availability—peak hours

						Where:						
S3	=	–0.001550						Availability	<	97.93%		
S3	=	0.430556	x	Availability	+	–0.423193	97.93%	≤	Availability	≤	98.29%	
S3	=	0.430556	x	Availability	+	–0.423193	98.29%	≤	Availability	≤	98.65%	
S3	=	0.001550					98.65%	<	Availability			

Figure F.4 Loss of supply event frequency > 0.2 minutes

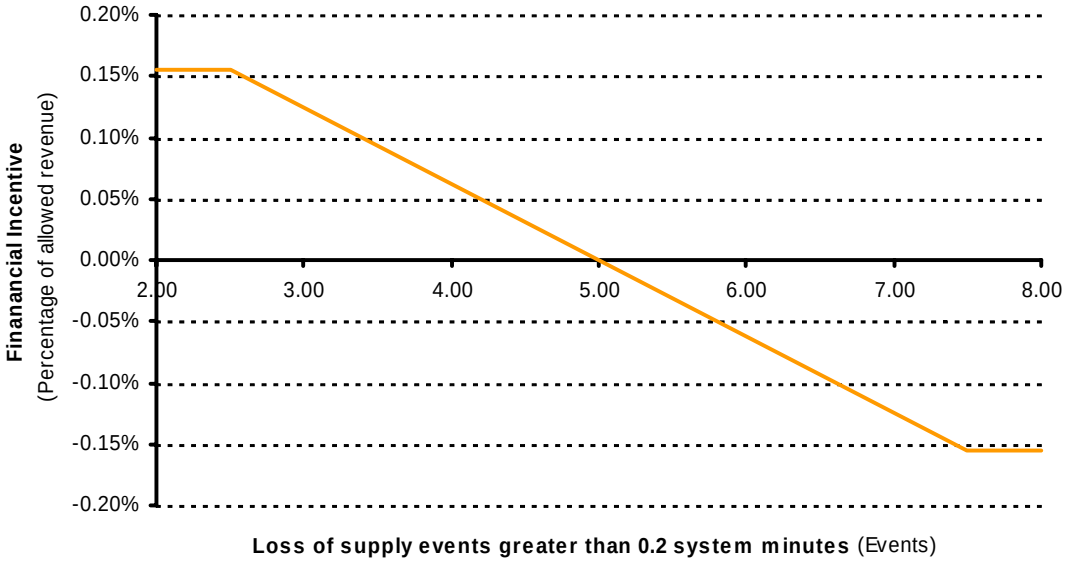

Table F.7 Loss of supply event frequency > 0.2 system minutes

							Where:					
S4	=	–0.001550					7.5	<	No. of events			
S4	=	–0.000620	x	No. of events	+	0.003100	5.0	≤	No. of events	≤	7.5	
S4	=	–0.000620	x	No. of events	+	0.003100	2.5	≤	No. of events	≤	5.0	
S4	=	0.001550							No. of events	<	2.5	

Figure F.5 Loss of supply event frequency > 1.0 system minutes

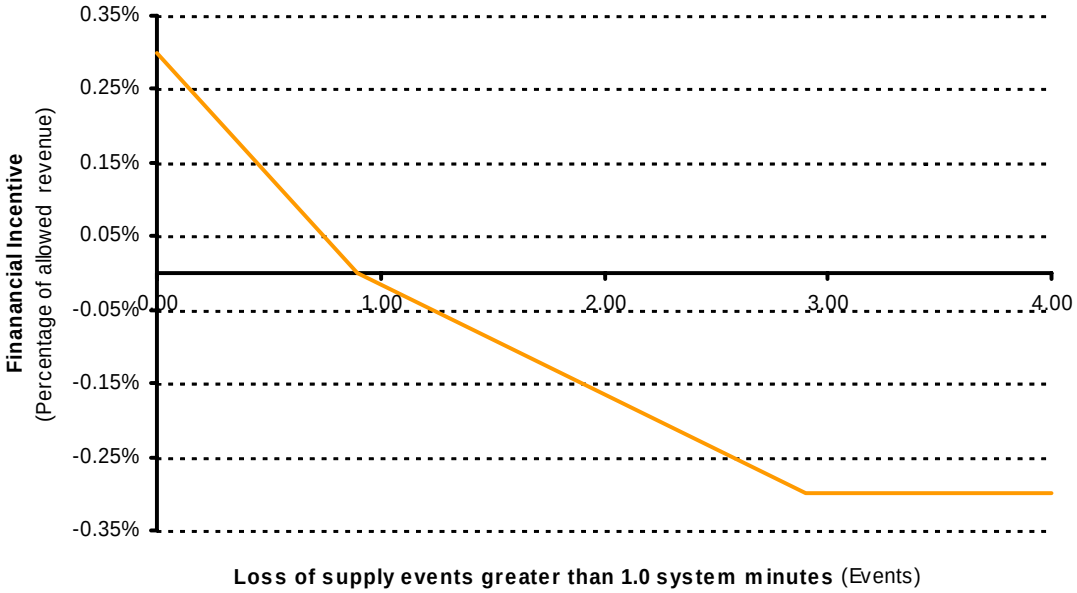

Table F.8 Loss of supply event frequency > 1.0 system minutes

							Where:					
S5	=	–0.003000					2.9	<	No. of events			
S5	=	–0.001500	x	No. of events	+	0.001350	0.9	≤	No. of events	≤	2.9	
S5	=	–0.003333	x	No. of events	+	0.003000	0.0	<	No. of events	≤	0.9	
S5	=	0.003000							No. of events	=	0.0	

Figure F.6 Average outage duration

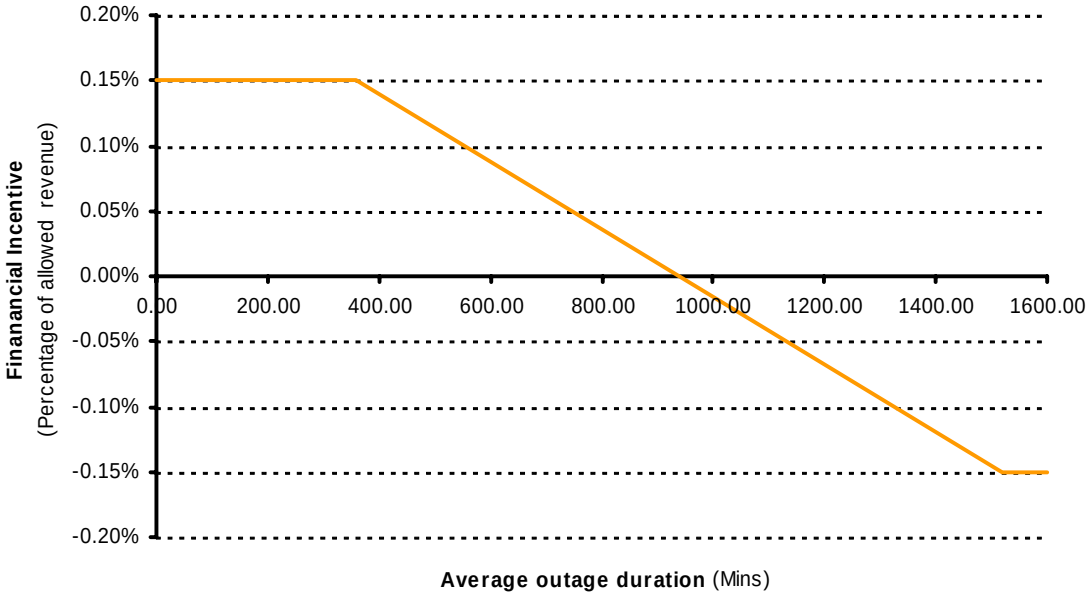

Table F.9 Average outage duration (capped at 7 days)

							Where:					
S6	=	–0.001500					1520	<	Average outage duration			
S6	=	–0.000003	x	Average outage duration	+	0.002424	939	≤	Average outage duration	≤	1520	
S6	=	–0.000003	x	Average outage duration	+	0.002424	358	≤	Average outage duration	≤	939	
S6	=	0.001500							Average outage duration	<	358	

F.4 Calculation of the financial incentive

The financial incentive applied to Powerlink's allowed revenue (AR) can be found by multiplying Powerlink's average AR by the total s-factor result. This may result in a positive (or negative) financial bonus (or penalty) depending on Powerlink's performance over the relevant calendar year. The financial incentive is included in the maximum allowed revenue (MAR) for the financial year immediately following the relevant calendar year. The financial incentive and MAR formulae are set out in chapter 9 of this decision.

F.5 Annual reporting

In accordance with clause 6.2.5 of the old rules and the service standards guidelines, Powerlink must record and report all performance measures annually on a calendar year basis. All reporting should be in accordance with the information requirements as outlined in the guidelines.

Performance should be reported within two months of the completion of the previous reporting period. The exact timetable for the annual compliance reporting should be decided on an annual basis by agreement between the AER and Powerlink with due regard for the guidelines and pricing imperatives.

Table F.10 Timing of Powerlink's service standards incentive reporting

Performance reporting period	Period	Financial incentive applied to AR
1 July 2007–31 December 2007	6 months	1 July 2008–30 June 2009
1 January 2008–31 December 2008	1 year	1 July 2009–30 June 2010
1 January 2009–31 December 2009	1 year	1 July 2010–30 June 2011
1 January 2010–31 December 2010	1 year	1 July 2011–30 June 2012
1 January 2011–31 December 2011	1 year	1 July 2012–30 June 2013
1 January 2012–30 June 2012	6 months	1 July 2013–30 June 2014

F.6 Change in recording or reporting systems

Powerlink is required to notify the AER in the event of any material change in the information systems used to record information relating to the service standards scheme.