PB ASSOCIATES

POWERLINK REVENUE RESET

Response on Selected Issues in Powerlink's Submission

Prepared for

AUSTRALIAN ENERGY REGULATOR

TABLE OF CONTENTS

SECTIONS

APPENDICES:

1. INTRODUCTION

1.1 BACKGROUND TO THE TASK

The Australian Energy Regulator (AER), in accordance with its responsibilities under the National Electricity Rules (NER), is determining the maximum allowed revenue for the prescribed transmission services to be provided by Powerlink Queensland (Powerlink) for the next regulatory period, which extends from 1 July 2007 to 30 June 2012.

On 3 April 2006, Powerlink submitted its revenue proposal for the five-year regulatory period to the AER.

In December 2006 the AER published its Draft Decision regarding the transmission network revenue cap for Powerlink, including PB Associates' (PB's) report on its review of the capital expenditure, operating and maintenance expenditure and service standards proposed by Powerlink (the PB Review).

As part of the public consultation on its economic regulation, Powerlink made a detailed submission to the AER in response to the Draft Decision and the PB Review. Other interested parties also made submissions.

Following receipt of Powerlink's submission, the AER requested further comment from PB on specific issues raised by Powerlink in respect of the PB Review. This request is included in Appendix A. This report addresses the issues raised in the AER request.

Unless otherwise indicated, this report does not consider information contained in Powerlink's supplementary revenue proposal, which Powerlink submitted in December 2006. This supplementary revenue proposal sought to increase the maximum allowed revenue due to new and relevant information that had emerged since the preparation of its original revenue proposal. PB was engaged to review Powerlink's supplementary revenue application under separate terms of reference.

2. FORECAST REPLACEMENT CAPEX

2.1 INTRODUCTION

In reviewing the replacement capex requirements for the next regulatory period we examined the replacement projects shown in Table 2.1 below.

Table 2.1: Summary of Replacement Capex Projects Reviewed ($m, 06/07)

Item	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Transmission Line Replacements						
Yabulu-Igham		5.59	41.64	27.03		74.26
Innisfail-Edmonton		6.82	50.41	0.58		57.81
Cardwell-Tully				10.94	35.82	46.76
Ingham-Cardwell			3.31	31.82	6.62	41.75
Kareeya-Innisfail[1]	19.14	18.60				37.74
Wurdong – South Pine Earth Wire Replacement	1.41	6.66	11.58	4.69	15.39	39.74
Substation Primary Plant Replacements						
Swanbank B Rebuild	-	-	2.43	9.40	25.97	37.80
Substation Secondary Systems Replacement						
Tarong Secondary Systems Replacement	-	-	4.74	20.23	1.56	26.53
Communications Systems Replacement						
Eagle Heights to Mudgeeraba Microwave Radio Replacement	0.22	0.17				0.40
Virginia to Mt Gravatt Microwave Radio Replacement			0.26	0.20		0.46
Wilkes Knob to Mt Glorious Microwave Radio Replacement				0.51	0.05	0.56
Metropolitan Communications Systems Replacement – Stage 2				0.20	0.15	0.35
Total Value of Reviewed Projects	**20.77**	**37.84**	**114.37**	**105.60**	**85.56**	**364.16**
Forecast Replacement Capex	113.72	93.58	208.07	196.39	201.05	812.80
Ratio of value of Projects Reviewed						45%

Source: PB Associates
Note 1: In addition $9.91 million is budgeted for this project for the two year period 2005-7.

In reviewing the information provided on the above projects we concluded that the provision for some projects, in particular the Swanbank B Rebuild and the Tarong Secondary Systems Replacement seemed excessive. However, it was not possible to determine the extent of any overestimate from a desktop review of the information available.

We therefore undertook a top down analysis to determine what we considered to be a reasonable provision for asset replacement and, based on the results of this analysis we recommended that Powerlink's forecast asset replacement requirements be reduced by $110.5 million or almost 14%.

In response Powerlink commissioned a report on its replacement cost forecast from Evans and Peck[1] that concluded:

> *It is difficult (if not impossible) to support PB's conclusion that a generic rule of thumb methodology should displace the rigorous bottom up forecasting processes adopted by Powerlink.*

Powerlink considers that substituting a rough rule of thumb plus arbitrary "fudge factors" estimate for Powerlink's detailed engineering-based replacement plan would constitute poor regulatory practice to the extent that it would set an "unrivalled low water mark in Australian regulatory practice".

In response to these comments the AER has requested that we respond to the comments by Powerlink and Evans and Peck and, in particular to comment on:

(i) whether our conclusions in relation to project scoping are correct;

(ii) whether a review of Powerlink's bottom up replacement plan should not have been abandoned in favour of an arbitrary, aged based, top down approach; and

(iii) whether we appropriately examined the integration of Powerlink's asset replacement requirements into the broader capital works program.

In this Section 2 we consider further those projects that we examined where we did not fully endorse Powerlink's replacement cost proposal. We comment in detail on the Evans and Peck report and provide more detailed reasons why we resorted to a top down analysis and the validity of the assumptions used for the top down analysis on which our recommendation on replacement capex was based.

2.2 PROJECT REVIEWS

2.2.1 Far North Queensland 132 kV Transmission Line Replacement

The largest replacement project reviewed was the replacement of the 132 kV lines between Townsville and Cairns. For administrative purposes, Powerlink has divided this project into five separate sub-projects, as separately identified in Table 2.1 above. These projects require a total expenditure of $258.32 million. The lines were originally constructed in the mid 1950s to supply Cairns and Townsville from the Kareeya hydropower station. In assessing the need for this transmission line replacement project we have relied on a condition assessment undertaken by Sinclair Knight Merz in 2000 that indicates that replacement of all these lines is necessary if they are to be kept operational. We concur with this assessment and did not dispute it in the PB Review.

However, since these lines were originally constructed the following system developments have occurred, which have impacted the need for these lines and the way that the system is operated.

- A double circuit 275 kV line was constructed between Chalumbun and Cairns in 2003 along a western corridor, effectively providing two high capacity supplies into Cairns. This is supported by a 275 kV backbone network that has the capability of transmitting power from Central Queensland north to Townsville and Cairns.

- The Kareeya hydropower station has been connected to this 275 kV network at Chalumbin.

[1] *AER Draft Decision. Review of Replacement Network Capex;* Evans & Peck, January 2007.

The consequence of these network changes are that supply into Cairns has been secured for the medium term and that currently the main function of the old 132 kV lines is to provide an electricity supply to the coastal towns between Townsville and Cairns. However, given the difficulty in obtaining the easement for the 275 kV line, Powerlink believes that it will not be possible to construct a third transmission circuit into Cairns along the western corridor and the only route available for an eventual third high capacity circuit into Cairns is the eastern corridor route currently occupied by these old 132 kV lines. Powerlink therefore proposes to construct a hybrid 275/132 kV line along this route with one circuit constructed at 275 kV to provide a long term third high capacity supply to Cairns and the second circuit operating at 132 kV to provide a supply to the local coastal towns. The existing 132 kV Kareeya-Tully and Kareeya-Innisfail lines will be decommissioned and not replaced on their existing routes. However, a new line between Tully and Innisfail will be constructed so that the new 275/132 kV hybrid line will run all the way from Townsville to Cairns, bypassing the Kareeya power station.

In respect of this proposal we make the following observations.

- The existing double circuit 275 kV line into Cairns, which was only completed in 2003, has a single circuit capacity of 738 MVA (according to the 2004 economic evaluation) whereas the current load in North Queensland (which includes Chalumbin, Innisfail and Cairns) is approximately 380 MW[2].

- The original proposal developed by Powerlink at the time of the SKM condition assessment in 2000 was to initially build a higher capacity single circuit 132 kV line on double circuit towers and to install the 275 kV circuit at a later date when the load grew.

- The current proposal was developed following a comprehensive economic evaluation of four options in 2004. The evaluation was undertaken for a project life of twenty years because of the need to take into account the potential load growth at Cairns. The selected dual voltage option was the highest ranked in four of the six load growth and generation planting scenarios studied. None of the options studied included staged single circuit construction as planned in 2000. The reason for discarding this option was not stated.

- The proposed new 132 kV circuit will use a conductor with a significantly higher thermal rating than the existing line. This would cater for additional growth in the coastal towns between Townsville and Cairns at a relatively low incremental cost.

- In its economic evaluation Powerlink estimated that the incremental cost of the preferred option over and above the cost of replacing the existing lines was $7.7 million (excluding the cost of procuring the new easement). On this basis it considered that it was under no obligation to treat the project as a large network augmentation in accordance with the requirements of the NER as the NER does not require consultation in respect of asset replacements and only requires full public consultation for augmentations expected to cost over $10 million. For all scenarios, it was assumed that the existing Kareeya-Innisfail line would be replaced by a line between Tully and Innisfail over a new route.

We accept that the existing 132 kV lines have reached the end of their useful life and that they must be replaced if they are to continue in operation. We also accept that it would not be good asset management practice to design replacements purely on a like for like basis and that long term load increases should be taken into account. In particular we agree that Powerlink was prudent to take into account a potential long term requirement for a further increase in supply capacity to Cairns, given that a route for a new overhead line is unlikely to be available.

[2] Powerlink advise that it would not be possible to fully utilise this capacity due to voltage stability considerations,

In spite of this we have reservations about Powerlink's approach to the analysis of this project. In particular:

- Notwithstanding the desire to secure a third transmission circuit route into Cairns, the project when fully constructed will result in a major increase in the power transfer capacity between Townsville and Cairns. Powerlink's decision to proceed with this project was made in 2004, very soon after a major augmentation to meet the medium term capacity requirement had been completed and was made without undertaking the full public consultation process required by the NER for large network augmentations.

- In spite of this, Powerlink justified the decision to proceed on the basis of its assessment that the augmentation component of the project was under the $10 million threshold. This highlights a lack of clarity in the NER regarding the treatment of projects that have both an augmentation and a replacement component or which involve a reconfiguration of the existing network arrangement. It is fair to say that in this instance Powerlink interpreted the rules in a manner that was advantageous to it. In our view an alternative, equally valid, interpretation of the NER requirements is that the new Tully-Innisfail line should have been treated as a network augmentation since no line currently existed on that route and that Powerlink should have taken the view that the Kareeya-Innisfail and Kareeya-Tully lines were stranded assets. If the NER requirements had been interpreted in this way, a full consultation process would have been clearly indicated since the estimated cost of the new Innisfail-Tully line alone was $20.8 million, plus the cost of the new easement. Arguably, such an interpretation would have been more consistent with the objective of the NER regulatory test, which is to ensure public consultation prior to implementation of works that will result in a major increase in the power transfer capacity of the transmission network.

- It is unclear that the four project alternatives included in the economic evaluation were the most cost effective options available to Powerlink. In particular they did not include the alternative of a single circuit strung on double circuit towers, as planned in 2000 and it is not clear why, if such an option was likely to be acceptable in 2000, it was no longer acceptable in 2004. Furthermore no information was provided on alternative 132 kV circuit capacities, an omission that could be significant if higher capacity circuits could defer follow-up augmentations at a relatively small incremental cost.

Powerlink advised that, irrespective of what was planned in 2000, it was necessary to run both circuits on the double circuit towers at the same time since to do otherwise would have left one or more towns in the area dependent on a single circuit during construction, and this was not permitted by the terms of its Transmission Authority (unless agreed by Ergon Energy). We accept this, but highlight that the single circuit would have been a relatively new cyclone-rated overhead line with a low probability of failure and a likely maximum repair time of only a few hours. There is no indication that Powerlink discussed the acceptability of such a risk with Ergon Energy or that it seriously considered the possibility of mitigating this risk in some other way, such as through the use of standby generation.

On the basis of the information provided, we were unable to reach a firm conclusion on whether the project selected for implementation was the most cost effective option available to Powerlink. Even if it is accepted that making provision for a future 275 kV line was reasonable, it is possible that the initial stringing of only one circuit would have resulted in a reduced NPV. We therefore believe that this alternative should have been considered in more detail even though it would require the community to accept a slightly elevated level of risk. Further planning studies, outside the scope of this project, would have been needed to determine whether such an approach was technically feasible and also to quantify both the magnitude of any cost savings and the extent of any additional risk. We further consider that the acceptability of any risk associated with a lower cost project alternative could have been much clearer if the project had been subjected to the

full and more extensive public consultation process in accordance with the requirements of the NER regulatory test.

2.2.2 Swanbank B Substation Rebuild

Swanbank B substation consists of six "breaker and a half" substation diameters providing twelve equipment termination bays. Powerlink is proposing to rebuild the outdoor switchyard to increase the fault level and to ensure compliance with its current standards. In the PB Review we supported this upgrade but noted that Swanbank B power station connections accounted for four of the twelve equipment termination bays. We commented that the future of this power station was most uncertain and that if, as appeared likely, the station was to be decommissioned only four of the existing six substation diameters would be required. We therefore proposed that the requested provision be reduced from $37.8 million to $30 million to reflect the reduced scope of work.

Powerlink acknowledges that the future of Swanbank B is uncertain but it argues that the decommissioning of Swanbank B would imply a "slightly reduced scope" that would reduce the required provision by only $2.6 million. It further noted that:

> *The Swanbank B switchyard is a critical switching and transformation node in the Brisbane area and is not solely associated with the power station. The switchyard is still required whether or not the power station continues to operate. Therefore the asset replacements are still required.*

We agree with the importance of the Swanbank B switching station to the network and the need to proceed with the rebuild of those parts of the switchyard that are still required after the power station is decommissioned. We believe however that if the station is decommissioned then the equipment in unused bays should not be replaced and that the switchyard should be rebuilt with a more compact layout. When additional bays are required any substation extension works should be undertaken as part of the associated grid augmentation project.

Our proposed 20% reduction in project cost was based on the rebuild of only four of the six switchyard diameters and made what we considered to be adequate provision for additional costs required to reconfigure the external network connections for the more compact layout. Powerlink has not stated the basis for its estimated cost reduction of only 7%, but we suspect that it may be planning to retain all six diameters and to leave four of the twelve line termination bays as spare. If this is the case we regard the proposed scope of work as excessive as it involves the replacement of stranded assets. On the other hand, if Powerlink is proposing to reduce the size of the switchyard then we do not understand why the cost savings are not greater.

We also think that it would be most cost effective for the project to be undertaken after Swanbank B is decommissioned, because that would mean that costs related to keeping Swanbank B operational during the project could be avoided. The project is currently timed for the final three years of the next regulatory period and if there is a delay in decommissioning of Swanbank B then the costs of the upgrade would be pushed out into the 2012-2017 regulatory period.

At the time of writing the PB Review no final decision had been made on the future of Swanbank B, although the station was not retained in any of the 40 scenarios used for Powerlink's modelling of its load related capex requirement. However it has now been publicly announced that Swanbank B will be decommissioned in 2011[3].

[3] Power Industry News, 19 March 2007, p4.

2.2.3 Tarong Secondary Systems Replacement

Powerlink is proposing a complete replacement of all secondary systems at Tarong substation. This will involve the installation of a new relocatable control building to house secondary systems associated with the 132 kV primary equipment, and the replacement of all equipment in the existing control building with new equipment, irrespective of the condition of the equipment it was replacing. This replacement will be progressive in order to keep the substation operational throughout the project. The total cost is $26.3 million, the bulk of which is programmed for 2009/10.

In the PB Review we concluded that the cost of this project was high, noting that it was higher than the estimated cost at completion of the outdoor switchyard rebuild and 70% of the forecast cost of rebuilding the outdoor switchyard at Swanbank B. We also stated that:

> *In order to justify the project Powerlink undertook its own condition assessment in January 2006. We did not find this report convincing. It rated the overall condition of the plant as 21.8 out of a maximum of 40, which, using Powerlink's own scoring system, indicates that only minor refurbishment is required. While the report notes that some equipment needs to be replaced it also indicates that many of the relays are relatively new, having been replaced in the last five years, presumably under operational refurbishment programs.*

We stand by this assessment. We believe that the condition assessment indicated that a more targeted approach with equipment being selectively replaced was all that is required. We also commented that a more detailed assessment, including a site visit, would be necessary in order to more precisely estimate an appropriate cost provision for the work.

Powerlink responded that:

> *…PB did not discuss its concerns regarding the apparent replacement of "recently installed" equipment with Powerlink during its review. Had PB discussed this with Powerlink, it would have found that Powerlink had considered two options for this project implementation – a full replacement (including the "early replacement of 13% of the assets), or a partial replacement (of 87% of the assets), with the remaining 13% being replaced at the end of their economic life...*
>
> *…The NPV analysis of these options identified that full replacement … was the lowset overall cost with the break even timing for the staged approach … being slightly greater than 8 years.*

It would appear that Powerlink takes the view that, in undertaking an assessment like this, rather than making an adverse finding based on the information presented, PB should have requested further detailed analysis from Powerlink. We reject this, because the regulatory process requires the review of the Revenue Reset submission prepared by Powerlink to be undertaken over a predetermined and published timeframe, and the time available does not include any provision for the AER, or its advisors, to undertake alternative in-depth analyses. Had this report considering the two options been available at the time we undertook our initial review, we believe we should have been advised of its existence and the report should have been provided to us without our asking for it. The 13% early replacement figure on which Powerlink's economic analysis was based appears to be taken from an age profile as of December 2006[4], which would indicate that the economic analysis may have been undertaken after we made our original findings.

While we have no reason to doubt the economic analysis methodology used by Powerlink, we note that the outcomes from such analyses are driven by the input assumptions made. We do not think such an analysis should be taken at face value and

[4] *Powerlink Response to AER Draft Decision of 8 December 2006,* (9 Feb 2007), Appendix I. p17, Table 2.

an in-depth consideration of the validity of input assumptions would have been required in order to properly assess Powerlink's work. We note, for example, that the assumptions are based on an asset age profile even though Powerlink has stated that its asset replacement decisions are based on condition rather than age. We still consider that a proper assessment of Powerlink's decision that a full secondary systems rebuild was necessary would require a site visit and could not be undertaken purely on the basis of a desk top analysis.

2.3 EVANS & PECK REPORT

Following the release of the AER's Draft decision and the PB Review Powerlink engaged Evans and Peck to provide an independent view of the issues in relation to asset replacement. Evans and Peck concluded that

> *Our overall conclusion is that, apart from arguments around the margin in the secondary systems category, the processes applied to the determination projects for inclusion, scope of solutions and costs are robust.*
>
> *Given the relatively small number of relatively large projects included in the forecast, and a lack of evidence supporting a view that projects are unnecessary and over scoped, it is difficult (if not impossible) to support PB's conclusion that a generic "rule of thumb" methodology should displace the rigorous bottom up forecasting adopted by Powerlink (p18)*

We do not argue with the bulk of the Evans & Peck report. It reaffirms our view that Powerlink has a rigorous process in place to identify, scope and cost asset replacement projects. The PB Review did not suggest otherwise, and in no case have we disagreed with the substance of the condition assessments made by Powerlink. We do note however that the Evans and Peck report makes use of information that was not made available to us at the time of our review.

However there are some statements made in the report that misrepresent our position to a greater or lesser degree and we consider these statements in more detail below.

Evans & Peck:

> *In order to achieve a $111 million reduction in forecast, we would have had to find significant line or substation projects that should be excluded from the forthcoming regulatory period. We have not been able to find such projects (p1).*

PB Comment: In our view the timing of replacement cost expenditure is more discretionary than the timing of augmentation expenditure, which is driven by the need to meet deterministic regulatory obligations. On this basis we believe the issue is not whether line or substation projects can be excluded from the next regulatory period but whether a reduction in replacement cost expenditure of $111 million or 14% over the next regulatory period would add a significant risk to Powerlink's ability to meet its regulatory obligations.

We addressed this issue directly in the PB Review where we stated:

> *Unlike augmentation projects, Powerlink has a significant amount of discretion over the timing of asset replacements. We agree that the current level of asset replacement expenditure is not sustainable going forward and that a significant increase is justified. Nevertheless, we consider that a prudent operator working in a competitive environment would be able to continue its operations on a significantly lower replacement cost budget than proposed by Powerlink for the next regulatory period while at the same time avoiding any material reduction in the level of service provided to customers. (p110)*

We also noted that:

> *The $140 million per year is well in excess of the average replacement capex over the current regulatory period and is more than sufficient to cover Powerlink's proposed requirement for the first two years of the next regulatory period. Any shortfall will not be apparent until the final three years. As we noted above, the timing of much of this expenditure is discretionary and we consider it highly likely that much of this proposed capex will be deferred to the 2012-17 regulatory period for other reasons. However, if Powerlink is able to show at the 2012 regulatory reset that the amount provided has been insufficient to meet its prudent asset replacement requirements, then the AER could increase the provision in the early years of the 2012/17 regulatory period to allow Powerlink to catch up on any backlog (p113).*

Neither Powerlink nor Evans & Pack have commented on these conclusions. Our understanding of the regulatory framework is that if the $140 million is allowed but not spent it is retained by Powerlink and could be considered a windfall efficiency gain. The money is then reinstated in the following period, constituting a strong incentive to overstate the asset replacement cost requirement and represent the need for asset replacement as more compelling than it actually is.

Evans & Peck:

> *PB reviewed [the North Queensland 132 kV line replacement projects] in some detail. Whilst expressing a philosophical view that some of the project should have been scoped as augmentation (and therefore subject to the Regulatory Test under the National Electricity Rules), and that the possibility of a part build should have been more fully investigated, PB endorsed the replacement of these assets. PB also accepted that even if the project had been scoped in this way, it is probable that the regulatory test would have confirmed the option selected by Powerlink. On this basis PB's recommendation should relate to the transfer of capital from one category to another, not its elimination from Powerlink's overall allowance (p8).*

PB Comment:

The PB Review did not state that a regulatory test would have supported the option selected by Powerlink but it did state that a regulatory test would probably have confirmed that it was appropriate to make provision for a third 275 kV supply into Cairns. Our main concern was that the option of stringing this 275 kV circuit at a later date was not seriously considered, even though this was the option that was proposed in 2000. We would have preferred this option to have been carefully examined from both a technical and economic perspective.

Evans & Peck:

> *SS14 ranks highly, but has been pushed **out** (E&P emphasis) of the current period to align with primary work (p12).*

PB Comment:

This is consistent with our view that Powerlink has significant discretion over the timing of asset renewal expenditure.

Evans & Peck

> *Whilst full details of PB's concerns are not provided, our review suggests that the main difference between PB's position and Powerlink's position is the cost of keeping the newer existing panels in service for a number of years. Powerlink believe that the cost of integrating an existing system into a new system is as high as 40% of the cost of replacing the panels completely. On relatively short life assets (that is 15 years), unless the newer panels are quite new, retention is unlikely to give the lowest life cycle cost. Intuitively this makes sense, but in the time available we are not in a position to verify the percentage allocated. In such situations, we err in favour of the practitioners with day to day responsibilities for preparing such estimates (p14).*

PB Comment

This statement is a reasonable reflection of the difficulty we faced in reviewing the Tarong secondary systems project and the reason we were unable to come to a firm conclusion. We note that in reviewing our assessment of this project Evans & Peck had access to information that was not made available to us. Our terms of reference precluded us from simply "erring in favour of practitioners with day to day responsibilities for preparing such estimates".

We also do not understand why it is necessary to replace so many of the panels completely as modern day relays and other equipment are designed to fit directly into existing modular frames.

Evans & Peck

> *The estimates provided by Powerlink [for the Swanbank B substation rebuild] are its best estimate of outcomes. The decision of the AER in relation to a revenue cap does not constitute approval for expenditure on a project by project basis. It remains the responsibility of Powerlink's management and Board to approve individual projects as and when they are required. In the case of the Swanbank B project, this will be sometime in 2010. If the closure of Swanbank B were confirmed by that time, Powerlink would be negligent in its duties if it incurred unnecessary expenditure. However, for the purpose of the AER decision, forecasts must be made at this point in time based on the best available information. At this point in time, that suggests that Swanbank B will still be in service and, in Evans & Peck's view, it is reasonable to include the related assets in this forecast.*

PB Comment

Given that the decommissioning of Swanbank B was assumed in all 40 network augmentation scenarios, we cannot accept the statement that its continued operation was Powerlink's "best estimate" of the outcome. To be consistent with the rest of the original revenue application it should have assumed that the station was to be decommissioned and prepared its forecast on that basis. In any case the issue is not whether Swanbank B will still be in service in 2010 but whether or not it will be refurbished to extend its life as it would be inappropriate to rebuild Swanbank B grid connections only a short time before the station was to be decommissioned.

2.4 TOP DOWN ANALYSIS

Our analysis of specific asset replacement projects proposed by Powerlink indicated that the asset replacement requirements proposed by Powerlink for some projects we reviewed could be overstated. Our difficulties included:

- The replacement of the North Queensland 132 kV lines incorporated a solution that was driven by the long term need to make provision for a third high voltage circuit into Cairns. Given that the proposed solution will involve the construction of assets that will have a much higher power transfer capacity than the existing arrangement, and that this was driven by the need to cater for forecast long term load growth in the city of Cairns, we believe that the project should heave been treated as a network augmentation. However our main concern is that Powerlink does not appear to have undertaken a comprehensive analysis of the alternative of implementing the project in two stages, and deferring the construction of the 275 kV "augmentation" circuit.

- The rebuild of the Swanbank B outdoor switchyard includes the replacement of assets likely to become stranded when Swanbank B is decommissioned.

- The rebuild of the Tarong substation secondary systems seems excessive when compared with the conclusions of Powerlink's own condition assessment. While Powerlink argues that the decision to proceed was based on an economic analysis of alternative approaches, we were not advised of the existence of this analysis at the time of our review and have not had the opportunity to properly evaluate it. However, assuming that a full rebuild is indeed a cost effective approach, on the information available to us we are confident that the project, which is not due for implementation until towards the end of the next regulatory period, could be deferred without undue risk of Powerlink not being able to meet its regulatory obligations.

Having reached these conclusions our terms of reference required us to propose an alternative forecast of Powerlink's asset replacement requirements. This is problematic since both risk and condition assessments are largely subjective, and any assessment based on a desk top review of the limited amount of information available to us would be little more than speculation.

Moreover it is not the role of the AER to micro-manage Powerlink and it is not required to individually approve each project. In setting a revenue cap the AER must ensure that sufficient funding is provided so that Powerlink's ability to meet is regulatory obligations is not compromised over time. On the other hand, it must also ensure that the funding provided for non-load driven asset replacement is not excessive as this would permit the Powerlink to make windfall gains at its customers' expense or alternatively would result in the economically inefficient premature replacement of assets. Given the subjective component of much bottom up condition and risk assessment it would seem appropriate for the regulator to use both a bottom up and top down analysis in determining an appropriate revenue cap. The top down analysis would set an appropriate replacement cost benchmark and then the bottom up analysis would then provide a view on whether the top down level should be adjusted to accommodate any special requirements of the business.

On this basis, given our difficulty in determining an appropriate adjustment to Powerlink's proposed asset replacement revenue requirement we considered that a high-level top down analysis would assist. This analysis, which used as a starting point the basic rule of thumb that asset replacement expenditure should be equal to depreciation, is described in Section 4.5.1.4 of the PB Review, indicated that Powerlink's forecast asset replacement requirements were high and that a significant downward adjustment was indicated.

While Powerlink did not accept the validity of using a top down approach, it has not criticised our analysis other than to say that the 20% escalation factors we allowed for augmentation and for working around existing infrastructure were arbitrary. We accept this but note that Powerlink did not suggest that they were manifestly incorrect nor did it suggest any analytical basis for the use of different assumptions.

A reasoned commentary on our top down analytical method was provided in EnergyAustralia's submission on the draft decision. EnergyAustralia considered that our approach may well be a good proxy for a replacement capex forecast provided that certain assumptions hold true. We discuss each of these assumptions in turn and the extent to which they are valid for Powerlink.

- *Assets can be replaced incrementally.*

  We agree that there may be some "lumpiness" in the actual asset replacement expenditure for transmission system fixed assets, where individual assets have a high capital cost. However this lumpiness would tend to manifest itself when comparing actual expenditure from year to year. Our analysis determined the total asset replacement expenditure over the five year regulatory period and did not determine, with any precision, the actual expenditure requirement in any specific year.

- *Depreciation was consistent with the correct replacement cost.*

  Powerlink's depreciation should be consistent with the asset valuation undertaken at the time of setting the current revenue cap, indexed at CPI in order to more closely reflect current replacement costs. We accept that replacement costs for transmission system fixed assets have increased at a rate greater than CPI in the current regulatory period and this difference was not explicitly taken into account in our top down analysis. Further work would be needed to quantify any error. On the other hand the top down analysis assumes that all existing assets will need to be replaced and does not remove the value of stranded assets, such as the Swanbank B connection assets.

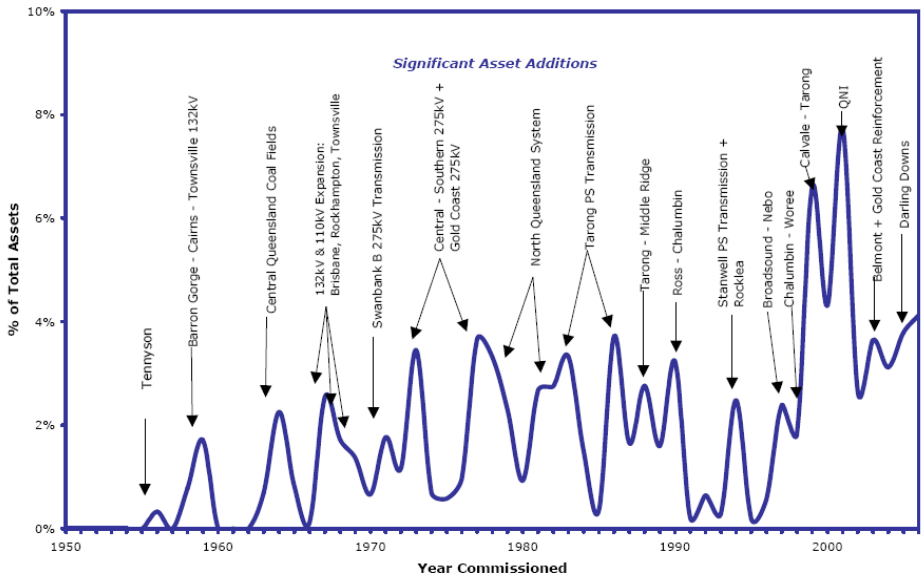
- *35 years is an appropriate capital weighted life for Powerlink's assets.*

  We understand that a more accurate capital weighted asset life would be about 42 years. However the assumed capital weighted asset life makes no material difference to the analysis. Using a longer asset life would increase the assumed undepreciated asset replacement cost. However this increase would be offset by the fact that if the asset life was longer the existing asset base could be replaced over a longer period.

- *The asset base will age over the 35 years in a consistent linear manner.*

  Our analysis has assumed that assets were added to the network at a constant rate over the period 1955-1998, which is not inconsistent with the age profile provided in Figure 2.6 of Powerlink's revenue application and reproduced below. We note that the bulk of the value of Powerlink's asset base is in primary assets, namely lines and substations, which have assumed economic lives of 50 and 40 years respectively. This would indicate that only lines constructed before 1962 and substations constructed before 1972 should need to be replaced by the end of the current regulatory period. Given that the bulk of the assets under consideration were commissioned between 1972 and 1990 a more accurate analysis is likely to reduce the indicated asset replacement requirement.

Figure 2.6: Age profile of Powerlink's network assets



- *Powerlink's average asset age (and condition) is at a level where it need only be maintained (not reduced).*

  Compared to other comparable utilities Powerlink has a relatively young network and none of its assets are over 50 years old. As discussed in the PB Review, Powerlink's standard asset lives are shorter than many other utilities. While some of Powerlink's assets operate in relatively harsh environment, and while we accept that some assets (including the 132 kV lines north of Townsville) are in relatively poor condition, we have seen nothing during the course of this review to indicate the condition of the asset base as a whole gives cause for undue concern.

- *The assets are being replaced with like for like equipment.*

  The major reasons for replacing existing equipment with assets that are not modern equivalents is the need to cater for additional load or fault level. We have included a 20% augmentation factor in our analysis to cater for this.

- *The replacement cost is equal to the existing asset value in the RAB.*

  We have considered this in the discussion on depreciation above. However we note that the asset value in the RAB is the depreciated replacement cost whereas the undepreciated replacement cost is relevant for determining asset replacement requirements.

- *The cost of replacing equipment on a brownfield site is significantly higher then the equivalent installation at a greenfield site. EnergyAustralia's experience suggests a premium of 50-100% would be more indicative of the actual costs incurred by businesses today.*

  Our 20% escalation factor is intended to cover these additional costs. However we are surprised at the magnitude of the additional costs indicated by EnergyAustralia. Typically for a greenfield installation of transmission assets, procurement costs would represent about 70% of project costs, design and project management costs 10% and installation costs 20%. Procurement and design costs are not impacted by whether the project is greenfields or brownfields. Hence our 20% escalation factor implies a doubling of installation costs. We therefore believe this factor to be more than adequate.

Overall, while we may accept the criticism that our top down analysis lacks rigour, we believe that the outcome is reasonable. In our view the main weakness of the top down analysis is the failure to take account of any difference between current asset replacement costs and the replacement costs implied by escalating forward the 2001 asset valuation. While correction for this would tend to increase the indicated replacement cost forecast, other assumptions made in the analysis are, we believe, conservative and that a more detailed assessment of appropriate values for these assumptions would tend to reduce the indicated replacement cost.

Furthermore, as noted above, we considered the possibility that our top down analysis was flawed. We stated:

> *Given the high level analysis that is relied on to reach this conclusion, and the fact that the amount we have suggested is significantly less than requested in Powerlink's Revenue Proposal, it is appropriate to consider the consequences for Powerlink if we have got this wrong. The $140 million per year is well in excess of the average replacement capex over the current regulatory period and is more than sufficient to cover Powerlink's proposed requirement for the first two years of the next regulatory period. Any shortfall will not be apparent until the final three years. …the timing of much of this expenditure is discretionary and we consider it highly likely that much of this proposed capex will be deferred to the 2012-17 regulatory period for other reasons. However, if Powerlink is able to show at the 2012 regulatory reset that the amount provided has been insufficient to meet its prudent asset replacement requirements, then the AER could increase the provision in the early years of the 2012/17 regulatory period to allow Powerlink to catch up on any backlog.*

2.5 COMMENT

A rigorous bottom up analysis is an important tool for prioritising different asset replacement projects and also for ensuring that the asset replacement budget is used efficiently and effectively. However, in our view, such an analysis is problematic if used to determine how much in total that a TNSP should be spending on asset replacement.

Transmission system fixed assets, and particularly the primary assets that form the major part of the asset base, have a relatively long economic life. Furthermore, it cannot be predicted with certainty when a particular asset will fail. An asset's actual life will depend on a range of factors including the external environment, the extent to which the asset is loaded over its lifetime and the level of maintenance applied. Economic lives are assigned to different asset classes for use in financial modelling and high level asset management planning. However these lives are only estimates and can vary from business to business. In general they are determined on the basis of the business's appetite for risk and its view of an appropriate balance between capital and maintenance expenditure. As noted above, the standard economic lives used by Powerlink are slightly lower than industry norms.

A decision as to when to replace a transmission asset can be informed by careful condition assessment and monitoring. In spite of this, there is necessarily a high degree of subjectivity in making such a decision. This subjectivity increases as the time period between the assessment and the actual date of replacement increases. Furthermore, as also noted above, the ex-ante regulatory framework provides a strong incentive for a business to "err on the safe side" in preparing its asset replacement forecast. This strong incentive, and the fact that the bulk of Powerlink's forecast asset replacements occur in the final three years of the next regulatory period and are thus subject to a high level of subjectivity, are not inconsistent with our view that a portion of Powerlink's forecast replacement costs could safely be deferred to the 2012-17 regulatory period without putting Powerlink's ability to meet its regulatory obligations at risk.

In these circumstances we believe that a top down analysis can be an appropriate tool to use to determine whether a TNSP's total asset replacement expenditure is appropriate. If both a top down and a bottom up assessment were undertaken, the top down model

could be used to calibrate or validate the bottom up assessment and any regulatory analysis could focus on the reasons for any discrepancy in the findings of the two approaches. In situations where a TNSP produced a high replacement cost forecast, this would be reflected in an overlap between the top down and bottom up analyses. On the other hand, if a TNSP's asset replacement costs were insufficient, this would be reflected in a gap between the top down and bottom up analysis outcomes.

On this basis we consider that the main issue is not the use of the top down analysis to set the expenditure level but the fact that our analysis lacked rigour. It is therefore unfortunate that Powerlink has not chosen to submit a more rigorous top down analysis for the AER to consider.

3. OTHER FORECAST CAPEX

3.1 RELIABILITY OF SUPPLY

Can PB review the comments made by Powerlink in section 2.2 of its submission on the AER's draft decision that PB had deferred the timing of projects based on a speculative assumption and incorrect analysis of the risks posed for Powerlink. The AER would like PB to specifically comment on the 275kV double circuit line into Larapinta project and the Strathmore to Ross 275kV double circuit transmission line project. In terms of the Strathmore to Ross project PB should also take into account comments on this project contained in section 5.2 of Powerlink's response to PB's draft report on Powerlink's supplementary revenue proposal. Does this information impact on PB's original recommendation in relation to these projects?

This matter relates to areas where PB has recommended the deferral of some augmentation projects.

Powerlink's mandated reliability obligations within its Transmission Authority are not prescriptive in the sense that they refer to 'good electricity industry practice' and do not prescribe demand forecast levels, contingency events (including both generation and transmission related outages), rating determinations, etc. These matters are covered within Powerlink's defined Planning Criteria documentation, which captures its interpretation of 'good electricity industry practice', and necessarily accepts some risk of loss of supply through the use of defined demand forecasts such as 10% PoEs. Hence Powerlink's planning does not guarantee supply reliability in Queensland for very high peak loads that are forecast to occur less than one of every ten years. In PB's view, Powerlink's planning criteria effectively set an acceptable risk threshold and there is little point in advancing an augmentation in order to cater for scenarios where the probability of occurrence is so low that the consequent risk is well below this threshold.

In a number of cases, Powerlink has shown good business judgment and planned and developed its transmission network whilst potentially exceeding transmission limitations (specifically the Strathmore-Ross and Stanwell-Broadsound developments) by using its discretion to defer some augmentation projects. The recommendations in the PB Review simply extend this approach to a number of different projects/scenarios in order to improve the timing and efficiency of Powerlink's selected options. This approach is based on an acceptance of the cumulative risk presented by a number of scenarios, as undertaken by Powerlink.

PB maintains its contention that the incremental risk to Powerlink of deferring the line into Larapinta by one year would not be significant to it or the connected parties. The overload identified was very low (2.6%) in the year that triggered the augmentation. PB also highlights that demand side management opportunities, which may be historically limited in SEQ but increasingly more relevant given the increasing temperature sensitivity of demand in this area, is only one of a number of options available to Powerlink and that the primary focus of our recommendations was associated with discussing the risks with the affected parties and accepting a temporary (one year) lesser supply standard compared with the arguably conservative one adopted within Powerlink's planning criteria.

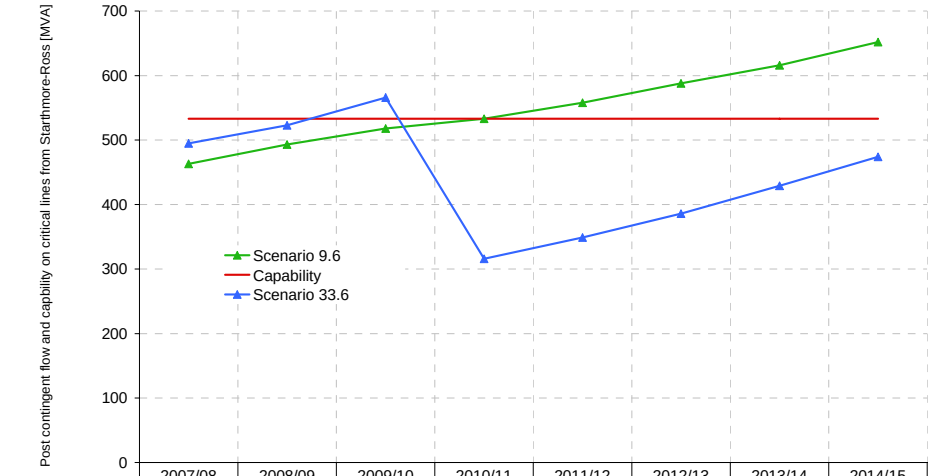
With respect to the Strathmore-Ross project, and as an example of Powerlink's approach to the risk based acceptance of potentially exceeding its mandated reliability obligations, for Scenario 9.3 and 33.3 in the following Table 3.1 of thermal limitations it can be seen that >10% overloads (viz. potentially >583MVA flows on a 530MVA rated piece of plant) during summer 2010/11 and 2008/09 were acknowledged and accepted, respectively. Powerlink has argued that a potential 10% overload in one sub-scenario is acceptable whereas an average overload of 7% on six sub-scenarios is not. While this is a valid argument, the basis for PB's recommendation of deferral in the high growth scenario

(33.6) is the fact that the constraint is removed in the following 5 years by the modelled development of new generation (depicted in Figure 3.1 as the large drop in loading on the blue curve). This generator is still assumed to proceed (even without the PNG gas pipeline) for the high growth scenario – on this basis we maintain our original recommendation to defer the project in the four high load growth scenarios, whilst accepting a marginally higher level of risk than that which would have existed otherwise.

Table 3.1: **Post contingent flows on critical line (as a percentage of 530MVA capability) for the Strathmore-Ross development.**

	07/08	*08/09*	*09/10*	*10/11*	*11/12*	*12/13*	*13/14*	*14/15*	*15/16*	*16/17*
Scenario 9.1	0.80	0.86	0.91	0.94	0.99	**1.05**	**1.10**	**1.16**	**1.23**	**1.30**
Scenario 9.2	0.83	0.88	0.93	0.97	**1.02**	**1.08**	**1.14**	**1.20**	**1.26**	**1.33**
Scenario 9.3	0.99	**1.05**	**1.05**	**1.10**	**1.14**	**1.18**	**1.24**	**1.30**	**1.37**	**1.42**
Scenario 9.4	0.85	0.91	0.96	0.99	**1.04**	**1.10**	**1.16**	**1.23**	**1.29**	**1.35**
Scenario 9.5	0.86	0.92	0.97	1.00	**1.05**	**1.11**	**1.16**	**1.23**	**1.30**	**1.38**
Scenario 9.6	0.87	0.93	0.98	**1.01**	**1.05**	**1.11**	**1.16**	**1.23**	**1.29**	**1.36**
Scenario 33.1	0.86	0.92	**1.00**	0.73	0.80	0.88	0.96	**1.06**	**1.16**	**1.27**
Scenario 33.2	0.89	0.95	**1.03**	0.76	0.83	0.90	0.99	**1.09**	**1.19**	**1.30**
Scenario 33.3	**1.05**	**1.11**	**1.20**	0.91	0.97	**1.05**	**1.13**	**1.24**	**1.34**	**1.45**
Scenario 33.4	0.91	0.97	**1.03**	0.60	0.66	0.74	0.82	0.91	**1.01**	**1.12**
Scenario 33.5	0.92	0.98	**1.07**	0.60	0.67	0.74	0.83	0.92	**1.02**	**1.12**
Scenario 33.6	0.93	0.99	**1.07**	0.60	0.66	0.73	0.81	0.89	0.99	**1.09**

Figure 3.1: **Post contingent flows on critical line Scenario 9.6 and 33.6 for the Strathmore-Ross development.**



	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15
Scenario 9.6	463	493	518	533	558	588	616	652
Capability	533	533	533	533	533	533	533	533
Scenario 33.6	495	523	566	316	349	386	429	474

In consideration of the potential overloads in Northern Queensland, Powerlink has also noted that it has a non-firm contract for DSM with a customer in this area to cover possible overloads in some sub-scenarios. It considers this non-firm arrangement is not sufficient to allow it to meet its mandated reliability of supply obligations. PB accepts that this is another mechanism through which opportunities to defer network capex can be sought and the risk of exceeding network limitations be minimised.

Regarding the Strathmore-Ross project, Powerlink's comments in section 5.2 of its response to PB's draft report on the supplementary revenue proposal is relevant to our final recommendations. In this case the updated and increased demand forecasts considered in Powerlink's supplementary revenue proposal do advance the need for augmentation and the materiality of the risk of constraints should the project be deferred. However, in our view, the identified consequences of the update in demand forecasts for the high growth scenario are countered by the fact that the underlying generation development is also likely to be advanced as a result of the increased demand. On this basis, we consider the two year exposure identified is very much a worst case scenario and is likely to be attenuated to acceptable levels given the correlation between the generation planting and demand forecasts. On this basis we further maintain that the project is not required until around 2014/15 under the high growth scenario 33.6 (which is effectively the same time as it was required under the original forecasts).

3.2 SHORT TERM/LONG TERM ECONOMICS

Can PB please review section 2.3 of Powerlink's submission on the AER's draft decision and respond to Powerlink's comments that PB has only considered short term economic analysis in reaching its recommendations rather than considering the lowest cost solution based on a whole of life assessment. In particular, the AER would like a response to Powerlink's comments for each of the projects where PB recommended that the scope of the project be reduced (i.e. Larcom Creek, Woolooga to North Coast and Strathmore to Ross). Can PB advise as to whether any of the information put forward by Powerlink affects PB's original recommendation in relation to each of these projects?

This matter relates to areas where the PB Review has recommended variations to the scope of augmentation projects.

As a general comment, we did not consider it within our terms of reference to undertake detailed NPV analysis on the various options we had identified in order to categorically prove alternative options were more efficient in the long term. We did however adopt projects that would effectively resolve the identified constraints and were more economic in the short term on the basis that deferring large amounts of capital expenditure is theoretically preferred as it introduces increased opportunities to consider intervening actions that may further defer any second stage of work. In each of these cases, Powerlink has countered our recommendations by suggesting that additional works are required in the not too distant future, and that the overall cost of their original proposal is more efficient.

With respect to our recommendation on the Strathmore-Ross project, we raised our recommended option of a double circuit tower initially strung on one side during discussions with Powerlink. This variation was not included in any of the NPV analyses presented by Powerlink but this has now been carried out by Powerlink in preparing its submission on the review. It is noted the NPV of this option is as close to Powerlink's preferred option NPV to any of the options Powerlink identified, justifying our statement (Section 2.5.4 of the PB Review) that the selection of projects for detailed analysis introduced some risk that the most economically efficient projects could be eliminated prematurely. We also note that the difference in the NPV analysis presented by Powerlink is only 3.5% in $128million (assuming the underlying assumptions, particularly the 7% interest rate and the six year deferral of the second stage works). Regardless of this, given the marginal difference in the final NPVs and their high sensitivity to the interest rate selected[5] and the timing and scope of the second stage of works[6], we think

5 We note that Powerlink has used an interest rate of 9% (with sensitivities at 7% and 11% in its public consultation report for augmentation into North and Far North Queensland and that the selection of 7% for the purposes of the revenue proposal has the influence of disadvantaging options which defer capital investment.

6 Detailed analysis has not been presented to support Powerlink's claim that the second stage of works will be required only six years after the first development. This is particularly relevant given any potential for new generation in the zone, plus the incremental transmission developments proposed (such as the Strathmore SVC, Stage 1 and Stage 2 of the North and Far North development, power factor correction at connection

that a prudent TNSP should opt for the cheaper $103 million option, and implicitly capture the potential for further deferrals in the stage 2 works during the intervening six years, rather than invest in the more significant $125 million dollar option at the onset. In particular given the information presented by Powerlink, we find it difficult to reconcile the need for further investment related to voltage stability constraints only six years after a considerable ($100 million) development and why the bifurcation points of voltage collapse would not move sufficiently given this and other previous investments for other alternatives, such as cheaper capacitor banks, to be used to further defer major transmission line works. To avoid any uncertainty, we have not proposed or tested the basis or validity of the timing or scope of any of the stage 2 works included in Powerlink's NPV analysis presentations.

With respect to the discussion regarding the Woolooga-North Coast project, our considerations of the predominantly new information provided by Powerlink is similar to that for the Strathmore-Ross project. Our option has an NPV that is only marginally lower than that of Powerlink's preferred option. However:

- The deferral of 6 years for the second stage of augmentation has not been verified through detailed investigation;
- The costs and scope of each stage of works have not been investigated (in particular the need for double circuit towers strung on both sides for both stages of PB's option)

Without considering any other changes to the economic assessment such as network losses or environmental impacts, we highlight that the NPV analysis results presented by Powerlink are highly sensitive to the discount factor used and the timing of investment, and the selection of the preferred option can be reversed by simply increasing the interest rate from 7% to 9% and deferring the second stage of works by an additional year.

With respect to the discussion on the Larcom Creek substation development, Powerlink has not provided any further information to warrant a review of our recommendations regarding the switchyard development over 3 bays or the 132kV line designed for 132kV operation. We do note however that the majority of these works should be captured under the contingent project mechanisms for the M50++ theme.

3.3 SOUTH COAST EASEMENT

Can PB review section 2.6.3 of Powerlink's submission on the AER's draft decision and indicate whether the information provided by Powerlink impacts on PB's original recommendation in relation to this project?

The key aspect of PB's decision to defer the project is related to its materiality (almost 2.5 times the next most expensive strategic easement acquisition) and the fact that the timing of expenditure is completely discretionary. Powerlink has provided no information with respect to the timing or use of the easement in the future to support the timing selected.

While highlighting that Powerlink has adopted a 'degree of difficulty multiplier' with respect to this acquisition of 0% (i.e. straightforward as opposed to some/medium/great/exceptional difficulty), we re-iterate the benefits of deferring this expenditure until more accurate information is known about the easement's final use.

points, plus the considerable >$280million programme of replacement capex in Far North Queensland), are each expected to significantly impact on the timing of any subsequent works.

3.4 BUSINESS IT

i. Can PB review section 2.6.1 of Powerlink's submission on the AER's draft decision and advise whether this information impacts on PB's original recommendation to reduce business IT project allowance by 15 per cent?

The Business IT plan submitted by Powerlink covered a five year period broken down into two categories – replacements and projects. The replacements component of the plan extended five years, while the projects component only covered the first two years of the next regulatory period in detail (i.e. it only extended to 2008/09). To forecast the expenditure over the remaining three years for the projects component, Powerlink used a methodology based on the previous three years rolling average. PB identified that the previous three years included a number of large one-off projects and that the expenditure in these years was considerably higher than the preceding four years (refer Figure 4-15 of the PB Review). On this basis, we have made a somewhat arbitrary adjustment to an already arbitrary forecast and reduced the projects component forecast by 15% in each of the final three years.

Note that we have made no adjustment to the replacement expenditure component.

ii. Can PB also explain how the long term average for business IT projects was calculated, including the years involved in determining this average?

We have not actually calculated the five year average to inform our decision, but consider our final adjustment as described below to be somewhat conservative.

The 15% reduction was informed by the fact that the average annual (nominal) IT spend was about $6 million between 2002/03-2006/07 compared with approximately $12 million forecast between 2007/08-2011/12. We have not adjusted Powerlink's proposal in the years that have a detailed forecast, but have recommended a reduction in the final three years of approximately $4 million in $34 million (i.e. our estimate of IT expenditure is around $10 million per year, real).

3.5 LINES SECURITY UPGRADE

i. Can PB review section 2.6.2 of Powerlink's submission on the AER's draft decision and advise whether this information impacts on PB's original recommendation to defer some of the scope of this project?

ii. Powerlink states that it is "unclear as to what PB is actually proposing" in relation to this project. Can PB clarify its recommendation in relation to the line security upgrade work?

No new or additional information is provided to alter the PB Review's original recommendation that the expenditure for the Transmission Line Security Upgrade should be extended over a longer period of time. We believe there is limited information to support the programme being compressed to a time frame covering the next regulatory period.

The scope of works proposed by Powerlink includes a number of confidential work programmes aimed at improving the security of individual line elements. Given the nature of the works, we consider that there is no need to implement them over a single regulatory period since the consequences of interference will vary across the network. Hence our proposal is framed around the option of extending the programme over a longer period and assumes greater co-ordination of this remedial work with the ongoing maintenance programme (i.e. visits) associated with line elements. On this basis we have recommended around 25% of the expenditure be deferred to the 2012-17 regulatory period, which should cover the works associated with less critical elements. If the most

critical elements are identified and treated early in the project, the bulk of the risk from interference will still be mitigated by the end of the next regulatory period.

We have also flattened the annual expenditure profile to reflect a more practical approach to this systematic roll-out of works. Originally, over 87% of the entire expenditure was programmed over two of the five regulatory years.

3.6 COST ESTIMATION RISK FACTOR

Taking into account the comments contained in section 2.4 and Appendix B (the Evans and Peck review) of Powerlink's submission on the AER's draft decision, does PB still consider that there is insufficient evidence that a material costing risk exists? In particular, can PB comment on Powerlink's and Evans and Peck's responses to the six issues raised in the AER's draft decision? The AER notes that most of these issues were originally identified by PB.

This matter relates to the $63 million adjustment for removal of the 2.6% risk adjustment factor.

Key issues are:

- the lack of information concerning the type of unforeseen risks that are being mitigated (given that all risks referenced on Page 3 and 4 of the original Evans & Peck report are attributable to items that are relatively small components of overall project costs and are managed through other mechanisms). Such information should be readily available from the list of historic projects used by Powerlink and Evans & Peck to arrive at the revised 9.4% risk factor. Powerlink has elaborated on some of the types of risks (i.e. wet weather, unforeseen or latent soil conditions, access restrictions) but Evans & Peck has not commented on this matter. We are still of the opinion that many of these matters are captured within Powerlink's detailed and refined cost estimating process.

- Part 5 (transfer of unreasonable risk) - the transfer of the vast majority of the risk to consumers. While it is generally agreed by all parties that the inclusion of the risk adjustment factor does transfer the risk, the question still remains as to how much should be reasonably transferred. Most of Powerlink's capital works costs estimates were lower than our benchmarked averages, but we also suggest they are more accurate. We consider a 2.6% risk adjustment factor is still unreasonable given the nature of the unforeseen risks that have been identified.

- Part 6 (risk in escalation factors) – as discussed in the PB review it is clear that the risks identified (i.e. labour and material, plant costs) are captured in both BPOs[7] and escalation rates.

- Part 7 (application of risk to relatively minor components) – the risks identified are not consistent with the 2.6% factor given unforeseen elements.

- We consider that the risks Powerlink is trying to mitigate should diminish significantly over time as experience is gained and the feedback is passed into its estimating process. i.e. the dynamics of the best fit distribution curves over time should indicate rapid improvements in accuracy. Given this background, we have some concerns that the Evans & Peck analysis of historic projects indicates that Powerlink appears to be four times worse than similar businesses. An explanation for this may be the old age of the projects used in the assessment.

[7] BPOs are Benchmark Planning Object component costs used to build up Powerlink's project cost estimates.

- It is not clear that the pert distributions used in the Evans and Peck analysis are weighted by the overall value of projects

- The historic information used to quantify the 9.4% risk factor is not open and transparent. As noted above it is not clear that the pert distributions are weighted by project value and therefore that the 9.4% increase can be applied across the entire forecast programme. (i.e. are the projects that indicate 180% overruns expensive projects). Furthermore, it is not clear what the drivers were for the systematic increase in the out-turn costs in the historical projects compared with original estimates. The reasons for the historic cost over-runs should be made very clear and associated with unforeseen/latent risks.

- The inclusion of a 10% scoping factor in the TransGrid determination appears to support Powerlink's arguments. We note that in its report for the ACCC on TransGrid's capex forecast PB Associates recommended that the scoping factor not be allowed. In considering the issue of the consistency of different decisions, care must be taken to ensure that the scoping factor allowed in the TransGrid determination is similar to the risk adjustment factor proposed by Powerlink. In the TransGrid determination, the scoping factor was driven by changes in scope associated with the transition from preliminary to detailed design and latent/unforeseen matters and, importantly was applied only to small augmentation projects rather than to all projects.

- Part 3 (mean/mode) – PB has no comment on this matter

- Part 4 (BPOs contain some uncertainty) - BPOs reflect installed and commissioned costs and implicitly include some assumptions about unforeseen influences, since they take account of earlier project outcomes. They are also established with accuracy tolerances (e.g. ± 10%), consistent with their application at a point in time as part of feasibility, planning and business approval processes. Given the rigour of Powerlink's refined cost estimating process, we consider the systemic risk of under-stating cost estimates is very low. Furthermore, Powerlink has adopted short line and locational adjustments, which are generic and capture both economies of scale and some degree of risk.

- From a timing perspective, it is unclear to us why data on a sufficient number of projects was not available to undertake analysis based on Powerlink's actual history in time for Powerlink's original revenue application.

- Most arguments used by Powerlink to allow it to meet the programme time frames mitigate a number of the risks identified. In addition, Powerlink's procurement practices, and the use of contractors has the effect of transferring some of the unforeseen or latent risks through to other parties. Allowing Powerlink to capture some of these risks in its revenue allowance appears to be double counting.

3.7 ADJUSTMENT TO S-CURVES

i. Can PB review the comments in section 2.5.2 and the Evans and Peck report (Appendix D) from Powerlink's submission on the AER's draft decision and comment on whether the information provided impacts on its original recommendation in relation to Powerlink's S-curve adjustments? Specifically, can PB comment on section 3 of the Evans and Peck report that responds to PB's reasons for not accepting Powerlink's S-curves?

The PB Review recommended s-curve adjustments be removed for four types of S-curves (lines, substation establishment/enhancement, transformer augmentations, and

capacitor banks). The s-curve adjustments were based on 'pre-payments' rather than extended lead times.

Evans & Peck has accepted this recommendation for transformers and capacitor banks. It has partially accepted the recommendation for substation projects and but rejected it for lines. Importantly, in these two latter cases, it has advised that Powerlink's 'prepayment' adjustment was at the higher end of expectations. Evans & Peck's analysis concluded the most appropriate mechanism for capturing the risks for tight supply conditions was to extend the project timeframes and we note the new S-curves would be extended to greater than 24 months, fundamentally changing the basis for Powerlink's cost accumulation model.

We maintain our contention that the 24 month timeframe for most line projects is a reasonable expectation for all projects (which acknowledging that the schedule would be a little tight for long distance transmission line projects). The argument that the order point for insulators has more than doubled and therefore the adjustment to s-curves is necessary is contradictory to the practice undertaken by Powerlink of pre-ordering. This matter also raises questions on how this practice has been incorporated into the original (unadjusted) s-curves. We consider the extension of lead times for insulator changing from 20 weeks to 40 weeks in a two year project still allows sufficient buffer i.e. it is unlikely that this item is on the most critical path and it should also be recognised that early ordering of such items would not constitute a significant cost as these items are not generally paid for in full up front. We also highlight that most supply contracts for critical plant will also incorporate liquidated damages provisions to mitigate Powerlink's financial risks of late delivery.

Evans & Peck's differentiation between substation and transformer projects is interesting in that it leads to such different outcomes for transformer augmentation and substation development/refurbishment projects.

Another key aspect regarding impacts of tight supply conditions is that much of Powerlink's proposed capex is discretionary in timing (i.e. related to replacement or has been advanced to smooth work load or capture off-peak times). There is not a lot of risk related to minor 1-2 month delays in commissioning many of the projects. Obviously for some projects, timing prior to peak summer loading is critical. However Powerlink has still captured some degree of buffer by selecting commissioning dates of 31 October, well before the summer load peak. Refer to Figure 4-18 of the PB Review. In our view, the generally discretionary timing of projects does not warrant any adjustment to historic S-curves.

At a high level, all of the arguments Powerlink has used to prove its ability to deliver the overall programme (section 4.9 of our original report) alleviate the risks of the tight time frames. We consider the risk has been adequately managed.

The outworking of Powerlink's application of the revised S-curves, and its claims that the overall capex has increased need to be considered in greater detail, given the concerns shared by Evans and Peck that in all cases Powerlink's adjustments were at the upper end of expectations.

ii. Powerlink claim that PB did not appear to have recognised that the pre-payment was a notional prepayment intended to capture the range of outcomes caused by tight supply conditions. Does PB agree with this statement?

The concept of "notional" in this sense appears to be consistent with a "notional capex allowance" whereby the allowance does not prescriptively dictate what projects will be built. This is irrelevant as the additional capex sought by Powerlink has been determined through an actual pre-payment adjustment to its S-curves. We accept the theory that either "pre-payment" or "extended lead times" are both mechanisms that can be used to mitigate tight market conditions, and are generally used under specific and different circumstances.

iii. From its recent experience, can PB indicate whether or not there have been significant increases in lead times on major plant items such as transformers, circuit breakers, insulators and cables?

Some anecdotal evidence confirms the lead time extensions for circuit breakers, current transformers and large high voltage power transformers (500/275kV) in the Victorian environment. However with standard project management provisions, this has not led to projects exceeding the typical 18-20 month project delivery timeframes.

iv. Evans and Peck expect that the tight supply conditions will continue over the next regulatory period. Can PB indicate whether it agrees or disagrees with this assessment and why?

The AER must also consider why Evans & Peck expects the tight supply conditions to continue. We refer to the discussion on future materials and labour escalations in the PB Review, where we consider the current tight supply conditions will abate over time. To further support this, economic and general growth is decaying in Queensland as represented in demand forecasts. Furthermore, we also recognise that transmission augmentation is particularly lumpy. Powerlink's augmented and replaced network will cater for load growth well into the future. We note the heavy rate of decay of the augmentation component of Powerlink's proposed capex plan (Figure 4-1 of the PB Review).

We are not aware of any aspects regarding changes in the supply (manufacturers') side of the market for transmission plant.

3.8 CONTINGENT PROJECT – GLADSTONE

Can PB comment on Powerlink's request for an additional trigger on this contingent project (relating to generation) and the change in the size of the point load required to trigger this contingent project?

Notwithstanding that the original M50++ theme set represented two unique triggers that were associated with two separate 500 MW step changes in industrial load in central Queensland within the Gladstone State Development Area in 2009/10 and 2010/11, we concur with Powerlink that a step change in load of less than 500 MW may trigger the need for some of the projects and hence accept that a trigger of 250 MW may be more practical. We further consider the extension of this to new generators to be appropriate to the extent that such generation triggers augmentations to the shared network, the cost of which cannot be recovered directly from the party seeking connection.

4. SERVICE STANDARDS

4.1 TARGET ADJUSTMENTS

AER has asked if the large increase in commissioned works in 2004-05 and 2005-06 could result in service improvements and, if so, the potential impact of this on the recommended performance targets for the next regulatory period.

We consider that a substantial amount of 'new' works could potentially affect service performance, and result in improved circuit availability and reduced loss of supply and average outage duration. However, in this case the works recently commissioned by Powerlink are unlikely to result in a significant improvement to Powerlink's service performance indicators.

For circuit availability, the number of circuit elements lost will rise as the number of circuit elements within the network increases (assuming that the risk profile of losing a circuit element remains substantially the same). However, the circuit availability measure is normalised by the total possible number of circuit hours. This means that the increased number of circuit outages will be offset by increased total circuit hours so that overall circuit availability should remain substantially the same.

The average outage duration measure is normalised by the number of events and hence, in a similar manner to the circuit availability measure, should not be affected by the expanding network.

Similarly, the loss of supply measures are normalised by peak demand, and projects aimed at meeting an increased peak demand should, therefore, not affect overall service performance.

In reaching the above general conclusions we note that the projects in the current period were justified under the reliability limb of the regulatory test and were constructed to maintain required reliability standards under increased electricity demand. The works were not intended to improve reliability or security of supply over and above required levels. For instance, in the South East Queensland area, many lines were rebuilt to a higher capacity by increasing the operating voltage, while an increased number of lines strengthened the capacity between central and northern areas. In both instances, the works were associated with increased peak demands.

In these circumstances, overall service performance should remain the same. However, the lumpy nature of augmentation means that the additional capacity is not fully utilised immediately. This means that redundancy within the network will increase in the short term and that might increase operational flexibility, particularly during off-peak and intermediate loading periods, resulting in a short term service improvement. However, this is likely to be offset by an increase in load at risk due to the more complex interaction of protection and control systems as the meshed network grows. In time, overall network reliability should improve but it is difficult to quantify the rate of change over a relatively short period of 5-years.

The PB Review noted that the proposed adjustment to reliability targets to allow for the increased volume of 'new' works assumed a linear relationship and did not take into account the relative size and location of projects in the past compared to those forecast for the next regulatory period. Offsetting possible service improvements, we noted that the performance in 2004 and 2005 indicates that when the overall number of events exceeding the threshold is small, a greater proportion may be associated with outages for "new works".

We conclude that, while the change in service performance due to works in the current regulatory period is not readily quantifiable, it is likely to be small when compared to the

affect of outage for 'new works' and will not result in a step change in performance levels. We therefore recommend that no specific adjustment be made.

We also note that targets set on the basis of average historic performance will 'lock in' a part of any service improvement previously achieved, with all benefits flowing to customers within 5 years, at the following revenue reset.

4.2 REVENUE NEUTRAL TARGETS

AER has asked PB to review Powerlink's claim that the circuit availability (critical) indicator is not revenue neutral and that this target should be lowered. Powerlink has provided supporting information in the form of an expert's report from the Queensland University of Technology (QUT).

It is difficult to assess the findings of the QUT report without access to the terms of reference for the study. For instance, the brief report does not mention any limitations or assumptions made in the analysis or discuss any difficulties experienced by QUT in its analysis. The report does not indicate the robustness of the findings.

While QUT has determined that a normal distribution can best describe the distribution of the historical data, the fact that the upper tail exceeds 100% availability makes it unlikely that it is a good fit. That is, the absence of data points in the upper part of the probability distribution (above 100% availability) makes the normal distribution an approximate fit to the data set at best. QUT has not indicated in its report whether in their analysis the probability of exceeding the cap (2.43%)[8] and the probability of exceeding the floor of the collar (2.29%) are materially different, given the likely degree of accuracy inherent in using the normal distribution as an approximation of the population.

QUT states that lowering the target by 0.1 per cent would make the probability of receiving a bonus equal to the probability of receiving a penalty (in an uncapped scheme). In adopting the lowered target, Powerlink have then applied a cap at one standard deviation above the lowered target and a floor at two standard deviations below the lowered target. PB notes several problems with this approach.

- Adopting a target other than the mean of past performance (suitably adjusted for step changes in capex) results in a target that no longer represents the long term average of performance. It therefore relies on the appropriateness of using the normal distribution to represent the data set to ensure the scheme's neutrality.

- Adopting an asymmetric collar about a lowered target results in the probability of exceeding the cap being larger than the probability of exceeding the floor of the collar, reintroducing a non-neutral outcome.

Statistical theory suggests other problems with the approach adopted by QUT.

- A normal distribution is an unbounded distribution, i.e. it extends to infinity in both directions. Hence, by definition, the normal distribution won't 'fit' a bounded variable. PB would expect to see the distribution truncated at both the upper and lower tails to improve the 'fit' of the distribution.

- With the upper tail of the normal distribution cut off at 100%, the remaining distribution should have been be re-normalised so that the integration of the area under the distribution is equal to 100%. Hence the probabilities calculated by QUT based on the unchanged normal distribution curve are not correct.

8 Figure 2 of the QUT report incorrectly states that the probability of exceeding the cap is 3.43 per cent. This seems to be a typographical error.

- With the distribution re-normalised, the mean of the remaining distribution would remain the same (that is, it is the mean calculated from the sample of the population) but the variance of the distribution about the mean would change. Hence, the approach taken by QUT in determining a lowered target (figure 3) based on a distribution curve that has not been re-normalised is not likely to result in the probability of gaining a reward being equal to the probability of incurring a penalty.

Considering these points, PB concludes that Powerlink has not demonstrated that a target set at the historical average is inappropriate.

PB notes that the statistical approach adopted by Powerlink will not address the perceived asymmetry in risk that service performance is more difficult to improve than decline. Adopting a normal distribution assumes that there is no asymmetry in risk. PB confirms its recommendation that the perceived asymmetry in risk can best be addressed by setting the cap at a lesser variance from the mean than the floor value. While PB recommended the collar be set at one standard deviation above and two standard deviations below the mean, these values were chosen arbitrarily based on PBs assessment of the asymmetry in risk. It may be that modelling of the asymmetry in risk may allow alternative approaches to be developed.

4.3 DEAD BANDS

Can PB advise as to whether or not the use of a single data point over a small number of events in the loss of supply measure creates greater downside risks for Powerlink? In addition, does PB consider that a dead band more appropriately mitigates that risk if implemented in these measures?

Powerlink argues that the targets for the loss of supply measures should be rounded to the nearest whole number. This is because in any one year, only a whole number of events can occur. Powerlink also considers that dead bands should be used between adjacent whole numbers.

PB considers that this approach—rounding to whole numbers in conjunction with dead bands between whole numbers—reduces the sharpness of the scheme as demonstrated in Figure 4.1 and Figure 4.2[9]. The figures show that penalties and rewards are reduced (for events within the collar and cap) when compared to the scheme recommended in the PB Review.

9 Figure 4.1 and Figure 4.2 are provided for illustrative purposes only and use the data provided by Powerlink in its submission on the AER's draft decision.

Figure 4.1 - Comparison of Loss of Supply events > 0.2 system minutes

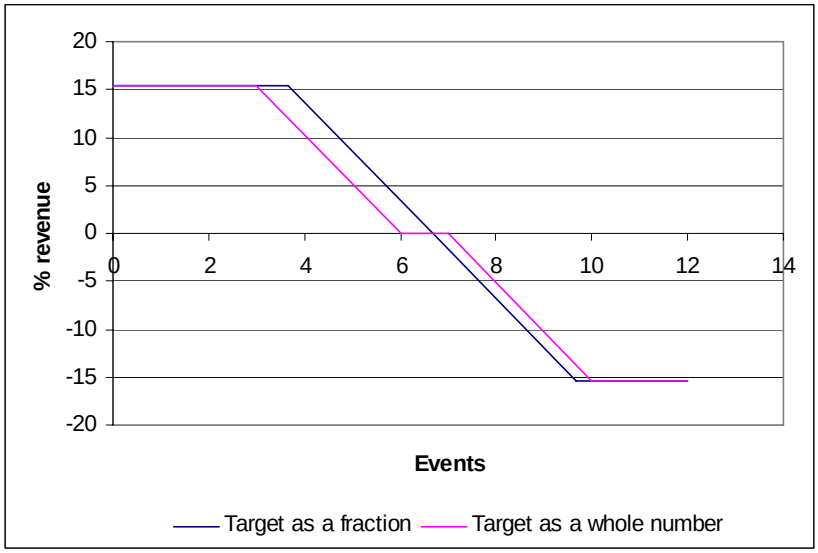
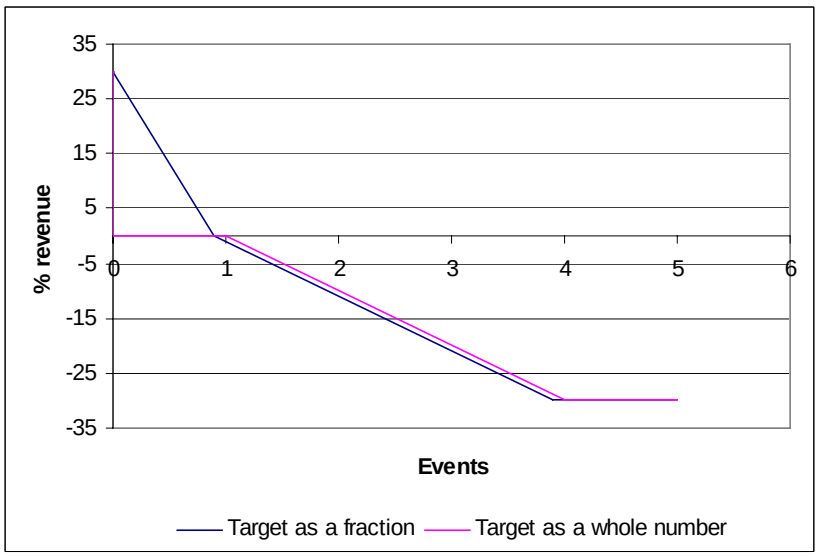


Figure 4.2 - Comparison of Loss of Supply events > 1.0 system minutes



For the loss of supply >0.2 system minutes, the potential reduction in penalties is equivalent to $100,000 pa and the reduction in rewards is equivalent to $210,000 pa, representing 11% and 22% of the value of the measure within the incentive scheme. For the loss of supply >1.0 system minutes the potential reduction in penalties is equivalent to $60,000 pa (3%), based on the collars, caps and weightings contained in Powerlink's submission on the AER's draft decision.

Because the reduction in rewards is different from the reduction in penalties (if the target performance is not a multiple of 0.5), a small asymmetry is also introduced into the scheme, which does not support a neutral revenue outcome for no change in underlying performance across the 5-year regulatory period. For the loss of supply >0.2 system minutes, the asymmetry is equivalent to $110,000 per annum and for the loss of supply >1.0 system minutes is equivalent to $60,000 per annum, based on the collars, caps and weightings contained in Powerlink's submission on the AER's draft decision.

The PB Review recommended no dead bands or rounding for the loss of supply measures because this provided a simple scheme that retained symmetry and applied the full penalty and reward to the service performance within the limits of the scheme.

We acknowledge that the asymmetry introduced by the alternative scheme suggested by Powerlink is small but consider the reduction in the sharpness of the measure to be a major disadvantage of the Powerlink proposal.

4.4 EXTRAORDINARY EVENTS

PB recommended that certain extraordinary events be excluded from performance calculations. Powerlink disagree with this treatment and raise concerns with the logic of PB's arguments. In particular, Powerlink asserts that the logic for excluding events is different for each measure. The AER has asked that PB consider Powerlink's claims concerning the logic applied to events in different performance categories.

Powerlink considers that, when calculating the circuit availability performance indicator, it is important that only the network circuit elements owned by Powerlink are included in the calculation, while for the loss of supply measure the issue is whether Powerlink fulfilled its obligation to supply a load, not whether the circuit element affected belonged to Powerlink or to a third party. It believes that a TNSP should be held accountable and measured for performance in the way it operates and maintains its network.

Consequently, Powerlink believes that the two events that PB recommends should be excluded from the loss of supply historical data should not have been excluded. Alternatively, Powerlink considers that the AER should provide Powerlink with future exclusions for similar events.

The first event recommended for exclusion was the lightning event that interrupted both 132 kV feeders to the Proserpine Substation. The criterion for exclusion is the force majeure provision.

The Service Standards Guideline provides a definition for force majeure. We note that it is the same for all measures and consider that a consistent application of the force majeure provision would be to compare an event against the criteria for exclusion. If the event meets the criteria, then the event should be excluded from all measures to which the force majeure provision applies. Conversely, adopting the Powerlink approach of using different interpretations of the force majeure provision for each measure is inconsistent with the Service Standards Guideline and would lead to uncertainty in application.

The force majeure provisions allows lightning events to be excluded where, despite the observance of good industry practice, the occurrence of the event was outside the reasonable control of the TNSP. We consider that the loss of both feeders together represents such an event. Not allowing the exclusion would likely result in no lighting events meeting the criteria – an outcome inconsistent with the inclusion of lightning in the force majeure provision.

The second event relates to an inadvertent protection system operation, which resulted in an inter-trip signal being sent to Energex's substation and the subsequent loss of load from that substation. Powerlink considers that the event should not have been excluded because it was its equipment that directly led to the loss of supply.

Powerlink, however, has no control over the manner in which third party assets respond to information about the combined electricity network and the amount of load at risk for such events. We believe that it would therefore be inappropriate for the loss of supply measure to include the performance of third party assets. The measure is clearly linked to the performance of Powerlink's regulated network and, for example, excludes unregulated transmission assets. We also note that the inclusion of the performance of third party assets in regulatory reporting would be uncertain and difficult to verify through audit.

We therefore continue to recommend that both be excluded from the loss of supply measure.

5. OPEX

5.1 ASSET GROWTH ESCALATOR – CONDITION BASED MAINTENANCE

Can PB review the information provided by Powerlink in its response to the AER's draft decision (see section 3.1.5) and confirm PB's view that newly commissioned assets will not require condition based maintenance during the next regulatory period?

We have reviewed the response provided by Powerlink and make the following comments and observations.

- We acknowledge the probability of a small percentage of new assets failing early in their service life. This "infant mortality" or early failure effect usually occurs during commissioning or within the first year of operation, and applies in particular to components of secondary systems assets. In many instances electronic equipment infant mortality occurs within the first 100 hours of operation. However, if failure occurs within the first year of operation the replacement costs are generally covered by warranty or guarantees issued by either the manufacturer or installation contractor. Hence the costs should not be included, nor forecast, in the TNSP's maintenance budgets.

- Our view remains that new assets incur substantially less, if any, routine inspection and testing and also do not require corrective maintenance for non weather related faults. In many cases normal maintenance routines are delayed one or more cycles from commissioning, to compensate for the fact the assets are brand new. Examples are the deferral of the ground line inspection of structure footings etc. for two or three normal inspection cycles after commissioning and the substantially reduced maintenance requirements of modern SF6 switchgear as opposed to the older oil circuit breakers they replace.

- We acknowledge that weather related faults and operation costs apply equally to all similar assets irrespective of age.

- As we are only considering operational expenditures over a five year regulatory period, assets commissioned during this period will be at most five years old at the end period. We believe that modelling these new assets to require the same maintenance effort and cost as significantly older assets is unreasonable and hence we have recommended an adjustment to compensate for the reduced maintenance requirement of new assets.

- It would be difficult to determine the corrective maintenance, both planned and unplanned, of newly commissioned assets as a percentage of the total asset base, without detailed analysis of fault records, preferably for a five year period. Hence, we have modelled the complete removal of condition-based maintenance for all assets commissioned during the next regulatory period as a proxy for the total reduction in maintenance effort resulting from assets commissioned during that period.

Table 5.7 of the PB Review is reproduced in Table 5.1 below and details our recommended revised expenditure as a result of the reduced maintenance effort required by newly commissioned assets.

Table 5.1: Adjustments to proposed capex ($ million, 06/07)

Item	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Original Powerlink proposal	113.11	119.49	126.54	135.64	140.16	634.94
Impact of Reduced Condition Based Maintenance	112.55	118.34	124.87	133.50	137.46	626.72
Variance	(0.56)	(1.15)	(1.67)	(2.14)	(2.70)	(8.22)

Source: PB Associates analysis

The recommended adjustment is a reduction of approximately $8.22 million over the next regulatory period, implying a 1.29% reduction in total the maintenance effort. We consider this to be a reasonable adjustment to the Powerlink's original proposal on maintenance to account for the number of new assets commissioned during the regulatory period.

5.2 MAINTENANCE MATERIALS

Does the additional information provided by Powerlink on this issue effect PB's recommendation (that is, that maintenance materials be escalated at CPI)? In particular, can PB respond to Powerlink's issue concerning the different base year used for capex and opex. In addition, can PB advise if the same materials are used for both maintenance and capex?

We have reviewed the comments made by Powerlink in relation to our recommended escalation of maintenance materials, and would make the following comments and observations.

- The mix of materials used for maintenance is usually different from the mix used in greenfield construction in so far as it does not usually contain major plant or fleet. The smaller "nuts and bolts" material items are usually exactly the same as those used in new construction and include items such as cables (high and low voltage), cable terminations, connectors, ducts and conduits, auxiliary transformers, insulators, surge diverters etc.

- As stated in the PB Review we have almost always recommended escalating maintenance materials in line with CPI as have historically most TNSPs and DNSPs. To this end we note that SP AusNet has also escalated maintenance materials in line with CPI in its recent revenue proposal.

- We also note that the opex forecasts are projected from a base of the 2004/05 financial year and hence do not capture the peak that occurred in 2006 for some metal prices. However, they more accurately reflect the longer term trend in metal prices which we believe to more accurately reflect the impact on maintenance materials over the longer term. The type of materials used in maintenance are usually purchased on period contracts, which due to their long term duration and provision of certainty to manufacturers production levels are more suited to managing short term price variations in base metals. Period contracts historically incorporate CPI price adjustments over the term of the contract.

- We do not consider the comments made by Powerlink sufficiently compelling to alter our original recommendation and continue to recommend that maintenance material be escalated by CPI for the next regulatory period.

5.3 VEGETATION MANAGEMENT

Can PB respond to the vegetation management comments made by Powerlink in its submission to the AER's draft decision (see section 3.1.4)?

In the PB Review (p159), we included the following comments and recommendations in regard to proposed vegetation management expenditures forecasts for the next regulatory period:

> *A key issue to be considered in predicting future vegetation management expenditure is whether the required work effort will continue to increase from the base year over the remainder of this current regulatory period and throughout the next regulatory period or whether it will increase initially and then stabilise at a higher level. In its opex model, Powerlink has assumed that the vegetation management work effort will increase at 2.5% per annum from the base year through to the end of the next regulatory period. We consider a more probable outcome would be for the work to compound, possibly at a higher level than 2.5% for the three years from the base year and then for the work effort to remain relatively constant for the remainder of the regulatory period. We therefore recommend that the work effort associated with vegetation management be increased by 6% for the 2005/06 year, then 4% for the 2006/07 year, 2% for the 2007/08 year and then 1% for remainder of the next regulatory period. This approach attempts to capture the significant initial increase in effort generated by the new policy but acknowledges that the work effort should reduce over time.*
>
> *The impact of this recommendation is shown in [Table 5.2 below]. In this table the impact of the revised vegetation management escalation factor have been calculated by adjusting the Powerlink opex model but excludes the effect of any adjustment to other escalation factors.*

Table 5.2: Impact of Revised Vegetation Management Costs ($m, 06/07)

Item	2007/08	2008/09	2009/10	2010/11	2011/12	Total
Original Powerlink proposal	113.11	119.49	126.54	135.64	140.16	634.94
Impact of Revised Vegetation Management	113.47	119.75	126.68	135.63	139.97	635.50
Variance	0.36	0.26	0.14	(0.01)	(0.19)	0.56

Source: PB Associates analysis

In effect we have made very minor adjustments to Powerlink's total proposed expenditure forecasts for the regulatory period, but have skewed the expenditure towards the beginning of the period. This recommendation was based on our experience in relation to vegetation management expenses, particularly when new processes or legislative requirements are introduced. In almost all instances there is a substantial increase in initial spend as the new process or methods are rolled out but as the program matures the ongoing maintenance spends decrease and eventually stabilise. This is as a result of gaining experience and expertise of the new procedures, reducing spends on timber removal from the easements after initial lopping cycles, better understanding of timber species identification and growth habits, and unsuitable timber species replacement programs, etc.

In the light of this experience and the fact that we have made only a minor adjustment to the total forecast expenditure over the period we do not believe that any additional expenditure should be allowed for the next regulatory period.

APPENDIX A
Terms of Reference

Request for response from PB on selected issues

The AER has received a submission from Powerlink on its draft decision. In a number of areas Powerlink directly comments on PB's analysis and recommendations which have been relied upon by the AER in its draft decision. The AER seeks a response from PB on selected areas of Powerlink's submission to enable it to finalise its decision. These areas are outlined below.

1. Forecast capex

(a) Replacement capex

Can PB please review section 2.1, Appendix I and Appendix A (the Evans and Peck review) of Powerlink's submission to the AER's draft decision and respond to the comments by Powerlink and Evans and Peck in relation to PB's review of replacement capex. In particular, the AER would like PB to comment on Powerlink's claims that:

i. PB's conclusion in relation to the scoping of projects is incorrect. Please refer to Powerlink's comments on page 5 of Powerlink's submission on the AER's draft decision in relation to each of the three replacement projects reviewed by PB and the additional information provided in Appendix I.

ii. a review of its bottom up replacement plan should not have been "abandoned in favour of an arbitrary, age based top down approach".

iii. PB did not examine the integration of Powerlink's asset replacement requirements into the broader capital works program.

(b) Reliability of supply

Can PB review the comments made by Powerlink in section 2.2 of its submission on the AER's draft decision that PB had deferred the timing of projects based on a speculative assumption and incorrect analysis of the risks posed for Powerlink. The AER would like PB to specifically comment on the 275kV double circuit line into Larapinta project and the Strathmore to Ross 275kV double circuit transmission line project. In terms of the Strathmore to Ross project PB should also take into account comments on this project contained in section 5.2 of Powerlink's response to PB's draft report on Powerlink's supplementary revenue proposal. Does this information impact on PB's original recommendation in relation to these projects?

(c) Short term/long term economics

Can PB please review section 2.3 of Powerlink's submission on the AER's draft decision and respond to Powerlink's comments that PB has only considered short term economic analysis in reaching its recommendations rather than considering the lowest cost solution based on a whole of life assessment. In particular, the AER would like a response to Powerlink's comments for each of the projects where PB recommended that the scope of the project be reduced (i.e. Larcom Creek, Woolooga to North Coast and Strathmore to Ross). Can PB advise as to whether any of the information put forward by Powerlink affects PB's original recommendation in relation to each of these projects?

(d) South Coast Easement 500kV Double Circuit Easement Acquisition

i. Can PB review section 2.6.3 of Powerlink's submission on the AER's draft decision and indicate whether the information provided by Powerlink impacts on PB's original recommendation in relation to this project?

ii. Can PB also provide the AER with the project pack for this project?

(e) Business IT

i. Can PB review section 2.6.1 of Powerlink's submission on the AER's draft decision and advise as to whether this information impacts on PB's original recommendation to reduce business IT project allowance by 15 per cent?

ii. Can PB also explain how the long term average for business IT projects was calculated, including the years involved in determining this average?

(f) Lines security upgrade

i. Can PB review section 2.6.2 of Powerlink's submission on the AER's draft decision and advise whether this information impacts on PB's original recommendation to defer some of the scope of this project?

ii. Powerlink states that it is "unclear as to what PB is actually proposing" in relation to this project. Can PB clarify its recommendation in relation to the line security upgrade work?

(g) Cost estimation risk factor

Taking into account the comments contained in section 2.4 and Appendix B (the Evans and Peck review) of Powerlink's submission on the AER's draft decision, does PB still consider that there is insufficient evidence that a material costing risk exists? In particular, can PB comment on Powerlink's and Evans and Peck's responses to the six issues raised in the AER's draft decision. The AER notes that most of these issues were originally identified by PB.

(h) Adjustment to S-curves

i. Can PB review the comments in section 2.5.2 and the Evans and Peck report (Appendix D) from Powerlink's submission on the AER's draft decision and comment on whether the information provided impacts on its original recommendation in relation to Powerlink's S-curve adjustments? Specifically, can PB comment on section 3 of the Evans and Peck report that responds to PB's reasons for not accepting Powerlink's S-curves?

ii. Powerlink claim that PB did not appear to have recognised that the pre-payment was a notional prepayment intended to capture the range of outcomes caused by tight supply conditions. Does PB agree with this statement?

iii. From its recent experience, can PB indicate whether or not there have been significant increases in lead times on major plant items such as transformers, circuit breakers, insulators and cables?

iv. Evans and Peck expect that the tight supply conditions will continue over the next regulatory period. Can PB indicate whether it agrees or disagrees with this assessment and why?

(i) Contingent project – Gladstone major industrial development (M50++)

Can PB comment on Powerlink's request for an additional trigger on this contingent project (relating to generation) and the change in the size of the point load required to trigger this contingent project?

2. Service Standards

Can PB review the service standards element of Powerlink's submission on the AER's draft decision (see section 6) and respond to the following issues:

(a) Target adjustments

PB recommended a reduction in targets for circuit availability and loss of supply events greater than 0.2 system minutes due to the connection of new works in the next regulatory period. PB also confirmed that Powerlink's future capex program would not have a positive impact on Powerlink's performance.

The AER seeks to ensure that all adjustments are made in a balanced manner in relation to past and future capex. The AER notes that Powerlink has had a large increase in commissioned works in 2004-05 and 2005-06 and that this could potentially result in service improvements.

Can PB indicate whether the past capex may be expected to impact performance targets in the next regulatory period and the potential impact of this on the recommended performance targets?

(b) Revenue neutral targets

Powerlink claims that the critical circuit availability target is not revenue neutral. It asserts that this target should be lowered to ensure revenue neutrality (consistent with PB's claim in its report).[10] Powerlink has provided supporting information in the form of an expert's report from the Queensland University of Technology.

Can PB review Powerlink's expert advice and its own analysis of the revenue neutrality of the targets and advise if any targets should be altered to ensure that outcomes are revenue neutral?

(c) Deadbands

Powerlink considers that the targets should be between the nearest whole numbers.[11] It also claims that deadbands should be used in loss of supply measures as this measure can only use a whole number of events.

The AER is concerned that the absence of deadbands for the loss of supply measures may create some undue downside risk and affect the balance of incentives which are in the control of TNSPs. This is particularly since the loss of supply measure is applied across a relatively small number of events.

Can PB advise as to whether or not the use of a single data point over a small number of events in the loss of supply measure creates greater downside risks for Powerlink? In addition, does PB consider that a deadband more appropriately mitigates that risk if implemented in these measures?

(d) Extraordinary events

PB recommended that certain extraordinary events be excluded from performance calculations. Powerlink disagree with this treatment and raise concerns with the logic of PB's arguments.[12]

Can PB consider Powerlink's claims concerning the logic applied to events in different performance categories. Are these claims founded? Does this result in any change to PB's recommendations? If PB recommends no change, what type of exclusion should be included to ensure that such events are treated consistently over time?

3. Opex

(a) Asset growth escalator – condition based maintenance

Can PB review the information provided by Powerlink in its response to the AER's draft decision (see section 3.1.5) and confirm PB's view that newly commissioned assets will not require condition based maintenance during the next regulatory period?

(b) Maintenance materials

Does the additional information provided by Powerlink on this issue effect PB's recommendation (that is, that maintenance materials be escalated at CPI)? In particular, can PB respond to Powerlink's issue concerning the different base year used for capex and opex. In addition, can PB advise if the same materials are used for both maintenance and capex?

(c) Vegetation management

Can PB respond to the vegetation management comments made by Powerlink in its submission to the AER's draft decision (see section 3.1.4)?

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10 Powerlink, *Response to AER Draft Decision*, February 2007, p.49

11 Ibid, p.49ff

12 Ibid, p.50ff