

# **Powerlink Revenue Reset**

## **CHC Review of Replacement Capex Reports and Submissions**

### **Purpose of this Report**

The AER has asked that CHC provide an opinion on the reasonableness of PB's assessment of Powerlink's replacement capex proposal. In particular:

- Does CHC think it is reasonable to set a replacement allowance based on a top-down analysis, given the information asymmetry between a TNSP and a consultant?
- Is there any evidence that the projects reviewed by PB have been over-scoped by Powerlink?
- If there is evidence of over-scoping, should it have been possible for PB to quantify the over-scoping? If quantification was not possible, was it reasonable to then revert to a top-down approach?
- Is PB's top-down methodology, and the assumptions on which it is based, reasonable?
- Does the information provided in Powerlink's submission to the AER's draft decision influence CHC's opinions in relation to the above issues?

In providing an opinion on these areas, it would be appreciated if CHC could review the following information:

- Powerlink's revenue reset application (April 3, 2006, pp. 67-70).
- PB's Final Report on its '*Review of Capital Expenditure, Operating and Maintenance Expenditure and Service Standards*' (pp 104-113 and Appendix I).
- The AER's Draft Decision for Powerlink, 8 December 2006 (pp 68 -70).
- Powerlink's submission on the AER's Draft Decision (see pages 2-6; Appendix A (the Evans and Peck review); and Appendix I).
- Submissions on the AER's draft decision, in particular the Energy Australia submission.

### **Background**

A substantial portion of the Queensland transmission network was constructed in the 1950s and early – mid 1960s. Those assets are now at, or reaching, the end of their economic lives. A substantial portion of the network asset base will reach an age of over 40 years during the next reset period, while more secondary systems will also exceed their shorter technical lives of around 15 years during this period.

A small amount of replacement capex was allowed for in the last reset- however a substantially larger amount is expected to be completed by June 30 2007. Even so there still appears to be a

backlog that is intended to be addressed in the coming reset period. For example Powerlink's proposal includes capital for replacement of assets built in the 1950s which operate in the harsh conditions of tropical north Queensland.

The original capex of the 1950s and 1960s is the start of a wave of replacement capex on major plant (lines and substations) that is likely to continue for the foreseeable future. An issue is what amount is justified for inclusion in this reset period.

Older assets tend to have higher maintenance costs, and a greater need for refurbishment to avoid obsolescence and to maintain required reliability standards. In the case of substation equipment spare parts become scarce or unavailable, and performance shortfalls can impact on service standards.

## **Reasonableness of adopting a top-down approach**

*The AER asked: Does CHC think it is reasonable to set a replacement allowance based on a top-down analysis, given the information asymmetry between a TNSP and a consultant?*

PB Associates commenced its review of Powerlink's Replacement Capex proposal by selecting a number of specific projects for detailed examination and commenced, and substantially completed, a conventional bottom-up assessment. Most of the replacement projects are still being planned, and are not yet to the stage of formal approval. Consequently the amount and quality of completed written supporting information that Powerlink produced in response to PB's questions on selected projects was less than what was available for either the historic or future demand-driven capex.

One factor in information availability is that replacement capex is not subject to the rigours of public consultation or a regulatory test: rather the process involves in-house on-site assessments and a decision-process that is hard to codify. It includes an internal risk-based assessment of each project and, only at the stage of final approval, an in-house business case for Board approval, rather than public scrutiny. Most projects were not to this stage.

The process that PB undertook involved detailed discussion and correspondence with Powerlink staff on the selected projects, and as a result the information received depended largely upon the questions that PB asked. Although there is certainly no suggestion that Powerlink held back any requested information, this process is inherently unbalanced as Powerlink holds more information, whether documented or not, than the consultant could hope to receive for review.

Issues examined by PB were aimed at determining whether the stated procedures were being followed, and included:

- Were the decisions based on a proper examination of the status of the equipment, and the assessment of capacity, capability and compliance, as distinct from age alone?
- Was the risk assessment meaningful?
- Were the projects properly scoped, having regard for the detailed condition assessment?
- Were the project costs reasonable, having regard for additional costs of working in a brown-fields site with adjacent live equipment?

- Was the timing of the work appropriate?

PB was reasonably satisfied with most aspects of Powerlink's processes, and considered that they were being followed. However, it formed an opinion that three of the sample projects might be over-scoped and that, if this was the case, the costs allowed would be too high. PB summarised<sup>1</sup> this assessment as follows:

While our detailed project reviews indicate that Powerlink's proposed capex on asset replacement is high, from the information available we were not able to form a view on the amount by which the replacement forecast should be reduced. We therefore believe that a top-down analysis is a better approach to addressing this issue.

The inability to satisfy itself on the amount of suspected over-scoping therefore led PB to pursue a "top-down" approach, which aimed to estimate how much Powerlink would need to spend in this regulatory period on the basis of renewing assets to maintain asset value. The assumptions and methodology surrounding this approach will be discussed later.

The method has been criticised by Powerlink, Powerlink's consultants Evans and Peck, and by most of the major NEM TNSPs and the Queensland Department of Minerals and Energy. The issues raised by these submitters will also be discussed later.

The AER's question can be interpreted as asking whether PB was justified in abandoning the pursuit of information transfer from Powerlink to itself, as required to assess Powerlink's claims in the traditional way. As suggested this issue revolves around information asymmetry.

Evans and Peck (E & P) were engaged by Powerlink to review PB's conclusions. E & P obtained additional information from Powerlink that helped them draw conclusions on issues that PB had reported as remaining uncertain. This leads to a conclusion that PB may have been able to progress some of the matters further had it persisted. Powerlink would have been proactive in informing its own consultant, given the timing of E&P's work, whereas it apparently relied upon PB asking relevant questions.

The matter then revolves around whether PB's alternative method could be as reliable as a not-fully-checked bottom up method. This will be discussed in relation to another question.

Several submitters have commented that "top-down" approaches or "rules of thumb" have a place in the assessment of projects in a general sense, but not directly in relation to setting revenue allowances. For example Evans & Peck said<sup>2</sup> that:

Evans & Peck firmly supports the use of rules of thumb in situations where time is short, data is sparse and project specifics are scant.

However, they qualified this in respect of revenue regulation by stating that:

The appropriateness of such an approach to override a detailed, well structured bottom up development of a capital program on a project specific basis must be seriously questioned. Adoption of this approach represents a significant backward step in regulation, encouraging broad brush rule of thumb budgeting by utilities to support their

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<sup>1</sup> PB Report p 110

<sup>2</sup> Powerlink Submission, Evans & Peck attachment p 3

submissions, rather than structured engineering and commercial assessment of the specific needs of the electricity supply system.

CHC concurs with this assessment.

## **Was there evidence of over-scoping?**

*The AER has asked: Is there any evidence that the projects reviewed by PB have been over-scoped by Powerlink?*

Over-scoping could be present in several forms, and not all are easy to evaluate. They include:

- Replacing more parts of an asset than is strictly necessary, given that a detailed assessment of condition has indicated that some parts remain serviceable;
- Manipulation of the risk assessment process to exaggerate the need for replacement; or
- Manipulating the timing of the replacement to advantage.

Each of these will be considered in turn.

### ***Scoping of Projects***

PB found that in several projects the scope covered more than the bare minimum needed to address the condition issue. It documented these concerns in its report. However, it is not clear whether PB considered this to be conclusive evidence that over-scoping was present, and nor is it clear to what extent PB pursued these issues with Powerlink to obtain a possible explanation. If it had done so then in hindsight it would certainly have been in Powerlink's interests to have provided clarification.

Powerlink and E & P have documented plausible reasons why Powerlink wanted to replace some secondary systems items at Tarong<sup>3</sup> that may have remained satisfactory for some additional time. These reasons include:

- Economics (it is less expensive to set up works at a site just once),
- Maintenance simplicity (it is better to concentrate training on one type of plant), and
- Interface (it is costly to interface old plant with new).

Powerlink documented<sup>4</sup> reasons for the proposed scope of the Yabulu to Edmonton line replacement. Selection of double circuit construction related to coordination of the project with operational security (Powerlink must maintain security of supply during the works).

These are explanations that would need to be verified. It is not clear whether this same information would have been available at the time of the original PB review.

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<sup>3</sup> Powerlink Submission, Appendix A (E & P report) p14 and Appendix I p 17

<sup>4</sup> Powerlink Submission, Appendix I p15

One item that is not certain is the replacement of the Swanbank switchyard. Powerlink has allowed for the inclusion in this project of the equipment associated with the connection of Swanbank B generating units. These units may be decommissioned at around the time proposed for replacement of the substation, but it might be later. Powerlink has stated that the saving by excluding this work is estimated to be \$2.6 million, rather than the \$ 7.5 million estimated by PB. Unless the replacement project was addressing a very high risk situation a prudent, capital-constrained operator would wait until this matter could be clarified before committing to this work. The fact that its revenue cap is determined ex-ante would motivate Powerlink to include this project, and the AER must assess whether, in all the circumstances, this is efficient. Alternatively this may not be considered a material amount.

**Risk Assessment**

PB<sup>5</sup> described a process where each project was assessed against criteria of “consequences” and “likelihood” as illustrated in figure 4.13 of its report, copied below.

**Figure 4-13: Powerlink’s two-dimensional risk assessment framework**

Likelihood	Consequences				
	1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
A Almost Certain	Yellow	Orange	Orange	Red	Red
B Likely	Yellow	Yellow	Orange	Red	Red
C Possible	Green	Yellow	Orange	Orange	Red
D Unlikely	Green	Green	Yellow	Orange	Orange
E Rare	Green	Green	Yellow	Yellow	Orange

PB stated that it understood that in preparing its Revenue Proposal Powerlink has generally proposed the replacement of assets where the risk of doing nothing was assessed to be in the red or orange areas of the above matrix, in which case the risk was assessed as “very high” or “high”.

It is not clear whether PB delved deeper into this issue, which appears to be important to the prioritisation of replacement projects. Of even greater importance is the rigor with which this methodology is applied to individual projects.

In relation to its assessment of replacement capex Systems Evans & Peck<sup>6</sup> observed:

As part of this assignment, Evans & Peck reviewed Powerlink’s Replacement Plan documentation (which we understand was made available to PB as part of its review of Powerlink’s proposal). Our initial reaction to this document, particularly in the case of substation secondary systems, was that the risk justifications for all of the proposed

<sup>5</sup> PB Report pp 108-109

<sup>6</sup> Powerlink Submission, E & P attachment p 9

projects looked “repetitive”. This caused us to question how rigorous the “bottom up” Powerlink Replacement Capex Review approach actually was.

E & P went on to describe its investigation of this issue<sup>7</sup>. This included a review of the entire process, which is documented in its report. They concluded that:

To the extent that the process combines fact-based quantitative factors, qualitative analysis and field assessment by specialists, with a common sense based risk review, Evans & Peck is of the view that the process is robust and likely to provide reasonable balance in the identification of projects.

Their findings need to be verified. It would be of concern if all project assessments proved to be similar, as this could indicate that the process lacked the necessary capacity for discrimination between projects.

### ***Timing of Replacement Projects***

A related issue to prioritisation is the timing of replacement projects relative to each other, and to other forms of capex. The main issue here is that there is usually no specific trigger for this work, in contrast to reliability-based demand-driven capex. To some extent the risk assessment identifies the most urgent work, but the remaining work must also be programmed.

Powerlink has stated that it has integrated these projects into other capex. However it was not made clear whether this was on a detailed case-by-case basis or rather at a macro level. There is a strong possibility that there would be a range of timing drivers. However, it is instructive to examine the incidence of expenditure for the three related areas (in the sense of skill and resource requirements), namely augmentation capex, connections capex and replacement capex. The graphs on following pages were provided by Powerlink in their original<sup>8</sup> submission and show the proposed time profiles of expenditure on augmentations, connections and replacement capex.

It is evident that Powerlink has timed the bulk of the replacement expenditure from 2009/10 to fill the void left by a fall-off in the expenditure in the other two categories. It is reasonable to conclude from these expenditure profiles that Powerlink has considerable discretion in the timing of its replacement capex that is not available for demand-driven and connection capex.

Scheduling the expenditure in this way may well be a prudent action, having regard for the need to manage construction resources. It may, for instance, be a factor in the achievability of the total capex program. However, it also begs the question: what would be the result of deferring some of the replacement expenditure to the next regulatory period?

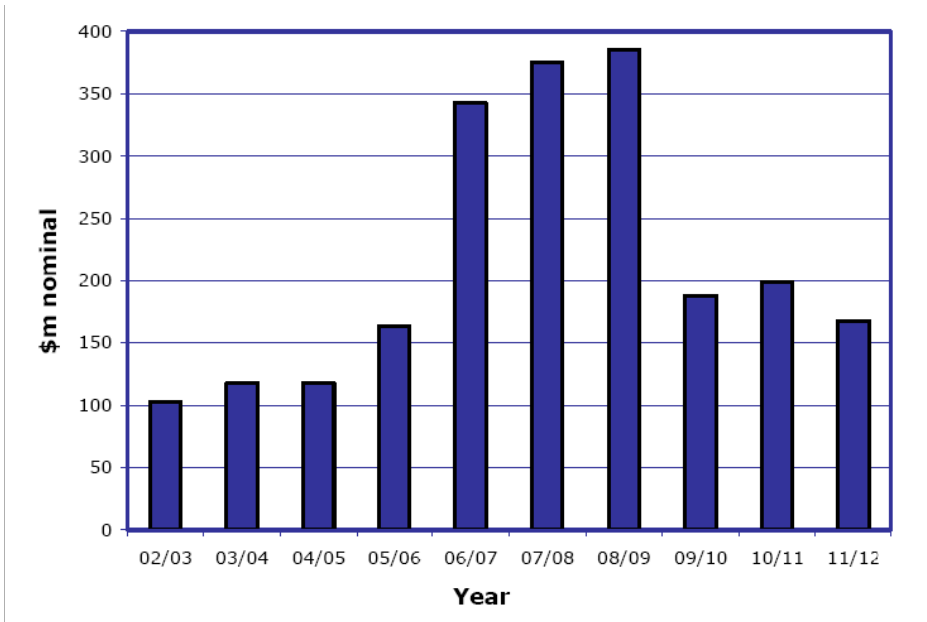
It may be difficult to provide an answer, since there is unlikely to be the same rigorous forward planning for replacement as exists for demand-driven projects. CHC has no information to pursue this issue.

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<sup>7</sup> Powerlink Submission, E & P attachment p 10

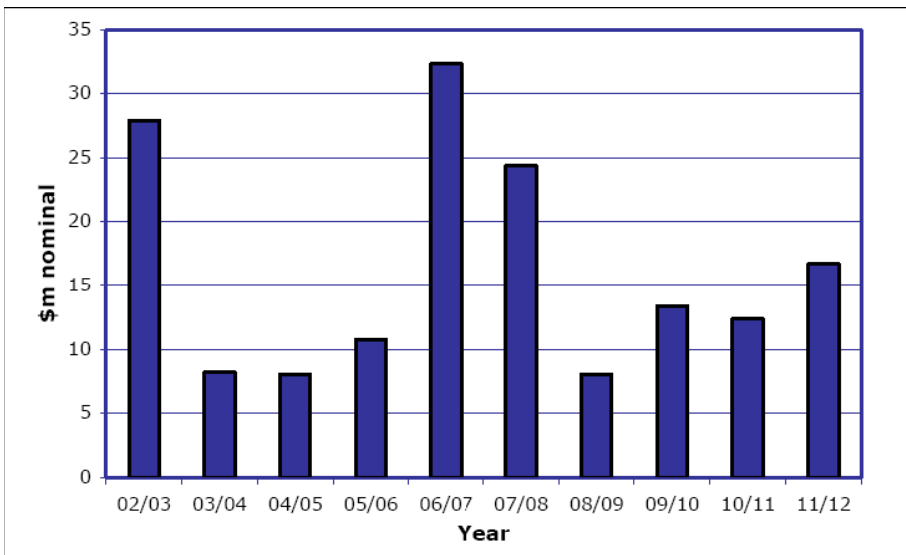
<sup>8</sup> This version was chosen as it is more likely to reflect the original evaluation of the timing of replacement capex.

**Figure 4-1: Historic and Forecast Expenditure on Augmentations**



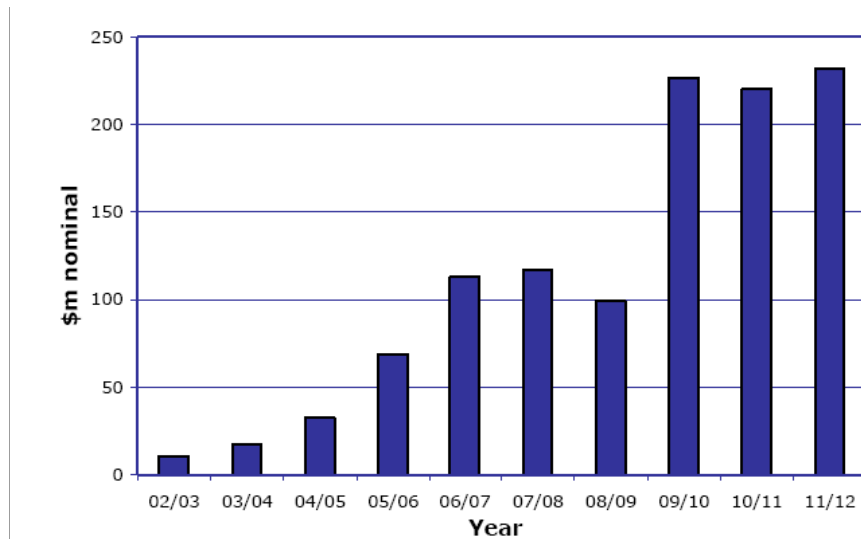
Source: Powerlink Revenue Proposal, p65

**Figure 4-2: Historic and Forecast Expenditure on Connections**



Source: Powerlink Revenue Proposal, p66

**Figure 4-12: Historic and Forecast Expenditure on Replacements**



Source: Powerlink Revenue Proposal, p70

### ***Conclusions regarding scoping***

The evidence presented by Powerlink and Evans & Peck is that there is a reason for the inclusion of more than the minimum scope for two of the three projects that PB identified as possibly being over-scoped. For the remaining project (Swanbank switching station), the issue is that some of the works may become redundant if power station units are decommissioned, which is uncertain. The potential saving involved is now estimated as being \$2.6 million.

The analysis presented to support this evidence is plausible, although it is noted that some of it is provided by Powerlink, and it is not specifically verified by Evans & Peck<sup>9</sup>.

### **PB's reaction to possible over-scoping**

*The AER has asked: If there is evidence of over-scoping, should it have been possible for PB to quantify the over-scoping? If quantification was not possible, was it reasonable to then revert to a top-down approach?*

As noted previously it is not clear whether PB considered that there was conclusive evidence, rather than a suspicion, that over-scoping was present, and nor is it clear to what extent PB pursued these issues with Powerlink to obtain a possible explanation. If it had done so then it would certainly have been in Powerlink's interests to have provided clarification.

If the information documented by E & P had been available at the time of PB's review (and this is not certain from the viewpoint of an outsider) then it appears that PB could have made further progress on the over-scoping issue, and could reasonably have quantified the extent in respect of the selected projects.

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<sup>9</sup> Operational matters related to Yabulu to Edmonton line, and costing of Swanbank scope change.



It is apparent that PB did not persist with this line of inquiry, and decided to try to get a measure of what Powerlink might reasonably expect to spend, using the top-down approach.

It is often good practice, when faced with a complex situation with poor data, to try to get an order-of-magnitude measure of an expected expenditure by making some basic assumptions.

However, it is a different matter again to rely totally upon this estimate. It is noted that the top-down estimate was not specifically directed at clarifying the over-scoping issue, but was intended to address the general issue of uncertainty in Powerlink's proposal.

It is difficult to place oneself in the position in which PB found itself. With hindsight it could have been prudent to use the top-down estimate only as a guidance as to how vigorously to pursue the conventional line of inquiry. In other words, faced with a conclusion result of a top-down analysis that over-scoping may have been present PB's approach could have been to:

1. Review the assumptions of the top-down approach to assess what accuracy might be expected from it; then
2. Review the specific projects included in the Application to determine whether savings of this order could possibly be identified.

It is noted that Evans & Peck conducted, and documented, an "order of magnitude" assessment<sup>10</sup> to satisfy itself that the proposed expenditure on secondary systems was reasonable.

## **Critique of the top-down methodology**

*The AER has asked: Is PB's top-down methodology and the assumptions on which it is based reasonable?*

### ***The Methodology***

In its Draft Decision<sup>11</sup> the AER adequately summarised the top-down methodology as follows:

From its review of Powerlink's RAB age profile, PB determined that approximately 35 per cent of Powerlink's asset base had been installed over the last 10 years (1996-2005). Based on Powerlink's standard asset lives it noted that none of these assets would require replacement before the end of the next regulatory period.

Therefore, PB considered it reasonable that from the remaining proportion of assets in Powerlink's RAB, some may need to be replaced during the next regulatory period. In arriving at its recommendation, PB noted that Powerlink's estimated depreciation for 2007-08 of \$154 million would indicate an undepreciated opening RAB of \$5400 million, of which \$3510 million (or 65 per cent) was older than 15 years at the end of the current regulatory period. Based on the assumption of a 35 year capital weighted average life for Powerlink's RAB, PB considered that Powerlink should be replacing its asset base to ensure that the \$3510 million portion is renewed over 35 years.

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<sup>10</sup> Powerlink Submission, Appendix A (Evans & Peck report), p11- 14

<sup>11</sup> AER Draft Decision—Queensland transmission network revenue cap 2007-08 to 2011-12 p 69

As such, PB recommended that the replacement allowance for the next regulatory period should be around \$500 million. It also recommended that a replacement premium of 20 per cent and a 20 per cent augmentation premium should be added to the allowance.

### *Critiques contained in submissions*

The top-down approach was criticised by Powerlink (supported by its consultants E & P), and this will be discussed in the next section. However there was a common view expressed by EnergyAustralia, Electranet, Transend, TransGrid, Energex, Ergon and the Queensland Department of Mines and Energy (QDME) that this approach is unacceptable, and should not substitute for a proper bottom-up assessment. The most detailed criticism was made by EnergyAustralia, and it is considered first.

**EnergyAustralia** strongly criticised the methodology as follows:

This method may be a good proxy for a replacement capex forecast provided that all the following assumptions hold true, namely that:

- assets can be replaced incrementally;
- depreciation was consistent with the correct replacement costs;
- 35 years is an appropriate capital weighted average life for Powerlink's assets;
- the asset base will age over the 35 years in a consistent (linear) manner;
- Powerlink's average asset age (and condition) is at a level where it need only be maintained (not reduced);
- the assets are being replaced with like for like equipment; and
- the replacement cost is equal to the existing asset value in the RAB.

EA stated that these assumptions are all questionable. CHC agrees with this assessment.

EnergyAustralia raised a number of additional points that are relevant to the credibility of the top-down approach. These included:

- Failure of the assumptions when the age profile of assets is not uniform, especially when there is a large number of older assets;
- Failure of the assumptions if there is ageing of blocks of assets that affect short term replacement needs relative to the long-term average;
- The need for a consistent approach to regulation over time;
- The cost of new assets relative to the value indicated by depreciation also requires a premium that is higher than 20%; and

- The costs associated with replacement work on a brown-field site relative to a green-fields development requires a high premium (50 – 100% suggested).

CHC notes that the first two points could cause either positive or negative errors. In regard to the second last point it is noted that PB did not make specific allowance for this factor, but included a 20% premium for “augmentation”, which is understood to recognise that replacement will not always be like-for-like, but may often provide additional capability.

In regard to the last point CHC notes that EnergyAustralia’s experience is as an urban NSP, and may not be directly applicable to Powerlink’s situation. However it is relevant that bottom-up costings include an allowance for this factor, whereas the top-down approach must include a premium that is appropriate to the specific environment in which the TNSP provides its service. The potential error in this assessment is large.

**Electranet**<sup>12</sup> described the reduction in replacement capex as “arbitrary”, and the top-down assessment as “crude”. It noted that an approach that is based on age rather than condition assessment is not one that would be used by a prudent operator. It observed that the standard of decision-making would not satisfy the new Chapter 6A Rules for assessing capex forecasts.

**Transend’s**<sup>13</sup> view is that the top-down approach used by PB could not reasonably be relied upon to determine a prudent replacement capital expenditure program. In particular, the top-down analysis described in the Draft Decision could only provide a very approximate ‘cross-check’ of the reasonableness of the replacement program.

Transend’s view is that the AER should give further consideration to the risks involved in reducing Powerlink’s replacement capital expenditure program and should also note PB’s comment that the level of asset replacement expenditure in the current regulatory period is not sustainable and a significant increase is justified going forward.

Transend notes that the ‘broad brush’ analysis conducted by PB in recommending a substantial reduction in replacement capital expenditure does not appear to consider the replacement cost of assets reaching the end of their expected lives in the forthcoming regulatory period.

**TransGrid**<sup>14</sup> does not believe that the ‘top down’ assessment of Powerlink’s forecast efficient replacement capex requirements, as carried out by PB Associates, is an appropriate method.

TransGrid understands that Powerlink adopts similar processes to those that it uses, and is able to provide “bottom up” information for review by the AER, and the AER’s consultants.

As such, TransGrid would be most concerned if, for budgetary or other reasons, this information was not fully considered and reliance is placed, instead, on a relatively simplistic high level assessment.

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<sup>12</sup> Electranet Submission of 7 February 2007, pp 1-2

<sup>13</sup> Transend Submission 7 February p 4

<sup>14</sup> TransGrid Submission 9 February pp 2-3

**Energex**<sup>15</sup> commented that a bottom-up assessment is more information-intensive and therefore more rigorous than a top-down assessment. It noted that the use of the top-down approach would set a precedent that might skew future regulatory processes.

**Ergon Energy**<sup>16</sup> stated that Powerlink is a recognised leader in the use of condition-based monitoring and asset management, and that replacement programs arising from detailed, objective and quantitative analysis of the condition of assets should be given due recognition.

**QDME**<sup>17</sup> raised concerns about the rigor of the consultant's assessment and its understanding of the cost of transmission assets in the current Queensland environment. It said that the consultant adopted a minimalist top-down approach, adopting a number of questionable assumptions with no consideration for need. A more thorough analysis may be appropriate.

### ***CHC's Assessment of the Top-Down Methodology***

The following notes highlight some limitations of PB's assumptions and methodology. This concentrates on the top-down methodology as presented, and does not consider other issues that would be relevant to a more rigorous appraisal of Powerlink's proposal.

**Assumption 1:** The basic assumption is that expenditure on asset replacement should reflect the depreciation cost since, if the age profile of an asset is flat, this will ensure that there is no increase in the average age of the asset base. (PB noted that the forecast asset replacement for the next regulatory period of \$812.8 million is only 7% lower than its forecast depreciation requirement of \$875.6 million over the next regulatory period).

Comments: The calculations that determine the valuation of depreciation allowance do not account appropriately for the large escalation in asset costs that is reflected in the future capex allowance. Some multiplying factors are applied later, but these do not correct for this deficiency. PB's comparison of the near alignment of the requested asset replacement capex with the depreciation allowance is likely to be fortuitous.

**Assumption 2:** PB noted that a significant component of the above is depreciation on assets installed over the next regulatory period: the depreciation requirement is forecast to increase by 25% over the period. The age profile of Powerlink's asset base shows that until about 1998 the asset age profile is relatively flat but the development of the network has accelerated since then.

Comment: This assumption is not a good approximation as evidenced by the age profile exhibit provided by Powerlink in its original submission (copied overleaf). Considering 5 year intervals corresponding to the resets it is evident that there would be quite large differences in the value of assets that would be assessed for replacement over successive resets.

The situation is further complicated if there is an element of catch-up in the works. This brings in projects outside the 5 year interval. CHC notes that the ACCC determined an allowance for Powerlink's replacement capex of \$87.3 million for 2002/03 to 2006/07, but Powerlink has indicated that it will spend an additional \$148.6 million, of which \$113 million is estimated for 2006/07<sup>18</sup>. It is a reasonable assumption that Powerlink is urgently addressing a significant

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<sup>15</sup> Energex Submission 9 February p 4

<sup>16</sup> Ergon Energy Submission 9 February p 4

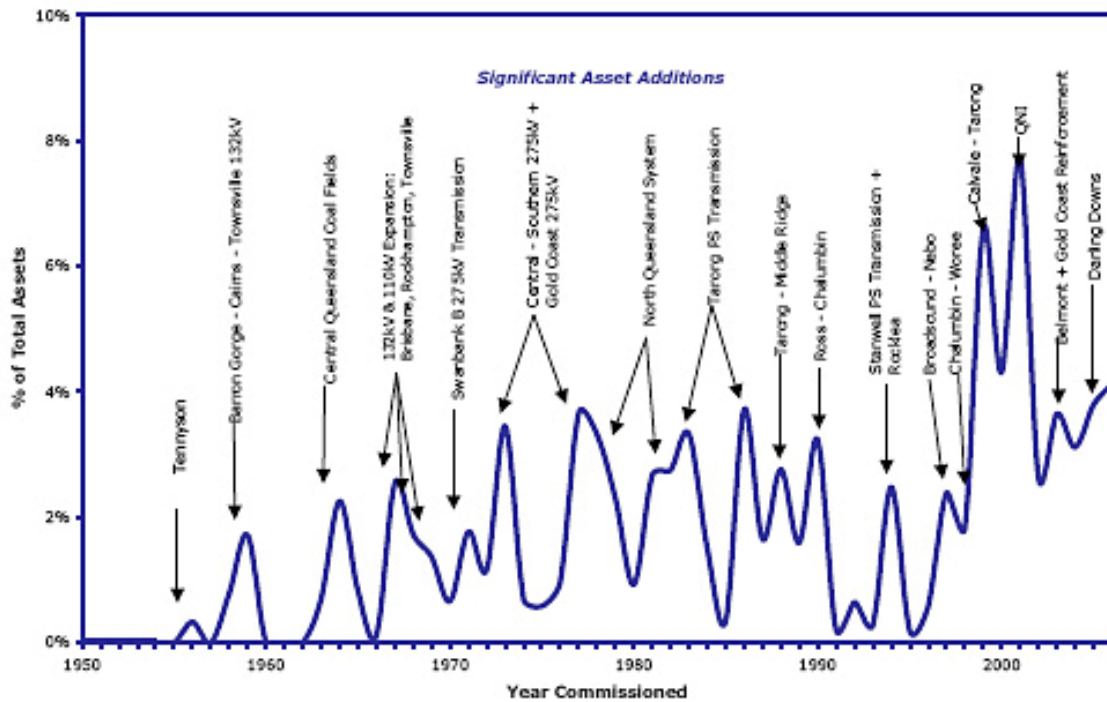
<sup>17</sup> QDME Submission (undated) Attachment A, no page reference.

<sup>18</sup> The expenditure profile is in figure 4.12 on page 7 of this report.

underestimation of the need for replacement capex, and that some backlog is included in the current Application.

PB also reported that one significant project that has been moved from the previous reset period is the replacement of the Yabulu-Ingham-Cardwell-Tully lines, for which environmental approval was delayed. The top-down methodology would not account for projects such as this.

**Figure 2.6: Age profile of Powerlink’s network assets**



**Assumption 3:** PB states that approximately 35% of the current asset base has been installed over the ten year period 1996-2005. Assuming the standard asset lives used by Powerlink, none of these newer assets will need replacement before the end of the next regulatory period. Assets that will be replaced over the next regulatory period will be selected from the remaining 65% of the asset base, since these assets will be over 15 years old by the end of the period.

Comment: This is a reasonable assumption but it is unhelpful in identifying which assets will require assessment.

**Assumption 4:** PB states that Powerlink assumes a 55 year life for transmission lines, a 40 year life for substations and a 15 year life for secondary systems. Based on the relative proportions in a typical transmission system, PB estimated that a conservative assumption for the capital weighted average life of the RAB is 35 years.

Comment: The reason for calculating this average, and its value in assessing replacement costs is not explained. The adoption of an average may mask the fact that secondary systems may need to be replaced two or three times during the nominal life of a substation. During a substation

replacement the replacement of the secondary systems would be included. It would seem preferable to retain the differences between asset classes and do the calculation for each.

**Assumption 5:** PB noted that Powerlink's estimated depreciation for 2007/08 is \$154.12 million, which would indicate an undepreciated opening RAB of \$5.4 billion of which \$3.51 billion would be more than 15 years old at the end of the current regulatory period. PB considered that it would **not be unreasonable** for Powerlink to be replacing assets at this point in time at a rate that would ensure that this \$3.51 billion portion of the asset base was renewed over a 35 year period. This would indicate a requirement of \$100 million a year or \$500 million over the regulatory period.

Comment: This calculation relies heavily on the disputed assumption that the age based expenditure profile is flat, and assumes an age-based method of assessment. At this particular time it also ignores the history of the network, and the fact that there may now be a requirement for some catch-up in asset replacement for assets that could have been replaced earlier. For example it is noted that around 24% of the original major assets will be older than 40 years by the end of the regulatory period.

It also assumes that all assets in the age group will be replaced at the cost implied by the roll forward of the RAB at CPI, rather than the contemporary costs used by the TNSP to estimate the cost of replacement assets. In the circumstances of the current Application this is likely to underestimate the cost of replacement assets. This could be dealt with using an additional premium that would align the top-down and bottom-up assumptions. However, this would be difficult to determine.

Further this calculation does not specifically address the suspected over-scoping issue, as it assumes entire replacement.

**Assumption 6:** PB stated that there is an additional cost involved in replacing assets because of the need to maintain supply and work around existing live infrastructure. This indicates that a replacement premium should be added to this base cost, and PB estimated that this is likely to be around 20%.

Comment: EnergyAustralia considered that this allowance is inadequate and quoted alternatives of 50 to 100%, based on its experience. It is evident that this premium would be location-specific, such that EnergyAustralia's experience may not be directly applicable to Powerlink. However, the use of any single multiplier would be questionable.

**Assumption 7:** PB also considered that there is an augmentation element in many of Powerlink's replacement projects, and that an augmentation premium should be added to the base cost. PB noted that the appropriate value for the augmentation premium is more difficult to estimate since it is dependent on the way that Powerlink categorises its projects. It stated that a 20% augmentation premium would also be reasonable.

Comment: The augmentation premium is assumed to allow for the possibility that replacement modern equipment would probably have greater capability than the original. However the selection of 20% for this value appears arbitrary.

### **Summary of Assessment of Top-down methodology**

In summary most of the assumptions associated with the top down approach are questionable to some degree and, when combined, the accuracy of the final result is not sufficient for the purpose

of determining a revenue allowance. In addition CHC is unable to propose alternative assumptions or a different top-down methodology that would not be questionable in some respect.

Specifically it is not possible to determine whether the proposed \$111 million reduction is high or low. Key factors that are not captured by the methodology are that there may be some catch-up replacement included in the Application, and that the replacement capex works should be costed using unit costs applicable to future capex rather than the asset values implied by depreciation. There are also doubts about whether the 20% premium applied by PB for work under brown-fields conditions is adequate. These considerations suggest that a smaller reduction in the allowance than proposed by PB may be appropriate. The margin for error is such that the proposal included in the original Application may be close to the replacement capex requirement.

## **Evaluation of Powerlink's Submission**

*The AER asked: Does the information provided in Powerlink's submission to the AER's draft decision influence your opinions in relation to the above issues?*

The short answer to this question is that it does.

However, the consistent response from a number of other submissions, to the effect that the top-down assessment is not acceptable, are also influential. EnergyAustralia provided a comprehensive analysis of its shortcomings that was discussed earlier. It is the view of several submitters that it is less rigorous than a bottom-up approach, and there are also concerns about the precedent that this would set if it was applied in future. Concerns were also expressed that the AER would not comply with the recently amended rules if it carried out its assessment in this way.

Powerlink has provided a comprehensive critique of PB's report, and has also attached its own consultant's report, which it implies contains considerable information that would have been available to PB if it had asked.

Overall I consider that Powerlink has addressed all the issues that PB has raised and, subject to verification, has made a good case for reverting to the original proposal. Specifically it has addressed the scope of the projects that PB considered may be over-scoped. Having regard for the margin of error that may be present in the top-down approach this would be a credible outcome. One aspect of the proposal that has not been addressed by any of Powerlink, Evans & Peck or PB is the criticality of the timing of the proposed expenditure, including the consequences of deferral of some of the expenditure into the next regulatory period. PB has noted that replacement capex is inherently more deferrable than demand-driven capex, but did not pursue this matter. It seems certain that if there proves to be a problem with achievement of the program Powerlink would sacrifice some of the lower risk replacement projects rather than mandated reliability projects. However Powerlink appears to have attempted to address achievability by the timing of a large proportion of the replacement work into a construction trough.

The AER will need to evaluate the new information that is contained in Powerlink's submission and the attached Evans & Peck report. Two possibilities would be to engage PB to continue its investigations, having regard for the information that is now available, or to simply accept the Evans & Peck assessment as being sufficiently independent and authoritative.

Powerlink's response highlights the issue that the AER identified earlier: namely information asymmetry, and what might be done to address this in the future. It is suggested that TNSPs should ensure that documentation can be assembled for replacement projects put forward in a

reset application and take more responsibility for proactively bringing forward for scrutiny whatever supporting information is available. This approach was attempted for this reset review in the form of “project packs” for historic capex, and additional ad hoc documentation for those demand-driven capex projects that were selected for detailed review. It succeeded best for those projects that were either in progress or where the preparation of approval documentation was at an advanced stage.

It would be expected that a TNSP’s rigorous process for replacement capex would generate similar relevant documentation for both those projects that are included in the revenue Application and those that have been examined based on the age trigger, but excluded from the revenue Application based on a condition-based risk assessment. It would give some comfort to the AER that a meaningful risk assessment process was in place if the TNSP’s documentation that supported the removal of low-risk potential projects from the Application was to be made available for scrutiny<sup>19</sup>. At the same time the AER’s consultants must take responsibility for defining their needs and persisting with their enquiries.

## Conclusions

Most of the assumptions associated with the top down approach that was applied by PB are questionable to some degree and, when combined, the potential error in the final result is too great to use it for the purpose of determining a revenue allowance. Specifically the rigour implied by the conclusion that it justifies a reduction in Powerlink’s allowance of precisely \$111M is not present. It is also considered that this approach could not be made more acceptable by adopting better assumptions. If used at all it should only be to test the order of magnitude of a recommended allowance that has been assessed by a bottom-up assessment of the Application.

Key factors that were not captured by the top-down methodology are that there may be some catch-up replacement included in the Application, and that the replacement capex works should be costed using unit costs applicable to future capex rather than the asset values implied by depreciation. There are also doubts about whether the 20% premium applied by PB for work under brown-fields conditions is adequate. These considerations suggest that a smaller reduction than proposed by PB may be appropriate. The margin for error is such that the amount proposed in the original Application may be close to the requirement.

Concerns expressed in Submissions about setting a regulatory precedent by accepting a top-down approach are also very real. A consequence of going down this path might be to discourage TNSPs from using a rigorous approach to prepare their revenue proposals. This would undermine confidence in the regulatory review process. Changing the regulatory approach between resets and between TNSPs would have a similar effect. The AER should therefore determine an acceptable uniform approach.

If it accepts this conclusion the AER will need to determine an approach to resuming a bottom-up assessment. PB has done a lot of work, and Powerlink, through Evans & Peck, has supplemented the information that was previously made available to PB. The AER will need to evaluate the new information that is contained in Powerlink’s submission. Two possibilities would be to engage PB to continue its investigations, having regard for the information that is now available, or to

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<sup>19</sup> This conclusion is analogous to PB’s comment that for future capex Powerlink should document project options that were identified but eliminated on technical or other grounds prior to the final project evaluation.



simply accept the Evans & Peck assessment and Powerlink's assurances as being sufficiently independent and authoritative.

Overall CHC considers that Powerlink has addressed all the issues that PB has raised in its Report and, subject to verification of its claims, has made a good case for reverting to the original replacement capex proposal. However CHC has been unable to assess the achievability of the overall capital works program, and whether Powerlink is likely to defer some replacement expenditure within the reset period or into the next period so as to complete higher priority demand-driven capex.

Reviewing this experience, and looking towards future reset applications, CHC considers that action is required to reduce the information asymmetry that is particularly evident for this class of expenditure. The AER could do this by encouraging a TNSP to ensure that it has prepared high quality documentation that covers all aspects of its processes and their application to project selection, scoping and timing. This documentation should include all age-qualified assets, and would be expected to include projects that have been prioritised as high, and those for which no work is intended. This documentation should be readily accessible for review by the AER and its consultants.

In making this suggestion it is implied that a more "principles and processes" based approach may be appropriate for review of this class of expenditure, which should aim to evaluate for a small random selection of projects:

- Is the project warranted at the time proposed, and do reasonable processes exist for the prioritisation of work?
- Has the prioritisation sufficiently distinguished between urgent and discretionary projects, and situations where indefinite deferral is possible?
- How has the TNSP exercised its discretion in the timing of the replacement work, and is this likely to result in an achievable overall capital works program?
- Is the scope of work proposed the optimal solution when all issues, including cost are considered?
- Is the budget forecast a reasonable estimate of the cost of completing the work?
- If not, then what alternative replacement capex allowance would be more appropriate?

In the case where some doubt exists about the size of the overall program then an assessment by the AER or its consultant of its order of magnitude using a top-down approach may be prudent.

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**27 March 2007**