POWERLINK OPERATING AND MAINTENANCE EXPENDITURE REVIEW

CONFIDENTIAL

Prepared for

Australian Competition and Consumer Commission

PB Associates *Quality System:*

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Prepared by	:	Bob Simpson
Reviewed by	:	Geoff Brown
Approved by	:	Ralph Parmella
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EXECUTIVE SUMMARY

This report presents the results of a review of Powerlink's regulatory revenue cap application in respect of Operating Expenditure. This review was undertaken by PB Associates for the Australian Competition and Consumer Commission.

The main conclusions and recommendations of the review were as follows:

- Powerlink has similar maximum demand and energy delivered to SPIPowerNet and Transpower and similar total line length to TransGrid. SPIPowerNet and TransGrid have lines at higher voltages and more compact service territories. Due to differing network characteristics and stakeholder interests, a range of views is required in determining whether Powerlink's Operating Expenditure is appropriate;

- Operating Expenditure includes all expensed costs to operate and maintain the network except for interest and depreciation. In real terms, direct and indirect Operating Expenditure, excluding grid support costs, is projected to increase from $58.6m to $75.1m over the regulatory period. Asset growth increases the direct costs by $13.1m. Indirect costs increase by $3.6m due to new market related functions. Grid support costs, which are required to compensate generators to run instead of Powerlink undertaking transmission capital investment, vary by up to $15.4m per year in real terms, and are additional to direct and indirect costs;

- Powerlink has a comprehensive asset management plan that links their asset management strategies to corporate visions, performance requirements and resource plans. Powerlink has developed an in-depth planning approach using scenario planning principles with detailed plans for both asset enhancement and maintenance. SAP provides an effective tool in managing expenditure;

- Powerlink's guidelines for classifying operating and capital expenditure are considered appropriate and are being applied in a consistent manner. Operating Expenditure does include some costs associated with site clean up following capital works;

- Powerlink's internal rates, incorporating full overhead allocation, are within 10-15% of the external service provider rates. KPMG, in an audit reviewed by PB Associates, has confirmed that Powerlink is applying the allocation of overheads consistently and that the practices adopted comply with ACCC and NEC requirements. PB Associates is satisfied that the allocation of common costs is being carried out appropriately;

- The maintenance costs proposed by Powerlink are considered appropriate. Detailed and high-level maintenance forecasts show consistent trends. Reasonable savings have been made in the last three years but costs will now increase with asset growth. Reduced availability of plant for maintenance and increasingly remote sites are increasing maintenance costs. Maintenance practices are considered to be consistent and effective. Refurbishment costs have increased above historical levels and the need for this has been confirmed by benchmarking studies and recent plant failures. Network monitoring and control costs will increase when NEMMCO shifts more responsibilities to Transmission Network Service Providers and terminates their payment for system security services;

- New NEM functions increase costs by $2.4m due to the need for more detailed network analysis and public consultation for network development, code compliance and regulatory reporting. Based on the information provided, these costs are considered reasonable;

- Additional insurance premiums to cover any additional liabilities imposed on it should be allowed on a cost pass through basis. The Regulatory Application allows for insurance premiums to cover only Powerlink's existing level of liability. It is likely that new regulatory requirements will increase the amount of insurance cover that Powerlink will be required to carry and that the resulting increase in premiums will be material. However the amount of additional insurance that Powerlink will be required to carry, and the resulting additional premium costs, cannot be forecast at this stage.

- Although the annual average grid support costs reaches $15.4m, there is considerable variation about this average depending on which scenario eventuates. Due to the variability and uncertainty in these costs, the revenue provision to cover these costs should be subject to a mid term reset at the same time as the revenue provision for capitalised network augmentations is reset;

- PB Associates has reviewed Powerlink's performance in the high level International Comparison of Transmission Performance (ICTP) and the detailed International Transmission Operations and Maintenance Study (ITOMS) comparative benchmarking studies. These studies show Powerlink Operating Expenditure to be competitive. Other comparisons carried out by PB Associates with Australasian companies also show in most cases that Powerlink's costs are lower;

- A number of influencing factors create uncertainty for operating expenditure over the regulatory period. These include the level of grid support costs, industry restructuring with Powerlink being required to carryout additional functions and other risk factors such as weather and environmental influences;

- Powerlink has made some provision in its projections for additional functions resulting from industry restructuring but not for extraordinary maintenance;

- Powerlink has already identified and adopted a range of efficiency and effectiveness practices, identified for example in its participation in benchmarking studies. Further opportunities could include achieving greater maintenance synergies for new assets so that overall maintenance costs increase at a rate slower than that assumed, and treating as capital project related dismantling work, which is currently included in operating expenditure.

1 INTRODUCTION

The Commission (Australian Competition & Consumer Commission - ACCC), in accordance with its responsibilities under the National Electricity Code (Code), is conducting an inquiry into the appropriate revenue cap to be applied to the non-contestable elements of the transmission services provided by the Queensland transmission network, Powerlink, from 1 January 2002. The Commission expects to release a draft decision in June 2001.

PB Associates has been engaged to review the Powerlink application in respect of the following areas that are pertinent to establishing an appropriate revenue cap:

- The value of the assets used by Powerlink to supply non contestable transmission services;
- Powerlink's capital expenditure (CAPEX) requirement over the regulatory period;
- Powerlink's operational expenditure (OPEX) requirement over the regulatory period;
- The appropriate standard of service that Powerlink should reasonably be expected to achieve over the regulatory period.

This report covers PB Associates' review of the Powerlink application in respect of the appropriate Operating Expenditure.

As part of the inquiry, a review of operating and maintenance (O&M) expenditure is required to assist the Commission in assessing the performance of Powerlink relative to the requirements of the Code. In particular, Part B of Chapter 6 of the Code requires *inter alia* that:

- In setting the revenue cap, the Commission must have regard to the potential for efficiency gains in expected operating, maintenance and capital costs, taking into account the expected demand growth and service standards; and
- The regulatory regime should seek to achieve an environment, which fosters efficient use of existing infrastructure, efficient operating and maintenance practices and an efficient level of investment.

In this context, the review will need to inform the Commission on the adequacy, efficiency and appropriateness of the O&M expenditure stated by Powerlink as being necessary to meet its present and future transmission service requirements.

1.1 TERMS OF REFERENCE

The Terms of Reference required analysis and comments on the following matters in relation to the contribution of O&M expenditure to Powerlink's delivery of transmission services:

- An assessment of whether Powerlink's target for reducing controllable operating costs for each of the next five years is achievable and whether there is scope for additional efficiency gains during the five year regulatory period commencing on 1 January 2002;
- An assessment of Powerlink's O&M performance against current available indicators, with a view to improving and implementing benchmark indicators and

targets, based on key controllable costs and with reference to national and international best practice;

- The appropriateness of Powerlink's allocation of O&M costs to specific activities, including the distinctions between regulated and non-regulated activities, between routine maintenance and renewals, and the treatment of joint and common costs, especially corporate administration expenses, financing charges and depreciation;

- The effectiveness of Powerlink's operating practices and asset management system in ensuring that only necessary (and efficient) O&M expenditure occurs, with reference to the acceleration or deferral of capital expenditure;

- In the context of a benchmarking methodology, the degree to which this methodology should account for differences in network age, design and configuration, operating environment, service standards and economies of scale; and

- Comment on the internal and external factors that may affect the level of O&M costs over the five-year regulatory period commencing 1 January 2002.

1.2 PROCEDURES ADOPTED FOR CARRYING OUT THIS REVIEW

The procedures adopted for this review were to examine the Application by Powerlink, develop a series of questions and then discuss these with Powerlink management. Cost comparisons were made of projected expenditures against historical actual levels taking into account time effects. In depth consideration was then given to various aspects of the projected expenditure, based on more detailed information obtained from Powerlink.

Following the detailed analysis, high-level performance comparisons were carried out using both studies carried out by Powerlink and those available to PB Associates.

The structure of this report is:

- Introduction;
- Business Overview;
- Overview of Operating Expenditure;
- Asset Management Efficiency;
- Allocation of Common Costs;
- Analysis of Operating Expenditure;
- Powerlink Performance Comparisons;
- Concluding Remarks.

1.3 ACKNOWLEDGEMENTS

PB Associates acknowledges the assistance from ACCC and Powerlink in carrying out this review. In particular, Powerlink management adopted a proactive and open approach to this review, making information readily available. This assistance is gratefully appreciated.

2 BUSINESS OVERVIEW

Powerlink is a government-owned corporation that owns, develops, operates and maintains the electricity transmission system in Queensland. The network stretches 1,700km from north of Cairns to the Gold Coast.

Powerlink's employs 460 full time equivalent staff as at 31 January 2001 who carry out planning, designing, development, operation and maintenance activities. In addition, Powerlink contracts external service providers to carry out these activities, particularly in the northern and central parts of its area. External service providers carry out 70% of the maintenance work.

2.1 BUSINESS STRUCTURE AND FUNCTIONS

Powerlink uses an Asset Manager/Service Provider business model with the Asset Manager function being undertaken by the Network Business unit. Other business units are either Network service providers or Corporate service providers.

The Network Business Unit comprises asset management, transmission environment, regulatory and code compliance, customer account management and corporate communications. Network maintenance provides maintenance services in the southern part of the network and Technical Services provides specialist services such as the Network Switching Centre, asset monitoring, testing and condition monitoring.

Other internal service providers are Engineering Projects, Transmission Planning, Finance and Commercial Services, Procurement, IT and Employee Relations. OPEX costs from service providers are reflected in the internal rates charged. Costs are allocated to OPEX, CAPEX and unregulated business.

2.2 POWERLINK NETWORK

Powerlink network parameters are shown in the following Table **Error! Reference source not found.**1 along with those for TransGrid in NSW, SPIPowerNet in Victoria and Transpower in New Zealand.

Powerlink has a similar maximum demand and energy delivered to all the above transmission networks except TransGrid. Powerlink's total line length is similar to that of TransGrid only. SPIPowerNet and TransGrid have lines at higher voltages and more compact service territories.

Powerlink in its Regulatory Application, raises the view that not only should the length of line be a factor in making comparisons but also the MW transported over each line. Their calculations conclude that on a MW-km basis, Queensland's "transport" requirements are 90% that of NSW. This approach provides some insight into network topology. It should be noted though that costs are not only influenced by line lengths but also by the number of nodes and the various voltages used.

Table 1 Network Parameters

	Powerlink	TransGrid	SPIPowerNet	Transpower
Maximum demand (MW)	6,323	11,573	7,839	5,830
Energy delivered (GWh)	36,953	66,235	46,054	33,880
Number of substations	80	72	46	181
Length of line (km)	10,308	11,650	5,995	17,426
500 kV line km	-	1,057	1,017	-
330 kV line km	-	4,691	739	-
275 kV line km	5,825	-	157	1,142(HVDC)
220 kV line km	-	681	3,941	8,365
132 kV line km	3,958	5,159	-	-
110 kV line km	524	-	-	6,207
66 kV line km	1	62	141	1,712

Operating Expenditure for companies with higher MW and lower km could be expected to be lower than companies that have lower MW and higher km even though the product of MW and km is the same for each. The greater distances that need to be covered to carry out maintenance work for companies with higher km would be the main influence on this difference.

In making comparisons across companies, it is considered more appropriate to consider a range of views taking into account the perspectives of the various stakeholders. For example end consumers are likely to be more interested in the cost per unit of electricity delivered ($ per MWh) whereas shareholders would be interested in costs per asset value.

As will be shown later, no one specific measure provides an absolute means of comparing performance. Other factors that will influence operating costs are the network age, design standards, environment, customer requirements and accounting policies.

Conclusion

Powerlink has similar maximum demand and energy delivered to SPIPowerNet and Transpower and similar total line length to TransGrid. SPIPowerNet and TransGrid have lines at higher voltages and more compact service territories. Due to differing network characteristics and stakeholder interests, a range of views is required in determining whether Powerlink’s Operating Expenditure is appropriate.

3 OVERVIEW OF OPERATING EXPENDITURE

This section defines Operating Expenditure (O & M in Terms of Reference), provides an overview of future projections in nominal (includes effect of inflation) and in real (dollars of today) terms and compares future trends against historic expenditure.

3.1 DEFINITION OF OPERATING EXPENDITURE

Operating Expenditure related to the management of Powerlink's assets includes both direct and indirect costs. Direct costs include field maintenance labour and material costs, and associated management costs. Also included in direct costs are the activities required to operate and monitor the assets such as switching equipment in and out of service and monitoring equipment status and condition on an ongoing basis. Indirect costs include support and corporate functions. Indirect costs also include planning, insurance, asset management support, legal, land and property, public relations, IT, finance, treasury and other corporate services.

Powerlink's accounting policies include refurbishment activities as direct operating costs. Activities that are expensed include both minor and major maintenance work and can extend to the replacement of assets such as circuit breakers. Treating specific refurbishment projects as either capital or expense is dependent on the accounting treatment adopted. Section 5 will consider this further.

Other costs that are expensed but have not been included in this review are interest and depreciation. These are being considered separately by the Commission.

3.2 POWERLINK OPERATING EXPENDITURE

Figure 1 shows a breakdown of the total Operating Expenditure projected by Powerlink over the regulatory period.

Figure 1 Total Operating Expenditure

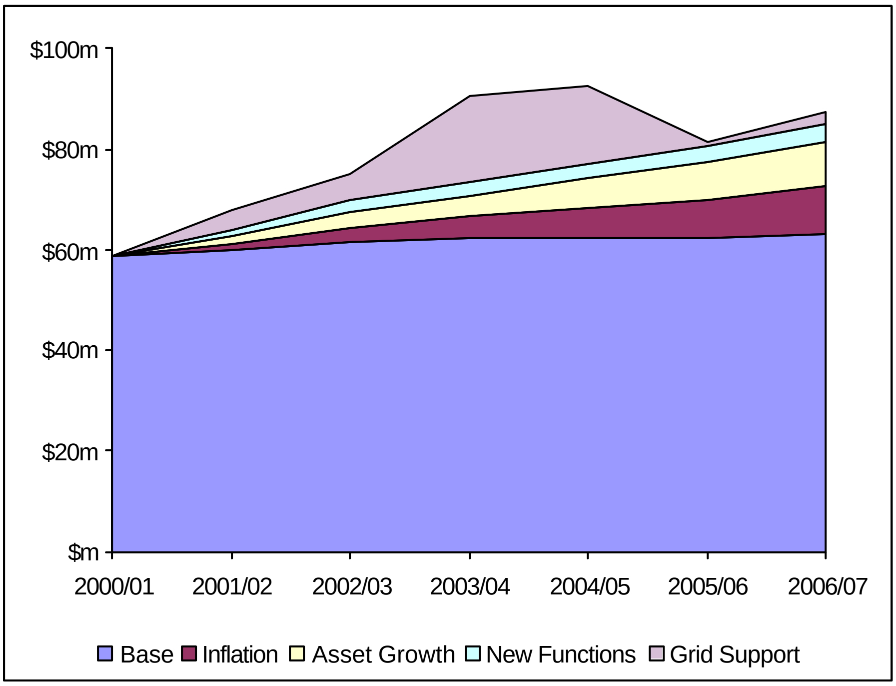


Figure 1 shows that the significant drivers for future costs are inflation, new functions, asset growth and grid support costs. Grid support costs are the expense costs paid to generators to run their generators in a generation deficient area in order to avoid or defer Powerlink carrying out transmission reinforcement for the area. Grid support costs will only be paid if the generation option is more economical than the transmission option and investment is deemed necessary to satisfy the ACCC regulatory test. New functions include constraint analysis, code processes for new augmentations, code compliance, regulatory reporting, outage co-ordination and regulatory revenue management.

As outlined in Powerlink's Application to the Commission, 2000/01 is considered to be the base year for costs. The ACCC jurisdiction commences on 1 January 2002 but this does not align with Powerlink's financial year (June/July basis). In order to overcome this discontinuity, the Application presents forecasts for six years. Operating Expenditure forecasts for these six years also form the basis of this review

Table 2 gives the detailed information in nominal terms (includes the effect of inflation) for the different business functions that form the basis of the costs shown in Figure 1. Powerlink has assumed a CPI rate of 2.5% when determining nominal projections.

Table 2 Regulated OPEX Forecast (Nominal $m)

Expenditure Category	Base Year 00/01	01/02	02/03	03/04	04/05	05/06	07/08
Maintenance	33.2	36.5	39.0	42.0	44.5	46.9	50.4
Network Monitoring and Control	4.2	4.9	6.7	7.0	7.4	7.8	8.2
Support/Corporate	21.1	23.1	24.7	25.6	26.5	27.7	28.6
Required OPEX (subtotal)	**58.6**	**64.5**	**70.3**	**74.6**	**78.4**	**82.4**	**87.1**
Grid Support	0	3.7	5.2	16.6	15.4	0.7	2.3
Total OPEX	**58.6**	**68.2**	**75.5**	**91.2**	**93.9**	**83.1**	**89.4**

Note – totals may not add due to rounding

Table 3 shows the same forecasts as in Table 2 in real terms (effect of inflation removed).

Table 3 Regulated OPEX Forecast (Real $m)

Expenditure Category	Base Year 00/01	01/02	02/03	03/04	04/05	05/06	07/08
Maintenance	33.2	35.6	37.1	39.0	40.3	41.5	43.5
Network Monitoring and Control	4.2	4.8	6.3	6.5	6.7	6.9	7.0
Support/Corporate	21.1	22.6	23.5	23.8	24.0	24.5	24.6
Required OPEX (subtotal)	**58.6**	**62.9**	**67.0**	**69.3**	**71.1**	**72.8**	**75.1**
Grid Support	0	3.6	4.9	15.4	14.0	0.6	1.9
Total OPEX	**58.6**	**66.5**	**71.9**	**84.7**	**85.0**	**73.4**	**77.1**

Note – totals may not add due to rounding

This review will use the forecast in real terms as outlined in Table 3 as the basis of analysis.

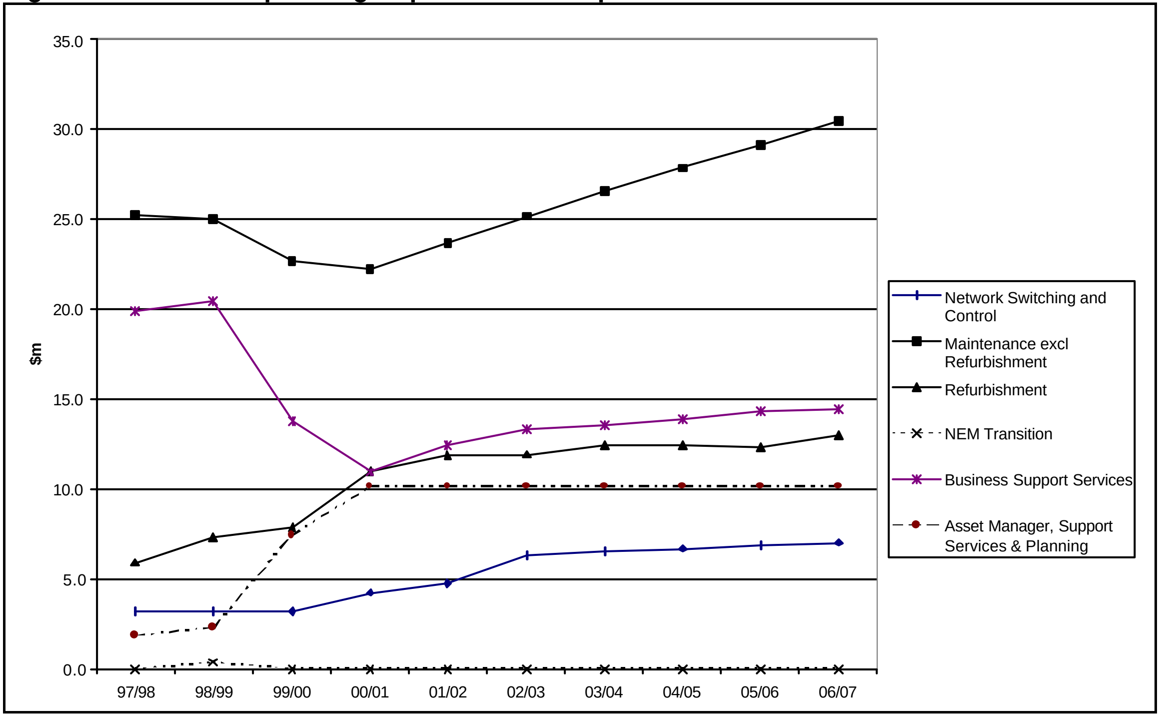
Table **Error! Reference source not found.**4 shows both historic and forecast Operating Expenditure in real terms and Figure 2 this information graphically.

Table 4 Trends in Operating Expenditure (Real $m)

All costs real in 00/01 $s	**97/98**	**98/99**	**99/01**	**00/01**	**01/02**	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**
Network Switching and Control	3.2	3.2	3.2	4.2	4.8	6.3	6.5	6.7	6.9	7.0
Maintenance	25.3	25.0	22.7	22.2	23.7	25.2	26.6	27.9	29.2	30.5
Refurbishment	5.9	7.4	7.9	11.0	11.9	11.9	12.5	12.5	12.3	13.0
NEM Transition	0	0.4	0	0	0	0	0	0	0	0
Business Support Services	19.9	20.5	13.8	10.9	12.4	13.3	13.6	13.9	14.3	14.5
Asset Manager, Support Services Planning	1.9	2.3	7.4	10.2	10.2	10.2	10.2	10.2	10.2	10.2
Total	**56.1**	**58.7**	**55.0**	**58.6**	**62.9**	**67.0**	**69.3**	**71.1**	**72.8**	**75.1**
Total excluding Refurbishment	**50.2**	**51.4**	**47.1**	**47.6**	**51.0**	**55.0**	**56.8**	**58.6**	**60.5**	**62.1**
Grid Support (not included in above totals)	0	0	0	0	3.6	4.9	15.4	14.0	0.6	1.9

Note – totals may not add due to rounding

Figure 2 Trends in Operating Expenditure Components



Due to the adoption of a new SAP accounting system on 1 July 1999, it has not been possible to make comparisons against historic costs to the same level of detail that is now available for future projections. Historic costs also included a full System Operator function until 1998/99. In providing the historic costs, Powerlink has adjusted historic network switching costs to only include the costs of the same functions as currently required under their NEMMCO agency arrangement and the NEC.

In 1998/99, Powerlink adopted an Asset Manager/Service Provider model with more appropriate allocation of overhead costs. This allocation methodology will be examined further in Section 6. The full impact of this approach did not occur until the 2000/01 financial year. The net effect of these changes was that some costs originally included in Business Support Services are now allocated to Asset Management and Planning. As can be seen in Table **Error! Reference source not found.**4, the combined total costs in real terms of Business Support Services, Asset Manager, Support Services and Planning over the four years from 1997/98 has been consistent at just above $21m per year.

Network switching and control costs increased in 2000/01 with the adoption of an on-line asset monitoring function and they will further increase by $1.4m in 2002/03 when NEMMCO terminates its agency contract. Other increases in network switching and control are related to Powerlink's asset growth assumptions.

Refurbishment costs in 1997/97 were $5.9m (in 2000/01 dollars), increasing to $11.0m in 2000/01 then to $13.0m in 2006/07. Powerlink identified through detailed asset modelling and benchmarking that service levels for certain assets needed to be improved and have adopted a comprehensive programme to rectify this. This programme will be reviewed in further in Section 7.

Maintenance costs reduced by $3.1m from 1997/98 to 2000/01 while the value of the asset base increased by $763m. Part of this reduction would have been the moving of costs from maintenance to network switching and control (about $1.1m) when the asset monitoring team was established. Up to 2000/01 Powerlink achieved significant efficiency gains that are reflected in the reduction of maintenance costs. The changes included "starting on the job", multi-skilling, single line patrol, outsourcing where efficient, work culture development, depot consolidation, use of helicopters, Asset Manager/Service Provider model and other efficiency initiatives. Savings are now harder to identify and achieve with incremental gains becoming smaller and smaller, resulting in increasing maintenance costs as the asset base grows.

From 2000/01 to 2006/07, Powerlink forecasts maintenance costs (excluding maintenance refurbishment costs) to increase by $8.3m due to an asset base increase of $1,555m. Part of the increase is attributed to the remote location of the assets, greater difficulties in getting plant releases for maintenance and increased fault response requirements from NEMMCO.

Conclusion

Operating Expenditure includes all expensed costs to operate and maintain the network except for interest and depreciation. In real terms, direct and indirect Operating Expenditure, excluding grid support costs, is projected to increase from $58.6m to $75.1m over the regulatory period. Asset growth increases the direct costs by $13.1m. Indirect costs increase by $3.6m due to new market related functions. Grid support costs, which are required to compensate generators to run instead of Powerlink undertaking transmission capital investment, vary by up to $15.4m per year in real terms, and are additional to direct and indirect costs

4 ASSET MANAGEMENT EFFECTIVENESS

The section considers the effectiveness of the operating practices and asset management systems to ensure that only necessary (and efficient) Operating Expenditure occurs

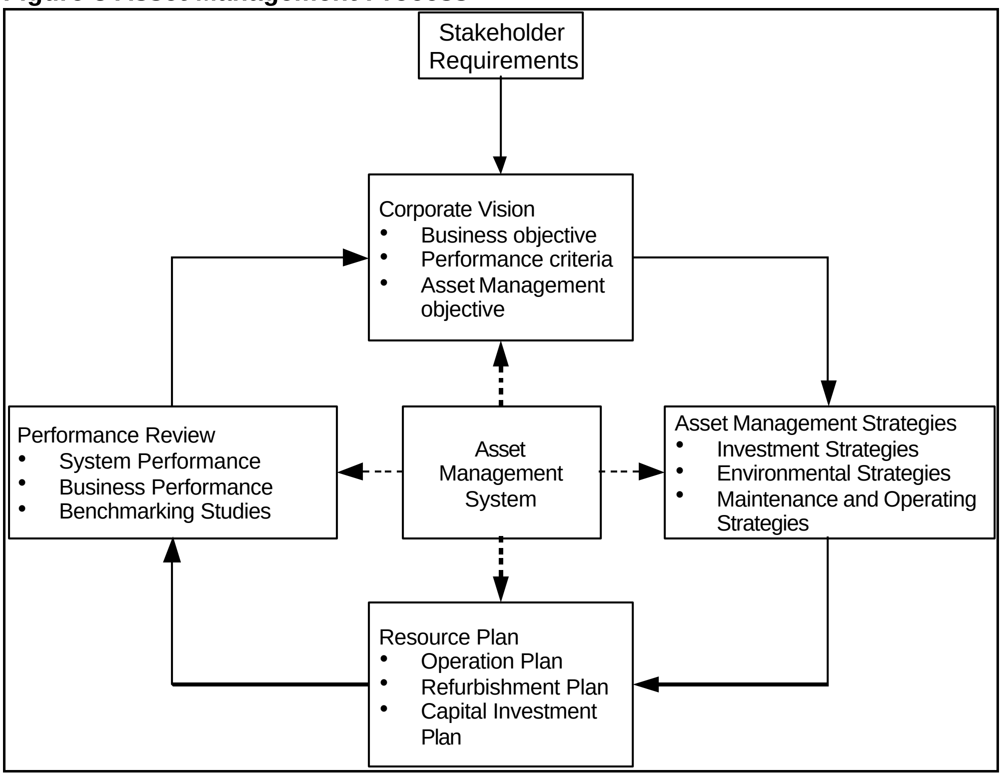
4.1 ASSET MANAGEMENT PRINCIPLES

Powerlink has an Asset Management Plan that is reviewed annually as part of an annual financial planning process that:

- Defines how the Asset Management Plan is structured and managed within Powerlink;
- Provides a high level review of asset performance to date;
- Provides an overview of the grid extensions planned for the coming period;
- Lists proposals for grid replacement;
- Overviews maintenance and refurbishment requirements.

The process adopted is shown in Figure 3.

Figure 3 Asset Management Process



4.2 NETWORK ENHANCEMENT AND DEVELOPMENT

Powerlink has developed a comprehensive planning approach using scenario-planning principles to consider plausible supply and demand development options. The 2001 plan consists of 72 possible network and non-network requirements (one for each of the supply/demand scenarios). For forecasting purposes the probability-weighted average cost of all the scenarios is used to estimate the expected capital and grid support expenditure. This is the process used for determining the grid support contribution to the projected Operating Expenditure included in the Application.

Short and medium term planning uses more detailed input information and the results are published in the Annual Planning Statement. Developments are carried out in accordance with the Code, along with industry consultation and application of the ACCC regulatory tests. The increasing requirements of the Code and regulatory tests will require more consultation than in the past. For example, whereas previously Powerlink could carry out projects below $10m without consultation, extensive consultation is now required for all projects above $1m.

Network enhancement and development will be examined in detail in a separate review of CAPEX being undertaken for the Commission by PB Associates.

4.3 ASSET MANAGEMENT

Investment strategies are driven by Code requirements, ensuring that investment is limited to assets for which a threshold rate of return will be achieved, and that new assets satisfy regulatory requirements and that optimum life cycle costs will be achieved.

Powerlink adopts reliability centred maintenance, whole of life cycle costing and quantitative risk assessment techniques in developing their various policies, procedures and standards. The SAP system is used to manage and monitor work. The various asset units are divided into work units and the service providers provide prices for various asset work unit classes. Powerlink also monitors asset health by trending the relationship between expenditure on routine maintenance, condition-based maintenance and corrective maintenance.

Extensive analysis of system performance is carried out to detect underlying trends and the need to address particular concerns. Powerlink also uses the practices available through their participation in benchmarking studies where the performance and practices are available on a confidential basis. Understanding why a particular company is a best performer assists in determining what they are doing different and then considering whether Powerlink can adopt those practices.

The Asset Management Plan indicates that there is an effective approach being adopted with respect to operating practices and asset management. The system performance being achieved also confirms this.

Conclusion

Powerlink has a comprehensive asset management plan that links their asset management strategies to corporate visions, performance requirements and resource plans. Powerlink has developed an in-depth planning approach using scenario-planning principles with detailed plans for both asset enhancement and maintenance. SAP provides an effective tool in managing expenditure.

5 OPERATING VERSUS CAPITAL EXPENDITURE

Powerlink has developed a set of guidelines to follow when classifying expenditure between operating and capital. This section discusses the approach adopted.

5.1 UNITS OF PLANT

Units of plant form the basis of determining whether expenditure should be treated as capital or operating. A test that is applied is whether the item is physically or commercially separate. Can it be purchased as a single unit and is the purpose for which it is intended complete in itself? The degree of integration is also a key factor in determining whether the item being installed is a discrete unit of plant or a component of another unit of plant.

Typical units of plant adopted by Powerlink are:

- Switchgear bay;
- Transmission line built section[1].

Another key factor in determining the make up of units of plant is the value of the components that constitute the proposed unit on plant. For example, Powerlink adopts a switchgear bay as a unit of plant. This includes the circuit breaker, infrastructure (foundations, earthworks, cabling etc), switchgear (equipment that connects circuit breaker to rest of network) and control equipment. Powerlink advises that when a circuit breaker is replaced, the cost is expensed. The age of the switchgear bay is retained for valuation purposes as it was prior to the circuit breaker replacement and not adjusted for the replaced circuit breaker.

5.2 CAPITAL EXPENDITURE

Powerlink expenses costs incurred on parts of units of plant while expenditure on entire units is capitalised. For example, building a section of line is treated as capital but replacing a tower is expensed. Capital tests applied also include whether the expenditure gives rise to future economic benefits and whether the asset has a value that can be reliably measured.

All expenses necessary to place an asset in service are treated as capital. The policy states that site preparation, survey costs, site clearing and dismantling associated with a capital project are also treated as capital.

In situations where it is cheaper to buy a new unit of plant than repair the existing unit, the new unit of plant is treated as capital. Additions to units of plant are also treated as capital.

If plant of a greater capacity such as circuit breaker in a switchgear bay is replaced that increases the capacity of the bay, then the replacement of the circuit breaker is treated as capital.

[1] A section of transmission line built as one project

5.3 OPERATING EXPENDITURE

Expenditure that contributes to a unit of plant being restored to the condition when first acquired or which reduces future deterioration of the unit of plant but does not significantly extend its life as Operating Expenditure.

Expenditure that extends the life of a unit of plant is not considered as major planned maintenance (e.g. refurbishment) and is capitalised.

Powerlink advises that the costs of demolishing or disposing of unwanted assets or material is capital if it is done in conjunction with a capital project or in order to sell land on which the structure or material is standing, and the costs are likely to be recovered in subsequent sale proceeds.

There are situations where a new substation is built and lines reconstructed and the old substation remains. Powerlink states that in such situations the clean up of the old substation is expensed if it adds no value to the new substation and need not be done in conjunction with the construction of the new one. Powerlink justify this treatment by saying that capitalising these activities would unlikely to be captured in future regulatory valuations. In Powerlink's refurbishment programme provision has been made for $4.2 m over the six-year period for decommissioning and site clean up.

Conclusion

Powerlink's guidelines for classifying operating and capital expenditure are considered appropriate and are being applied in a consistent manner. Operating Expenditure does include some costs associated with site clean up following capital works.

6 ALLOCATION OF COMMON COSTS

This section reviews the process adopted by Powerlink to allocate costs between various aspects of the business. The introduction of SAP in 1999 allowed Powerlink to record in more detail the various costs associated with the operation of the business. Prior to this, there was only an accurate view of revenues.

6.1 POWERLINK POLICY

94% of Powerlink's revenue comes from the shared network, with the balance from the provision of customer specific assets (e.g. between a new power station or load and the shared grid) and technical consulting.

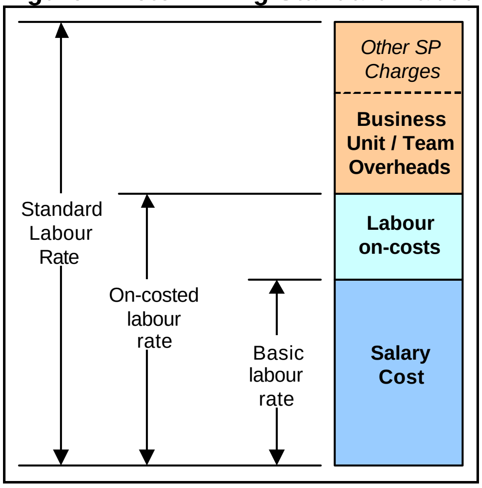
The Asset Manager/Service Provider model segregates the purchasers of goods and services from the providers of these services (internal or external). Service providers charge either using a monthly journal transaction, a fee for service based on an hourly rate, or a percentage on-cost based on the cost of the materials or service provided.

The monthly journal is used for predicable and static services and involves a set monthly amount that does not change from month to month. Fee for service is used for tasks such as planning studies where the quantity of work required is less predictable. Procurement services are charged using the percentage on cost approach.

In all cases the annual budgeting process forms the starting point in establishing rates and charges. Historical requirements, projected requirements and known projects are used to set the rates. The process adopted aims to ensure that all internal charges net out to zero. In some cases the process is iterative to ensure a full recovery. Some charges such as those for insurance, corporate governance, treasury, debt management are associated directly with Powerlink as the Network Owner.

The fee for service approach adopts standard costing for internal labour charges, pooling employees in various trade types, experience and remuneration. The overall labour rate is determined as shown in Figure 4.

Figure 4 Determining Standard Labour Rate



Overhead costs for each team include the cost of building facilities, plant, training, support from other areas and administration. As assets are allocated to regulated and non-regulated business at a detailed level, interest and depreciation charges are also expected to be appropriately allocated between regulated and non-regulated activities.

6.2 APPLICATION OF POLICY

The SAP system allows for the full separation of costs for both regulated and unregulated activities. Original timesheets, purchase orders, inventory requisitions, invoices are coded at source to individual activities and assets. This process also allows costs to be allocated to capital and operating activities.

Capital projects are separately identified and broken down into a range of sub-projects etc, enabling costs to be recorded appropriately. For maintenance, each job or activity is identified on a work order, which roll up to a cost centre. Activities are therefore segregated at source. Work orders are also associated with an asset and assets have been identified as regulated or unregulated thus enabling asset related costs to be captured appropriately.

6.2.1 KPMG Audit

KPMG carried out an audit recently to review Powerlink's overhead allocation methodology. The process adopted was to review:

- Service Level Agreements (SLA);
- A selection of journal transactions in order to confirm costs were being allocated according to the SLA;
- The basis for the business unit transfer of costs between the business unit management and teams;
- A sample of procurement transactions;
- Three SLAs randomly selected for further investigation.

KPMG concluded by stating:

"Based on the information provided to us, it is our opinion that Powerlink Queensland is currently applying overhead cost allocation principles that are consistent with those previously accepted by the ACCC and contemplated by the NEC, and which reflect appropriate bases for cost allocations".

6.2.2 Validation with External Rates

As further validation of the appropriateness of the allocation methodology, PB Associates requested Powerlink to provide a range of Powerlink charge-out rates and the associated rate being charged by external service providers. Powerlink selected rates on a similar basis i.e. for a similar skill and competency level with similar levels of support and supervision. Powerlink's rates are fully costed and do not allow for profit although they do include a small component of penalty rates.

Conclusion

Powerlink's internal rates, incorporating full overhead allocation, are within 10-15% of the external service provider rates. KPMG, in an audit reviewed by PB Associates, has confirmed that Powerlink is applying the allocation of overheads consistently and that the practices adopted comply with ACCC and NEC requirements. PB Associates is satisfied that the allocation of common costs is being carried out in an appropriately.

7 ANALYSIS OF OPERATING EXPENDITURE

This section reviews in more detail the Operating Expenditure projections outlined in Section 3 of this report.

7.1 MAINTENANCE

7.1.1 Overview

Table **Error! Reference source not found.**5 provides an overview of projected maintenance expenditure. The primary driver for increasing costs is the growth in assets.

Table 5 Overview of Maintenance Expenditure ($000's)

	00/01	01/02	02/03	03/04	04/05	05/06	06/07
Field Maintenance							
Lines	6,364	6,583	6,802	7,020	7,239	7,458	7,677
Stations	8,641	9,372	10,070	10,768	11,466	12,164	12,862
Communications	1,322	1,478	1,633	1,789	1,944	2,100	2,256
Overtime increase	-	176	374	496	525	553	581
Field Support	4,142	4,196	4,250	4,304	4,358	4,412	4,466
Direct Charges	1,750	1,897	2,044	2,191	2,338	2,484	2,631
Refurbishment	11,016	11,896	11,928	12,463	12,471	12,318	12,986
Total	**33,236**	**35,597**	**37,100**	**39,031**	**40,340**	**41,490**	**43,459**

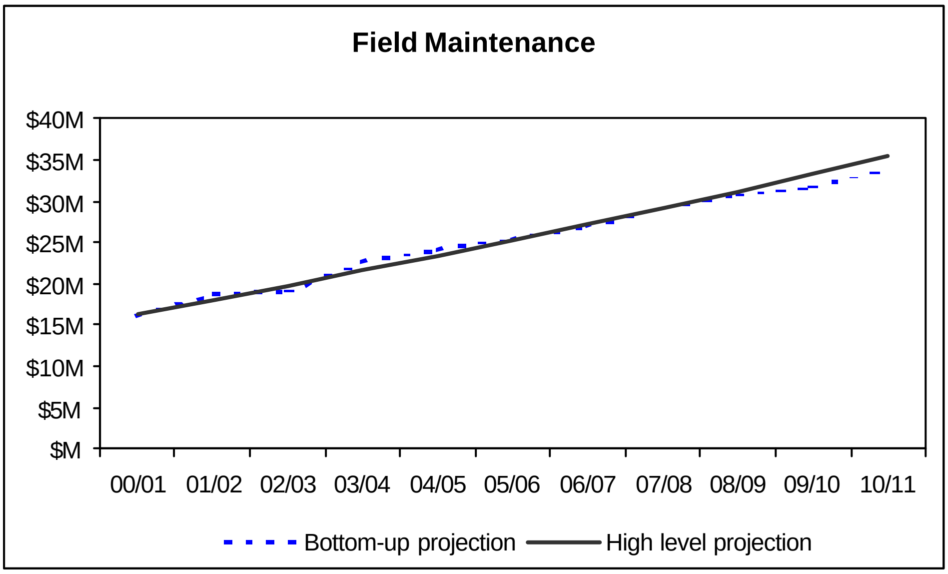
7.1.2 Field Maintenance

Powerlink outsources 70% of its maintenance work. Based on information provided by Powerlink, it has been confirmed that the internal service provider is as efficient as external service providers. This assessment is based on comparisons of the maintenance cost per asset replacement value for the respective asset maintained.

Asset maintenance is managed through a series of work units for different plant types. Service providers provide rates for these work units as part of their contract. SAP enables the future work unit requirements to be identified based on scheduled requirements and hence project future costs. Work is categorised into routine scheduled, condition based and corrective maintenance. Routine scheduled work is determined by the asset and its servicing requirements. Powerlink has developed a series of ratios for corrective and condition based maintenance levels based on the level of routine work. These ratios are used in conjunction with known future routine maintenance levels from SAP enable Powerlink to model future maintenance requirements.

Powerlink has also developed a high level OPEX model to forecast future maintenance cost based on asset growth. Figure 5 shows the forecast for field maintenance determined by Powerlink from their OPEX model and that from SAP. Both approaches show consistent trends.

Figure 5 Field Maintenance Forecast



Powerlink stated in its Regulatory Application that there are difficulties in releasing transmission circuits for maintenance and this will increase their future costs. Powerlink has provided documentation that confirms that service providers are seeking higher work unit rates due to the increasing difficulty in carrying out work in normal hours. A specific overtime increase has been incorporated within the budgets prepared as part of the Application and shown in Table **Error! Reference source not found.**5.

Table 6 shows transmission line availability. 35% of transmission circuits cannot be taken out for maintenance during the day and a further 43% may also be in this category depending on network configuration and generation despatch. Powerlink uses live line maintenance practices but this is not always possible depending on the type of work. For example, if a suspect insulator needs to be changed and if there was doubt about the damaged insulator strength, then the work would need to be carried out with the circuit not in service. Live techniques are not yet practised in substations although the industry is working to develop suitable work procedures. However there will always be constraints on carrying out live substation work due to the close proximity of equipment.

Table 6 Transmission Circuit Availability

	%
Circuit km not available in day time	35
Circuits kms available in day time	22
Circuits kms that maybe available in day time	43

Another factor that increases costs is the NEMMCO approval process for outages. Outage notification is now required twenty days in advance of the proposed date. A Service Provider has noted that in many instances the application is rejected only the day before the scheduled date resulting in a further twenty-day notice period for reapplication. This rescheduling is also a driver on costs, as resources cannot be scheduled as effectively.

Powerlink has not allowed for the 1 in 8 year transmission line failure that has been experienced in the past. The last event cost $2.5m to repair following unusual wind damage to transmission towers.

Additional maintenance costs are being incurred due to the remoteness of some assets. For example there is an average travel time of 2 hours to a site in South-East Queensland and work on the QNI can involve a one-way travel time of 4 hours. Powerlink has incorporated extra travel time into their labour cost for maintaining these remote sites. This approach is considered appropriate. While consolidating depots has resulted in savings in overall maintenance costs, these costs will increase for sites further away from depots and decrease for sites closer to depots.

Direct charges are those associated with phone, rates and electricity billed directly to Powerlink and not incorporated in field maintenance costs. These have been forecast to increase with asset growth.

Field support is a contract service to manage the assets in the field. Costs have been projected to increase in proportion to asset growth. Based on benchmarking studies, a lower proportionality constant has been used than for field maintenance.

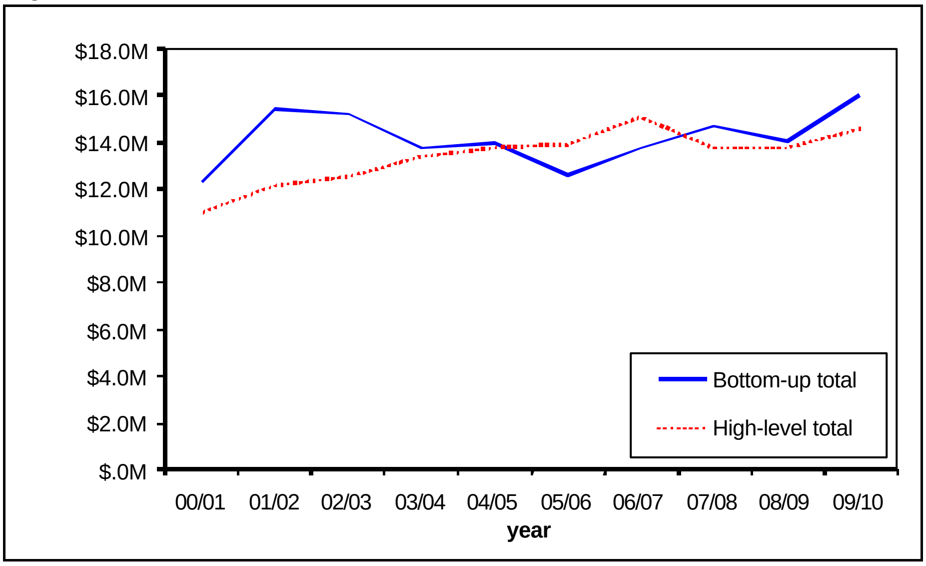
7.1.3 Refurbishment

Refurbishment is where subassemblies are replaced or plant overhauled to ensure the unit of plant can achieve the assessed economic life. Typical refurbishment work would be:

- Reinsulating transmission lines;
- Replacing older, less reliable types of circuit breaker;
- Upgrading battery systems;
- Replacing older style protection relays with more reliable systems.

Powerlink has identified through benchmarking studies that in order to improve service levels for certain types of equipment, mid life refurbishment work is required. A 10-year bottom up refurbishment plan has been developed that identifies a range of projects. A model has also been developed that estimates asset refurbishment requirements based on the asset age for those in the 25 to 50 year old range. Figure 6 shows the results of the two different approaches adopted by Powerlink. The high level forecast has been used for the Regulatory Application.

Figure 6 Refurbishment Forecasts



Both of these approaches have indicated a need to increase the level of refurbishment from $5.9m in 1997/98 (in real terms) to $11.0m in 2000/01. Powerlink has an extensive Capital Re-investment and Operational Refurbishment Plan that details the proposed projects. The significant projects included are:

- Replacing faulty airblast circuit breakers and those not able to sustain fault levels (creates a safety issue);
- Replacing SVC control systems;
- Replacing substation batteries due to degradation and unreliability;
- Decommissioning substations;
- Replacing transmission line insulators, conductor and dampers.

The high system minutes in 2000 was largely due to the failure of assets that could have been refurbished and, Powerlink has committed an additional $2m above the maintenance costs allowed in its ERU determination for refurbishment in 2000/01.

The proposed level of refurbishment is considered appropriate.

7.2 NETWORK MONITORING AND CONTROL

Network monitoring and control includes the network switching centre and the asset monitoring team. The projected costs are shown in Table **Error! Reference source not found.**7.

Table 7 Network Monitoring and Control Expenditure ($000's)

	0/01	01/02	02/03	03/04	04/05	05/06	06/07
Network Switching	3,144	3,641	5,188	5,334	5,481	5,628	5,775
Asset Monitoring	1,093	1,122	1,150	1,179	1,207	1,236	1,264
Total	**4,237**	**4,763**	**6,338**	**6,513**	**6,689**	**6,864**	**7,039**

The asset monitoring function was introduced in 2000/01. Powerlink sees this new development as the key to their ongoing asset management and reliability strategies. The team monitors asset performance and condition, audits network configuration and performs fault management. Fault management involves gathering fault data, diagnosing the cause, determining remedial actions to minimise the impact of the fault, co-ordinating the response and maintaining fault history. The workload is projected to increase with asset volume, although with a lower proportionality constant than for field maintenance.

The creation of the asset monitoring team is an appropriate initiative and should result in longer-term benefits by allowing asset management activities to be more precisely targeted with consequential savings in costs.

The Network Switching Centre provides a real-time control room function, off-line system security support and technical support for SCADA and the energy management system (EMS). Costs for these are also assumed to increase with the asset base.

A review is presently being concluded on National Electricity Market governance and liability. The Market and System Operation Review Committee has recommended:

- A shift in certain responsibilities from NEMMCO to Transmission Network Service Providers (TNSPs);

- That NEMMCO only be responsible for main grid (220 kV and above) and that it relinquish responsibility for security and operation of the rest of the grid to TNSP. TNSPs would be required to become local system operators (LSO);

- Costs currently incurred by NEMMCO be made the responsibility of TNSPs and recovered as part of regulated service.

To date NEMMCO has been funding TNSPs to provide a range of system security services. TNSPs have been using these payments to support their system control function. NEMMCO has now announced that it intends to terminate these payments. The increase in Network Switching and Control from 2002/03 onwards is a consequence of this change and the increase in asset numbers. The forecast extra costs are considered to be reasonable.

7.3 SUPPORT AND CORPORATE

7.3.1 Overview

Table 8 shows the various components of support and corporate Operating Expenditure.

Table 8 Support and Corporate Expenditure ($000's)

	00/01	01/02	02/03	03/04	04/05	05/06	06/07
NEM Driven Functions	70	1,340	2,095	2,160	2,270	2,530	2,530
Asset Manager Support	10,168	10,168	10,168	10,168	10,168	10,168	10,168
Other Support and Corporate	10,869	11,062	11,252	11,425	11,593	11,760	11,933
Total	**21,107**	**22,570**	**23,515**	**23,753**	**24,030**	**24,458**	**24,631**

7.3.2 New NEM Requirements

Powerlink is forecasting a cost increase of $2.4m in real terms over the period as a result of additional NEM driven functions. A comprehensive description of the functions has been reviewed along with detailed financial and resource projections. The additional functions identified are:

- More detailed constraint analysis in the power planning area;

- The recently introduced regulatory test for new augmentation. This requires greater in-depth analysis and an increased level of public consultation. All projects over $1m are now subject to public scrutiny, requiring more consultation. In the past such scrutiny applied only to projects that increased a customer's charges by more than 2% (typically projects greater than $10m);

- Resources to improve management of Code compliance;

- Regulatory reporting of both financial accounts and service standards along with reconciliation for OPEX, CAPEX and pass-throughs; and

- Improving network outage management to minimise energy impacts.

Based on documentation provided, the forecast costs associated with these additional functions are considered reasonable.

7.3.3 Other Corporate Costs

Other corporate costs are projected to continue at the same level as the base year except for insurance. PB Associates has reviewed Powerlink's assumptions in which its insurance premium projections based and the scenario adopted for the forecast is considered to be reasonable. The insurance premiums paid by Powerlink appear very competitive compared to premiums paid by some other transmission companies.

In November 1999, the liability cap for system operator functions was increased from $0m to $100m. Increases in premiums have been based on market knowledge and projections. The projected premiums are considered to be reasonable.

The Market System Operator Insurance Advisory Committee (MSOIAC2) has been reviewing future insurance options in conjunction with NEM proposed changes. It is not yet clear what the liabilities will be under the proposed changes and Powerlink proposes that any change in costs be "passed though" based on;

- The impacts are uncertain until the MSOIAC2 report is finalised and recommendations accepted by the States. The costs cannot therefore be reasonably estimated in time for this regulatory review;
- The impacts are likely to be material based on the draft report recommendations reviewed;
- Powerlink would not have access to relief until the next regulatory review in 2007;

Powerlink has made no provision for any increases in insurance premium over the regulatory period as a result of MSOIAC2 report.

Powerlink is maintaining the cost for Asset Management Support constant in real terms although they state that an increase of 15% based on asset growth could be justified.

Powerlink states that the projected corporate costs in real terms are 7% lower than allowed for by the Queensland Electricity Reform Unit (ERU) in its final determination and this lower level is projected throughout the regulatory period.

7.4 GRID SUPPORT

Table 9 shows the probability weighted average of the expected grid support costs (in real terms). The costs are the outcome of a comprehensive scenario analysis carried out by Powerlink.

Table 9 Forecast Grid Support Costs ($000's)

	00/01	01/02	02/03	03/04	04/05	05/06	06/07
Grid Support	-	3,597	4,947	15,431	13,976	617	1,946

In developing their Capital Re-investment Programme, Powerlink has incorporated the requirements of clause 5.6.2 of the National Electricity Code and the ACCC Regulatory Test which require TNSPs to also consider non-transmission options to address, projected limitations of the transmission system.

Grid support costs for substitute generation (instead of a transmission development option in CAPEX projections) have been included in the Operating Expenditure projections when:

- A higher cost generator exists in an area where lower cost energy could be used were it not for the existence of a transmission constraint and / or;

- Security standards would be violated in the area if the generator was not operating and;
- The additional costs incurred in contracting for the more expensive generation output is likely to be economic compared to an alternative transmission reinforcement.

Section 5.6 of the NEC requires TNSPs to plan and initiate augmentation options to ensure the network can meet the demands of forecast load growth. In assessing augmentation options, the NEC requires the TNSP to consider generation options and demand side management options, as an alternative to a network augmentation. This is reinforced in the ACCC' s Regulatory Test. For example, Clause 5.6.2 (f) of the NEC states:

"Within the time for corrective action notified in clause 5.6.2(e) the Network Service Provider must consult with affected Code Participants and interested parties on the possible options, including but not limited to demand side options, generation options and market network services provider options to address the projected limitations of the relevant transmission system or distribution system."

In addition, Clause 5.6.2 (m) states:

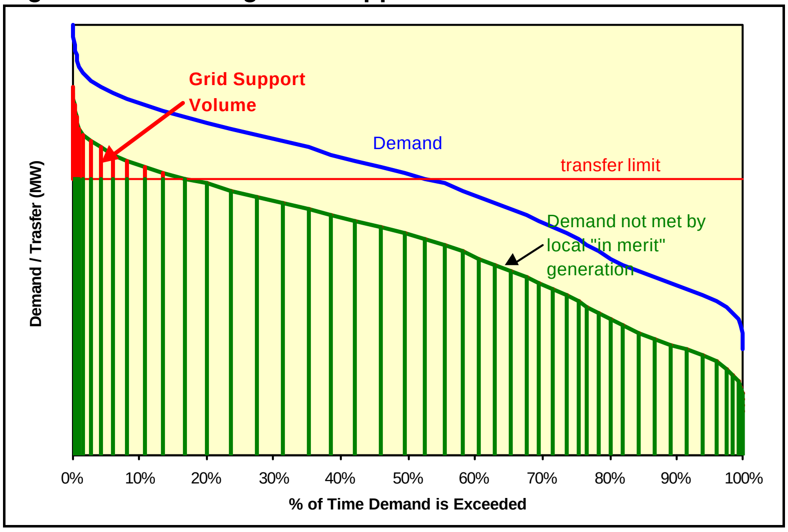
"Where the Network Service Provider decides to implement a generation option as an alternative to network augmentation, the Network Service Provider must:

- *Register the generating unit with NEMMCO and specify that the generating unit may be periodically used to provide a network support function and will not be eligible to set spot prices when constrained on in accordance with clause 3.9.7; and*
- *Include the cost of this network support service in the calculation of transmission service and distribution service prices determined in accordance with Chapter 6 of the Code".*

In developing the forecast cost of grid support Powerlink has developed 72 planning scenarios, each of which results in either a transmission related capital expenditure, grid support cost or a mix of both. A significant network limitation that would be addressed by grid support is the Central Queensland to North Queensland transmission constraint. The use of more expensive local generation in North Queensland to replace less expensive thermal generation in Central Queensland is considered an alternative to transmission augmentation.

Powerlink determined the local energy requirement by considering the transmission transfers limits and developed a load duration curve similar to that shown in Figure 7.

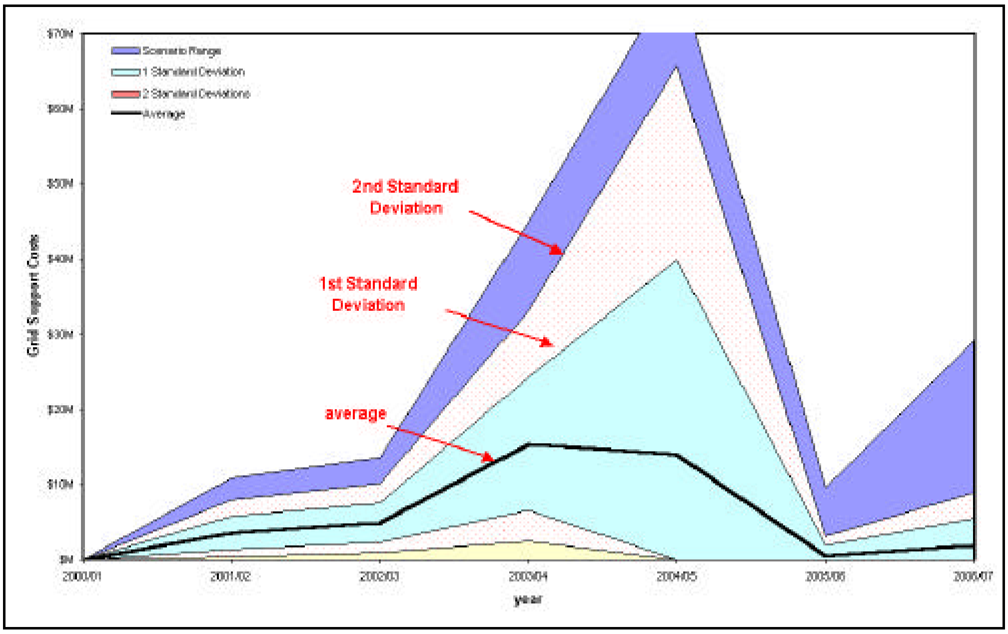
Figure 7 Calculating Grid Support Volume



The projected cost of grid support was then determined by estimating the expected price differential between the pool price (at times when support is required) and the marginal cost of the generators providing the grid support. The marginal costs adopted estimated actual costs for liquid fuel and coal fired plant as against using market clearing prices for these plant based on commercial factors.

As outlined in Powerlink's Regulatory Application, the expected capex requirements and associated grid support costs were calculated using probabilities of each scenario and calculating weighted average. As with capex forecast, there is an envelope of grid support costs. Figure 8 shows the range of grid support costs along with first and second standard deviations.

Figure 8 Grid Support Cost Variability



A number of the scenarios are sensitive to the timing of the proposed gas turbine in Townsville.

Due to the variability and uncertainty in grid support costs, Powerlink proposes an annual revenue cap adjustment be applied to cover differences between the revenue allowance for grid support and the outturn grid support costs. However, grid support requirements are determined in conjunction with the planning of non-current network augmentation requirements, which are subject to a similar level of uncertainty. There would appear to be no reason to treat the uncertainty in required expenditure for grid support differently from the uncertainty in the required expenditure for network augmentation. We therefore recommend that the grid support expenditure forecast be subject to a mid-term reset, in accordance with Section 7.3.9 of Powerlink's Regulatory Application.

Conclusion

The maintenance costs proposed by Powerlink are considered appropriate. Detailed and high-level maintenance forecasts show consistent trends. Reasonable savings have been made in the last three years but costs will now increase with asset growth. Availability of plant for maintenance and increasingly remote sites are increasing maintenance costs. Maintenance practices are considered to be consistent and effective. Refurbishment costs have increased over past levels and the need for this has been confirmed by benchmarking studies and recent plant failures. Network monitoring and control costs will increase when NEMMCO shifts more responsibilities to Transmission Network Service Providers and terminate their payment for system security services.

New NEM functions increase costs by $2.4m due to the need for more detailed network analysis and public consultation for network development, code compliance and regulatory reporting. Based on the information provided, these costs are considered reasonable.

We support Powerlink's view that additional insurance premiums to cover any additional liabilities imposed on it should be allowed on a cost pass through basis. The Regulatory Application allows for insurance premiums to cover only Powerlink's existing level of liability. It is likely that new regulatory requirements will increase the amount of insurance cover that Powerlink will be required to carry and that the resulting increase in premiums will be material. However the amount of additional insurance that Powerlink will be required to carry, and the resulting additional premium costs, cannot be forecast at this stage.

Although the maximum annual average grid support costs reaches $15.4m, there is considerable variation about this average depending on which scenario eventuates. Due to the variability and uncertainty in these costs, the revenue provision to cover these costs should be subject to a mid-term reset at the same time as the revenue provision for capitalised network augmentations is reset.

8 POWERLINK PERFORMANCE COMPARISONS

This section considers the performance of Powerlink against a range of measures. It is not possible to make absolute comparisons between companies due to different network topologies and commercial factors. In making performance comparisons the change in the performance trends is as important as the actual relative positions of the different TNSPs. This variation in performance compares the company against itself and shows if the performance is getting better or worse.

This section also reviews the performance of Powerlink in a number of benchmarking studies that it has been involved in.

8.1 BENCHMARKING STUDIES

8.1.1 International Transmission Company Performance Study (ICTP)

As reported in its Regulatory Application, Powerlink has been participating in an international transmission company performance (ICTP) study co-ordinated by National Grid (UK). Results of the ICTP were reviewed in conjunction with Powerlink. The ICTP study considers the Operating Expenditure on the same basis as adopted for this review for making performance comparisons.

The results presented in the Regulatory Application (p95) showed the performance of 11 companies. When companies that do not value their assets on a depreciated replacement cost basis are excluded, five companies remain. It is most likely that these companies are all Australasian, as most other countries do not adopt the depreciated replacement cost valuation methodology.

Amongst these five comparable companies, Powerlink's operating costs compared to depreciated replacement costs were as low as any other company. Powerlink's reliability was on the group average for these five companies, but better than the average of all eleven companies in the study.

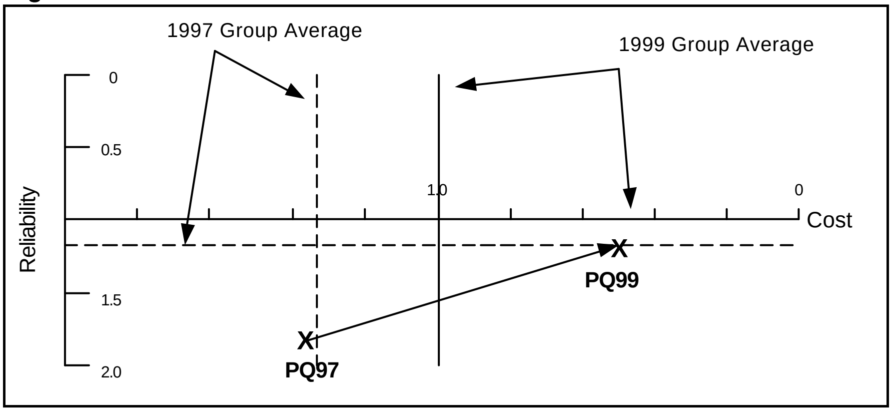
8.1.2 International Transmission Operations and Maintenance Study (ITOMS)

The ITOMS study is focused on maintenance. This study involves twenty transmission companies from throughout the world and Powerlink has participated since 1995. The aim of this study is to enable companies to identify opportunities for improvement and involves collection of detailed information about specific groups of assets. Both cost and performance information are collected and a range of normalisers have been developed that take into account currency differences and asset configurations, in order to make comparisons as accurate as possible. Typically the costs include activities up to the asset manager. In Powerlink's case, they included $30.2m of the $31.3m 1998 operating and maintenance expenditure. A further $21.9m, being costs associated with support services and planning, was excluded.

This study provides a reasonably accurate comparison of the direct costs of maintenance. While the study makes comparisons between operating expenditure against reliability, it does not consider any capital expenditure that could also influence reliability.

Figure 9 shows the performance of Powerlink in substations for 1999 and 1997 ITOMS studies. Over this period, Powerlink significantly reduced its costs against the group average. In 1997 Powerlink was just on the group average for costs but by 1999 it had reduced its costs to the point where they were significantly lower than the group average. The group cost average also reduced between 1997 and 1999.

Figure 9 Powerlink ITOMS Substation Performance

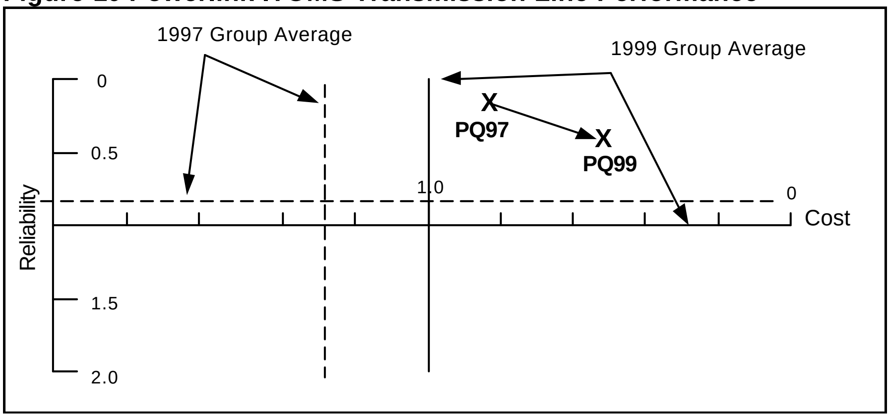


Powerlink improved its reliability between the two studies although the group average improved slightly. Powerlink's reliability is still just below the group average.

Powerlink have identified 110/132 kV circuit breakers as being an area for improving performance. Older circuit breakers with pneumatic and hydraulic systems have caused problems in the past and these problems are to be rectified in the proposed refurbishment programmes.

Figure 10 shows the performance of Powerlink in transmission lines for the 1999 and 1997 ITOMS studies. Powerlink has been in the desired upper right quartile for both studies. In 1999 costs were below those in 1997 with the group average also improving. Powerlink's reliability reduced slightly from 1997 to 1999 although the group average also reduced.

Figure 10 Powerlink ITOMS Transmission Line Performance



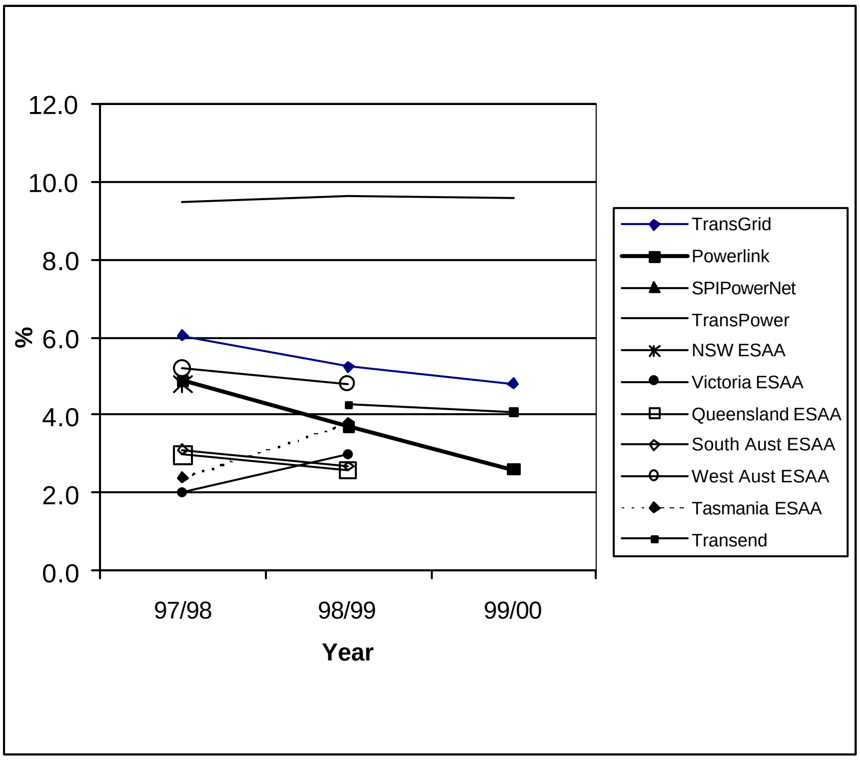
Overall, the ITOMS results show Powerlink maintenance costs to be very comparable with the best performers.

8.2 OTHER PERFORMANCE COMPARISONS

To make comparisons for operating expenditure, normalisers that are often used include energy transmitted, asset value and the length of line. No one measure on its own will provide a complete picture. Powerlink has also suggested the use of MW-km, which measures how much electricity is transported how far. This approach provides a further view for making performance comparisons, but is dependent on a more detailed knowledge of each network than is always publicly available. The MW-km approach as noted by Powerlink does not account for load densities.

Figure 11, Figure 12 and Figure 13 show operating costs against asset value (depreciated replacement), MWh and circuit length in km. The graphs are based on information available in company annual reports, information published by ESAA and other information available in the public domain.

Figure 11 Operating Cost versus Depreciated Asset Value



Powerlink has superior performance in both operating cost per asset value and circuit km to all Australasian transmission companies. Both SPIPowerNet and TransGrid have better performance for operating costs per MWh. This latter result is to be expected given their greater energy transfers and shorter line lengths. TransGrid transmits 80% more electricity over 10% more lines and SPIPowerNet 25% more electricity over 40% less lines.

Information provided to ESAA by Australian companies typically is only for assets above 100 kV and excludes the costs of operating control centres that manage grid operation and the costs of energy trading and settlement activities. The exclusion of these items does provide an opportunity for more realistic comparisons but there is not a consistent application across all companies. Powerlink's ESAA results for operating costs per MWh show a better performance than that based on company annual reports.

In each of Figure 11, Figure 12 and Figure 13 Powerlink's performance has improved over the last three years.

Figure 12 Operating Cost versus MWh

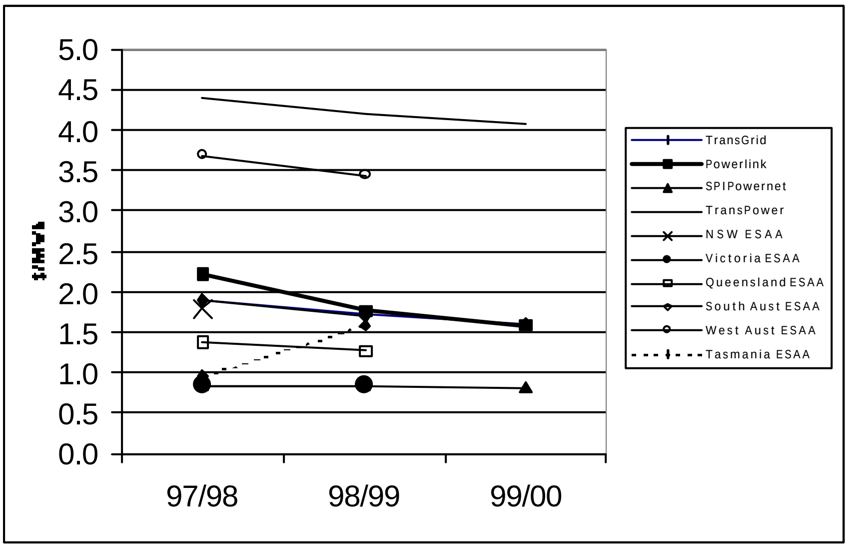
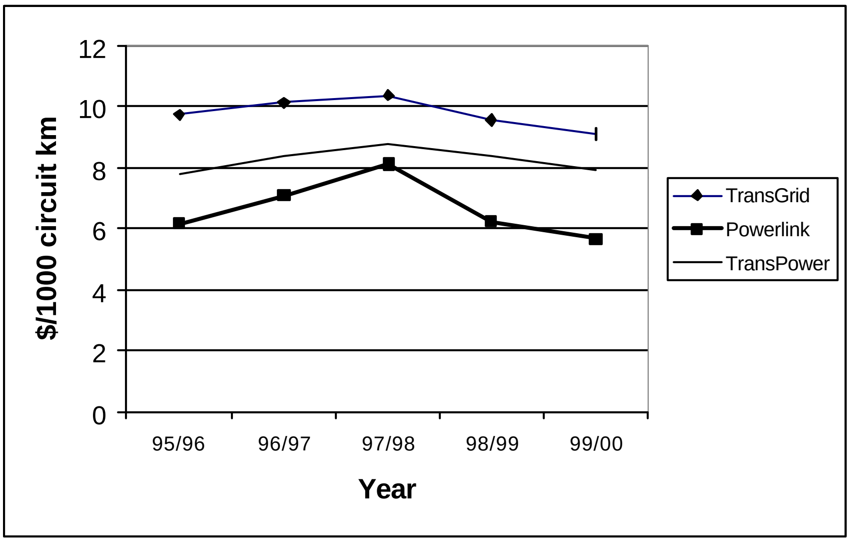


Figure 13 Operating Cost versus 1,000 Circuit km

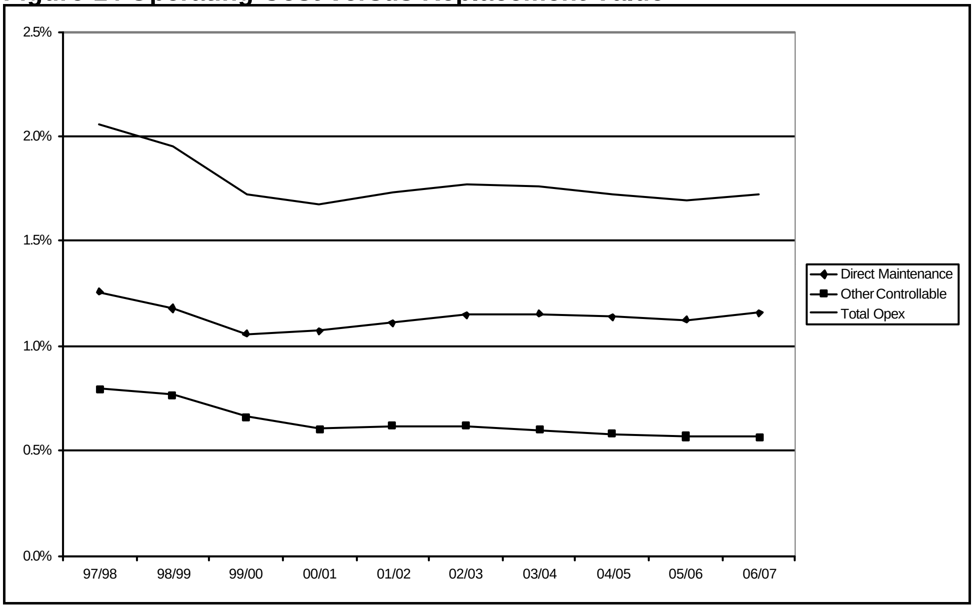


Powerlink in their Regulatory Application have also considered Operating Costs per asset value on a replacement value basis. Figure 14 shows the past and future trends for this measure. The past costs are based on actual expenditure while future costs are in nominal terms.

Although the measure provides a denominator that equates to the system size determined through the valuation process, the age and construction of the network still influences the performance a company achieves. For example Transpower has more 110 kV lines than other TNSPs and many of these use wood poles. These lines will be valued lower than similar length higher voltage lines but their maintenance costs will be higher due to their age and construction.

Operating costs as a percentage of asset replacement costs for Australasian companies are TransGrid (3%), ElectraNet SA (2.6%) and Transpower (4%) compared with Powerlink (1.7%). This is one of the more robust comparisons because it is independent of differences in voltage levels, distance and energy transfers.

Figure 14 Operating Cost versus Replacement Value



Conclusion

PB Associates has reviewed Powerlink's performance in the high level International Comparison of Transmission Performance (ICTP) and the detailed International Transmission Operations and Maintenance Study (ITOMS). These studies show Powerlink's operating expenditure to be competitive. Other comparisons carried out by PB Associates with Australasian companies also show in most cases that Powerlink's costs are lower.

9 CONCLUDING REMARKS

9.1 POWERLINK FORECAST EXPENDITURE

Powerlink's operating expenditure forecast, excluding grid support costs, is driven by asset growth, inflation and new functions. Refurbishment costs have increased from traditional levels but this change is supported from the results of benchmarking studies. Detailed asset refurbishment programmes and modelling support the proposed levels of refurbishment expenditure.

The greatest uncertainty in future operating expenditure is the requirement for grid support. While the Regulatory Application presents the probability weighted average requirements, there is a reasonable variation about this average depending on the particular scenario that might eventuate. Powerlink proposes that an annual revenue cap adjustment be applied to cover differences between the allowance and outturn grid support costs. While we agree that the uncertainty in grid support costs is such as to justify review during the regulatory period, we believe that a single mid-term reset, undertaken in conjunction with the mid-term CAPEX reset (as per Section 7.3.9 of Powerlink's Regulatory Application) should suffice.

Powerlink's asset management practices are considered to be effective. The allocation of common costs and overheads is considered appropriate.

9.2 POWERLINK BENCHMARKS

Comparisons with other Australasian Companies along with international benchmarking studies show Powerlink's operating costs to be very competitive.

9.3 EXTERNAL AND INTERNAL INFLUENCING FACTORS

A number of influencing factors create uncertainty for operating expenditure over the regulatory period. These include:

- The level of grid support costs;
- Industry restructuring with Powerlink being required to carry out additional functions or be responsible for higher risks. Many of these are still to be quantified in sufficient detail to determine the impact on operating expenditure;
- Weather and environmental factors that could result in extraordinary maintenance expenditure requirements.

Powerlink has made some provision in their projections for additional functions and for grid support costs but not for extra ordinary maintenance.

9.4 EFFICIENCY AND EFFECTIVENESS OPPORTUNITIES

Powerlink has already identified and adopted a range of efficiency and effectiveness practices identified for example in their participation in benchmarking studies. Further opportunities include:

- Achieving greater maintenance synergies for new assets so that overall maintenance costs increase at a slower than assumed rate. This is not likely to impact future CAPEX but could have some benefit to operating expenditure;

- Powerlink is expensing some dismantling refurbishment activities. Some of this work may be associated with capital projects and could be treated as capital although this approach may result in the value not being captured in future valuations.

10 GLOSSARY OF TERMS AND ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
ICTP	International Transmission Company Performance Study
ITOMS	International Transmission Operating and Maintenance Study
O&M	Operations and Maintenance
GWh	Giga Watt hours (1,000,000 kWh)
kWh	kilo watt hour
MWh	Mega watt hour (1,000 kWh)
MW	Mega watt
NEC	National Electricity Code
NEMMCO	National Electricity Market Management Company

11 REFERENCE DOCUMENTS

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