PB ASSOCIATES

# REVIEW OF

# SPI PowerNet Operating Expenditure

**Prepared for**

## AUSTRALIAN COMPETITION AND CONSUMER COMMISSION

***PB Associates** Quality System:*

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# EXECUTIVE SUMMARY

This report presents the results of a review of the SPI PowerNet regulatory revenue application in respect of operating expenditure. PB Associates undertook the review at the request of the Australian Competition and Consumer Commission.

The main findings of the review were as follows:

I. SPI PowerNet is different from other Australian TNSPs in that VENCorp plans and requisitions augmentation to the shared network. Further, the planning of connection assets is the responsibility of the connected customers. In other States, these functions remain within the TNSP.

II. The volume of energy transmitted by SPI PowerNet is between that of Powerlink and TransGrid. SPI PowerNet has about half the number of substations and length of line as both Powerlink and TransGrid with the number of SPI PowerNet circuit breakers being greater than both Powerlink and ElectraNet. ElectraNet SA has more substations than SPI PowerNet, slightly less circuit km of line and much lower maximum demand and energy transfer. Differing network characteristics and stakeholder interests will influence the perceived performance of SPI PowerNet.

III. SPI PowerNet's approach to budgeting is to forecast expenditure using an expected value approach rather than using median or typical year values. In addition to pass through options, operating costs are categorised as deterministic (70%), probabilistic (22%), defined risks (6%) and contingency (2%).

IV. The significant increases in operating and maintenance expenditure from 1998 to 2003/04 are due to the transfer of VNSC to SPI PowerNet, adjustments to the transmission circuit availability incentive scheme with VENCorp, increases in maintenance, taxes and leases, insurance, and corrosion/condition initiative and support costs.

V. SPI PowerNet has included a 2% pa increase real for salaries based on past trends. The overall operating expenditure also has a 2% contingency for unidentified events that could not be passed through and were not covered by specific risk allowances.

VI. SPI PowerNet has developed an Asset Management Strategy to provide high-level guidance and a framework for the development of operating expenditure and capital plans and programs, setting out broad strategy and polices. There are only plant specific asset management plans for certain types of plant with programs for the balance based on the asset modelling, policies, plant condition and performance information. Benchmarking best practice information also drives strategies and policies.

VII. The Asset Management Strategy is an evolution from earlier versions, differing from its predecessors by the changing circumstances, such as progressively aging network and environmental requirements moving forward. Additional planning may identify increasing expenditure to address newly identified issues, but conversely the results of the INDEC review (see Section 4.2) may lead to efficiencies not allowed for in the expenditure forecasts.

VIII. INDEC was engaged by SPI PowerNet to review policies, processes, plans and practices to, identify opportunities for process and efficiency improvements and potential areas of risk. A range of deficiencies were identified, although INDEC rated SPI PowerNet with an overall score of 77%, demonstrating SPI PowerNet as being in the highest 10% of organisations reviewed. SPI PowerNet has established a range on initiatives to address the deficiencies.

IX. SPI PowerNet considers that the only significant opportunities for further cost reduction will derive from innovation and will only manifest in five years time at the next reset. However, PB Associates considers that the proposed improvements in asset management plans and processes could result in further cost savings.

X. SPI PowerNet has continued with the same capitalisation policy since privatisation in 1997. In essence, asset replacement is capitalised if a complete asset recorded on the fixed asset register is replaced or if the service life or efficiency/economy of operation of the asset unit, not just the replaced component, is significantly improved. This would for example capitalise the replacement of a circuit breaker. This is not the same approach as some other TNSPs whose unit of plant is a "bay" and the circuit breaker replacement would be expensed. SPI PowerNet also capitalises major refurbishments of transmission lines. Asset write-offs are based on modelling of the asset removed and the written down value of the asset replaced is then expensed at the time of replacement.

XI. SPI PowerNet has developed a comprehensive cost allocation system to allocate costs between various lines of business (e.g. regulated shared, regulated connection, excluded shared, excluded connection, external work, property and VNSC).

XII. In forecasting its costs for the revenue cap application, overhead costs that cannot be directly allocated to either the contestable or non-contestable parts of the business were fully allocated to the regulated business on the basis that only 3% of SPI PowerNet's business is from non revenue-capped services. PB Associates considers that a preferred approach would be for these overhead costs to be allocated between the two parts of the business on the basis of a suitable cost driver, such as the proportion of the asset base in each part of the business. SPI PowerNet advises that this approach would increase the revenue capped cost allocation by about $110k.

XIII. The routine maintenance forecast is based on equipment maintenance schedules and the non-routine maintenance forecast is based on historical levels. The increase in maintenance costs is driven by the costs of additional condition assessments, cyclical nature of work and greater maintenance requirements on communications assets. Cost forecasts are based on detailed analysis and equipment condition information and are considered appropriate.

XIV. Forecast non-recurrent maintenance expenditure has increased over the 1998 level due to extensive tower painting, tower foundation and ground level corrosion repairs, circuit breaker refurbishment and other works. The details for these programmes have been reviewed and are considered appropriate.

XV. The transfer of VNSC increased costs by $3.3m and the modified rebate for the network availability scheme has an expected annual cost increase of $4.8m, being set to better reflect the actual cost of circuit outages to other users. Taxes and leases have increased due to a change in the valuation methodology by councils. The operating expenditure of these is considered appropriate.

XVI. The $6m rebate cost provided for in the regulatory application has been calculated on the basis that there will be no change to current practices in the pattern of outages. Nevertheless, the revenue application also requests funding for initiatives such as a higher level of strategic spares and shorter time widows for scheduled outages, which are designed to increase equipment availability. These initiatives should reduce SPI PowerNet's exposure to the rebate scheme. The scheme is to incentivise SPI PowerNet to adopt new and more efficient practices and make the appropriate capital investments funded through the revenue cap.

XVII. Support costs increase by $2.7m from 2001/02 to 2003/04, driven by additional lease cost for centralising staff, technical specialist advice, additional resources to replace future retiring staff and support for field programs. SPI PowerNet has provided detail substantiating the increases.

XVIII. SPI PowerNet has proposed $0.8m pa for non-insured risk identified events, based on an actuarial assessment of the cost of bearing such risks. It advises that the costs have not been separately budgeted and that it would not be seeking pass through should any of the identified events occur. The significant components in the non-risk element are liability claim insurance ($0.248m), easements contractual disputes ($0.175m) and costs of handling public liability claims ($0.1m).

XIX. SPI PowerNet has allowed for a wide range of contingencies in its operating cost forecast including 2% for unidentified events. PB Associates has been unable to assess whether this 2% contingency provision is reasonable or to confirm that the risks have not been covered in other provisions in the application. Some of the examples provided related to asset write-offs and not operating expenditure being considered by this report.

XX. From 1995/96 to 1999/00, SPI PowerNet achieved a cumulative reduction of $60m nominal due to reductions in staff numbers and a range of rationalising initiatives.

XXI. SPI PowerNet has participated in International Transmission Operations and Maintenance Study (ITOMS) for the past five years. Over 60% of SPI PowerNet, direct costs are included in this study. In both substations and transmission lines SPI PowerNet is one of the top performers, surpassing the Australasian average. Over the last three studies (carried out every two years), SPI PowerNet has made significant improvements.

XXII. Comparisons of operating costs on a “per asset value” and on a “operating costs per MWh” show SPI PowerNet costs to be comparable with Powerlink and more efficient than TransGrid and ElectraNet SA. Powerlink has lower operating costs per circuit km than SPI PowerNet. On a maintenance unit basis, Powerlink and SPI PowerNet do not rank as highly as ElectraNet SA but rank above TransGrid.

XXIII. SPI PowerNet is showing an increasing trend in operating expenditure, after achieving significant reductions in operating costs in earlier years. The increase is due to increasing asset age along with changes to business scope (e.g. transfer of VNSC and revision of rebate scheme). Asset management practices are considered effective with some although there would appear to be some potential for further improvement. Cost allocations between regulated and un-regulated along with the treatment of common costs and overheads are considered appropriate.

XXIV. SPI PowerNet does not face grid support costs, as was the case for Powerlink. If any were applicable, they would be included in VENCorp operating costs.

XXV. Independent benchmarks show SPI PowerNet to be a very efficient transmission operator. However, it should also be noted that some external factors affecting operating expenditure and reliability are favourable to SPI PowerNet compared with other states. For example, the network covers a comparatively small area, a very high proportion of network is either in, or close Melbourne, the network contains only a limited number of radial spurs and there is no light 110kV system.

# 1. INTRODUCTION

The Australian Competition & Consumer Commission (Commission), 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 Victorian transmission network, SPI PowerNet, from 1 January 2003. The Commission expects to release a draft decision in August 2002.

SPI PowerNet has submitted an application to the Commission setting out its view of the appropriate revenue cap to be applied over the regulatory period 1 January 2003 to 31 March 2008[1]. PB Associates has been engaged to review this application in respect of the following areas that are pertinent to establishing an appropriate revenue cap:

- The value of the assets used by SPI PowerNet to supply non contestable transmission services;
- SPI PowerNet's capital expenditure (CAPEX) requirement over the regulatory period;
- SPI PowerNet's operational expenditure (OPEX) requirement over the regulatory period;

This report is a review of SPI PowerNet's operational expenditure requirement over the regulatory period. The other reviews referred to above are contained in separate PB Associates' reports.

A review of operating and maintenance (O&M) expenditure is required to assist the Commission in assessing the performance of SPI PowerNet 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 seek to achieve an environment that fosters efficient use of existing infrastructure, efficient operating and maintenance practices and an efficient level of investment.

In this context, the review needs to inform the Commission on the adequacy, efficiency and appropriateness of the O&M expenditure forecast in SPI PowerNet's revenue cap application as being necessary to meet its present and future transmission service obligations.

## 1.1 TERMS OF REFERENCE

The Terms of Reference require this review to analyse and comment on the following matters in relation to the contribution of O&M expenditure to SPI PowerNet's delivery of transmission services:

- an assessment of whether SPI PowerNet'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 2003;

[1] SPI Power's Revenue Cap Application for the period 1 January 2003 to 31 March 2003.

- an assessment of SPI PowerNet'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 SPI PowerNet'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 SPI PowerNet'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 2003.

## 1.2 REVIEW

PB Associates notes that this review and ensuing report is based on the costs and information provided to PB Associates by SPI PowerNet. This report relies on the said information and PB Associates has not undertaken any form of audit to confirm the data collection processes or verify the authenticity of the data.

## 1.3 ACKNOWLEDGEMENTS

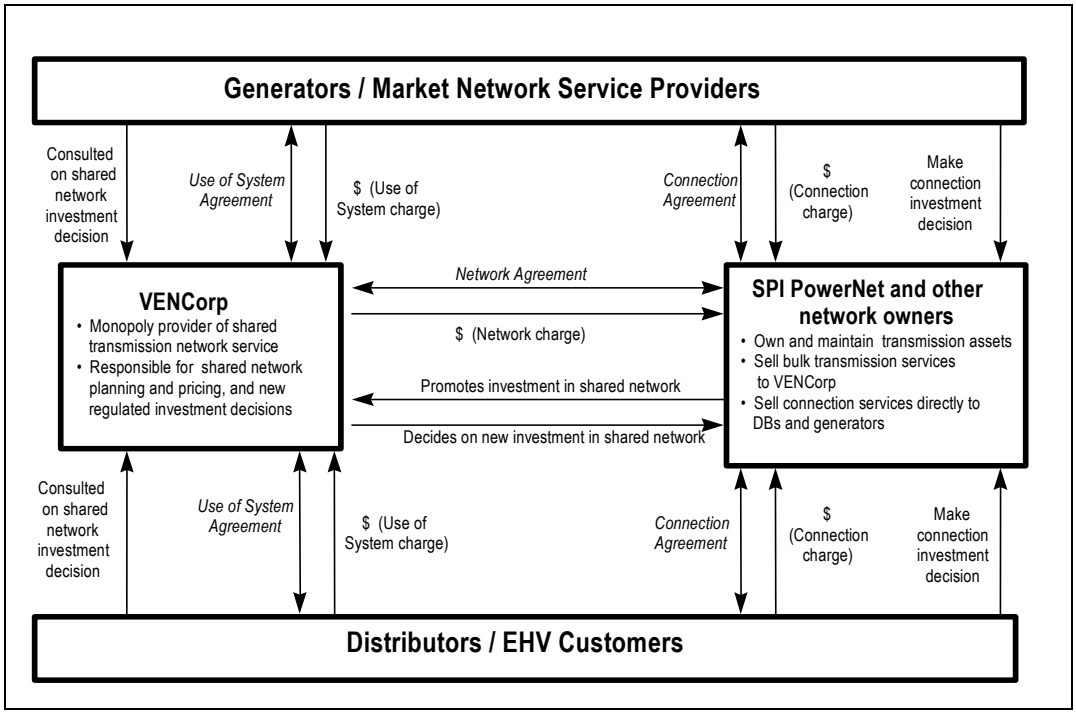
PB Associates acknowledges the assistance from SPI PowerNet and ACCC in carrying out this review.

# 2. BUSINESS OVERVIEW

## 2.1 COMMERCIAL RELATIONSHIPS

The relationship between SPI PowerNet and other key industry participants is shown in Figure 1.

**Figure 1 Commercial Relationships**




The SPI PowerNet transmission system includes two broad asset categories:

- The shared network, which is the main extra high voltage network that provides or potentially provides supply to more than a single point. This includes all lines rated above 66kV and main interconnecting transformers that operate between two voltage levels above 66kV.

  In Victoria, the responsibility for ensuring that sufficient shared network transmission capacity is available rests with a separate government owned organisation (VENCorp). SPI PowerNet is simply a Transmission Network Service Provider (TNSP) contracted by VENCorp to provide shared transmission network services. VENCorp also contracts with other TNSP for similar transmission services. This is unlike Queensland and New South Wales where the TNSP is itself responsible for planning and implementing augmentations to the shared transmission network.

- Connection assets are those parts of the transmission system that are dedicated to the connection of generator(s) or customer(s) at a single point. Connection customers are responsible for planning and directing the augmentation of the connection assets they use.

Connection and shared network augmentations can either be contestable or non-contestable. Where SPI PowerNet builds a shared network augmentation following a contestable tender process with VENCorp, these assets are not included in the regulated asset base and are not subject to ACCC review. Similarly, assets provided to connected parties by SPI PowerNet on a contestable basis, would be excluded from the regulated asset base and not subject to ACCC review.

Non-contestable augmentations (for both the shared network and for connection assets) are normally included in the regulated asset base and subject to ACCC review. Non-contestable assets account for about 98% of SPI PowerNet's asset base, primarily because all transmission assets prior to the commencement of the existing arrangements in 1994 are classified as non-contestable.

SPI PowerNet's revenue cap application forecasts the revenue it requires over the 2003-2008 regulatory period to operate and maintain its non-contestable assets (both shared and connection assets). This revenue includes provision for funding forecast O&M expenditure, as well as the capital expenditure required for refurbishing and replacing existing non-contestable assets.

SPI PowerNet's operating costs will be lower than those of TNSPs in other states, which have a planning and development function similar to that provided by VENCorp. The cost for VENCorp to provide a planning and development service is in the order of $6m pa.

This report considers the operating and maintenance expenses of the non-contestable services provided by SPI PowerNet. PB Associates is also carrying out a similar review of VENCorp operational and augmentation expenditure on behalf of the ACCC.

## 2.2 CORPORATE STRUCTURE

SPI PowerNet's corporate structure is based on an asset manager / service provider model. Its key business divisions are Transmission Services, Strategic Asset Management, Network Services and resource pools.

Transmission Services manages the commercial relationships including negotiation of new services. Strategic Asset Management is responsible for the development of asset management strategies and plans which are implemented by Network Services. Work in one geographic region is outsourced. Network Services also manages the Victorian Network Switching Centre. Resource pools are both internal and external, providing services to the core business.

## 2.3 SPI POWERNET NETWORK

SPI PowerNet's transmission network covers an area of approximately 227,600 sq km and serves a population of approximately 4.5 million. The network comprises a 500kV backbone that links the Latrobe Valley generation to Melbourne and through to Heyward near the border with South Australia. There are three interconnectors with NSW and one with South Australia. 220kV rings supply terminal stations in the Melbourne metropolitan area and in country Victoria. These terminal stations supply distribution businesses, which reticulate the electricity to individual consumers. Figure 2 and Figure 3 provide an overview of the network.

**Figure 2 SPI PowerNet Transmission Network**

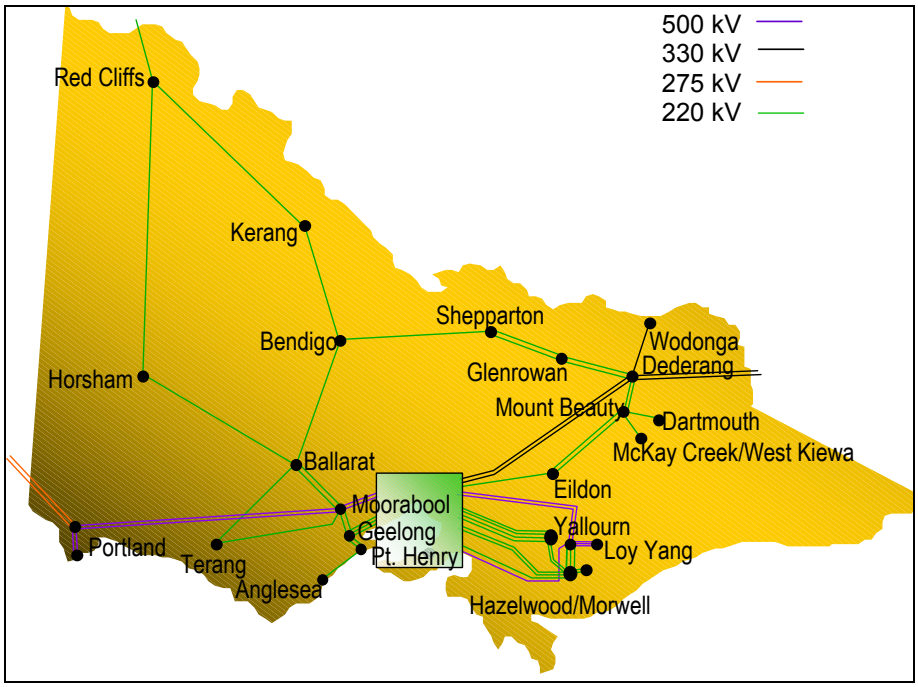



**Figure 3 Melbourne Area**

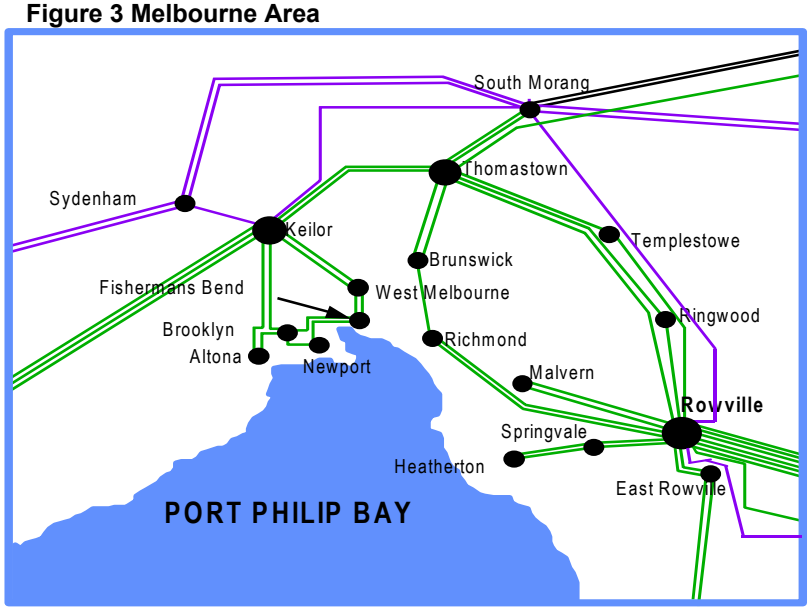



Table 1 provides comparative network information for Australian NEM participants. The energy transmitted by SPI PowerNet is between that of Powerlink and TransGrid. SPI PowerNet has about half the number of substations and length of line as both Powerlink and TransGrid, although the number of circuit breakers is greater than both Powerlink and ElectraNet. ElectraNet has more substations than SPI PowerNet, slightly less circuit km of line and much lower maximum demand and energy transfer.

**Table 1 - Network Parameters for Australian NEM Participants**

| | Powerlink | TransGrid | SPI PowerNet | ElectraNet SA |
|---|---|---|---|---|
| Maximum demand (MW) | 6,585 | 11,360 | 8,205 | 2,850 |
| Energy (GWh) | 40.353 | 64,443 | 51,692 | 11,921 |
| Number of substations | 85 | 75 | 44 | 68 |
| Length of line (km) | 11,088 | 12,011 | 6,552 | 5,576 |
| 500kV line | - | 1,057 | 1,517 | - |
| 330kV line | 505 | 5,109 | 739 | - |
| 275kV line | 6,084 | - | 157 | 2,563 |
| 220kV line | - | 681 | 3,988 | - |
| 132kV line | 3,958 | 5,102 | - | 2,989 |
| 110kV line | 528 | - | - | - |
| 66kV line | 1 | 62 | 141 | 14 |
| 330kV cable | - | 20 | - | - |
| 275kV cable | 5 | - | - | - |
| 220kV cable | - | | 11 | |
| 110kV cable | 6 | - | - | - |
| 66kV cable | 1 | - | - | - |
| 500kV CB | - | 12 | 107 | - |
| 330kV CB | - | 322 | 29 | - |
| 275kV CB | 231 | - | 4 | 142 |
| 220kV CB | - | 14 | 368 | - |
| 132kV CB | 311 | 482 | - | 169 |
| 110kV CB | 171 | - | - | - |
| 66kV and below CB | 62 | 421 | 505 | 71 |
| Total CB | 775 | 1,251 | 1,013 | 382 |

Note: Energy delivered based on ESAA generation sent out plus interconnectors with other states. ElectraNet and Powerlink CB numbers based on their Revenue Applications and TransGrid on their 1998-2003 Network Management Plan with an allowance for an increase in 330kV CBs due to QNI project and other augmentations

Indicators that could be used to compare operating expenditure between states include operating costs against energy delivered ($/MWh), operating costs against asset value, operating costs against length of line, work unit measures and benchmarking specific aspects of the business.

When comparing company performance, no one measure will provide a complete comparison, as the various stakeholders will have different perspectives. For example rural customers with low energy use at the end of long lines will be concerned about costs per km whereas urban customers are more likely to be concerned about cost per MWh of energy. Other factors such as environment, network age and design, customer requirements and accounting policies also influence comparisons.

The performance of SPI PowerNet in relation to other TNSPs is considered in more detail in Section 7 of this report.

## 2.4 SUMMARY

SPI PowerNet is different from other Australian TNSPs in that VENCorp plans and requisitions augmentation to the shared network. Further, the planning of connection assets is the responsibility of the connected customers. In other States, these functions remain within the TNSP.

SPI PowerNet's energy transmitted is between that of Powerlink and TransGrid. SPI PowerNet has about half the number of substations and length of line as both Powerlink and TransGrid with the number of circuit breakers being greater than both Powerlink and ElectraNet. ElectraNet has more substations than SPI PowerNet, slightly less circuit km of line and much lower maximum demand and energy transfer. Differing network characteristics and stakeholder interests will influence the perceived performance of SPI PowerNet.

# 3. OVERVIEW OF OPERATING EXPENDITURE

## 3.1 ESTABLISHING OPERATING EXPENDITURE

SPI PowerNet's approach to budgeting is to forecast expenditure using an expected value approach rather than using median or typical year values. This approach includes known and certain costs and then adds an amount for the expected value of uncertain costs together with an allowance for risk.

Consistent with this general approach SPI PowerNet has used different methodologies for forecasting operating expenditure for different categories of expenditure. Table 2 outlines the various operating expenditure categories used by SPI PowerNet and examples of typical operating expenditures included in each category.

**Table 2 - Approaches to Operating Expenditure Forecasting**

| Category | Typical Expenditure/Proposed Treatment |
|---|---|
| Risk mitigation or transfer | The application proposes that specific identified risks be excluded from the revenue cap. If such costs arise during the regulatory period, they would be recovered by pass through. This would apply to costs resulting from specific events such as tax or code changes, terrorism, changes in the Commission's approach to service standards, insurance premium increases and asset stranding. |
| Deterministic (known and certain expenditure items) | Scheduled maintenance, system operation, health, safety and environment, taxes/leases, support, corrosion/condition monitoring, finance, HR, IT and other corporate |
| Probabilistic (identified categories of expenditure) | Unscheduled maintenance, vegetation maintenance, rebates |
| Risk allowance for identified events | Insurance, non-insured risks and major asset failure risk |
| Contingency for unidentified events (not covered by pass through or risk allowance) | Uplift on all items except rebates and non-insured risks (approximately $1m pa in total) |

The proportions of each of the above categories of expenditure included in the revenue cap are deterministic expenditure (70%), probabilistic expenditure (22%), risk provision (6%) and contingency provision (2%).

Deterministic operating expenditure forecasts are derived from the works management system with bottom-up studies used for forecast maintenance support and overheads. Corrosion/condition monitoring is based on detailed asset management studies.

In the probabilistic operating expenditure category, unscheduled maintenance and vegetation management costs are based on historical trends. Outage rebates are based on continuation of current practices.

Insurance costs were forecast based on market trends with provision for self-insurance of towers and wires. Non-insured and major plant failure risks are based on actuarial studies and internal assessments.

An additional contingency has also been allowed for based on SPI PowerNet's judgement.

As indicated in Table 2, SPI PowerNet proposes to not to make provision in the revenue cap for potential costs relating to certain specified events. It would seek a pass through of associated additional operating costs in the event of a tax or code change, an increase in insurance costs, terrorism or a change in the Commission's regulatory requirements in relation to service standards.

## 3.2 SPI POWERNET OPERATING EXPENDITURE

Operating expenditure covers both the direct costs of asset management and indirect costs. In presenting its operating expenditure forecast SPI PowerNet has categorised operating expenditure into system recurrent, system non-recurrent and non-system expenditures.

System recurrent expenditure includes the costs of activities of a regular and on-going nature. These include routine maintenance (49%), system operation (11%), health, safety and environment (6%), taxes and leases (10%), insurance (2%), asset management support (14%) and rebates (14%). The numbers in brackets are the percentage component that each of these contributes to system recurrent expenditure.

System non-recurrent expenditure arises from programmes of work, made up of corrosion, condition monitoring and associated support costs. These programmes carry over several years and address particular asset condition problems such as deteriorating tower foundations. Such a programme would continue until the situation was rectified.

Non-system cost expenditure includes finance (29%), HR (12%), IT (21%), other corporate (31%) and non-insured risk (7%).

Table 3 summarises SPI PowerNet's forecast O&M expenditure as outlined in its submission.

**Table 3 SPI PowerNet Expenditure (01/02 real $m)**

| | 1998 | 2001/02 | 2002/03 | Q1 2003 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 |
|---|---|---|---|---|---|---|---|---|---|
| System recurrent | 26.8 | 27.8 | 33.1 | 11.2 | 42.3 | 43.2 | 43.1 | 43.4 | 43.8 |
| System non-recurrent | 3.5 | 8.0 | 9.8 | 4.5 | 11.5 | 11.5 | 11.3 | 11.4 | 11.4 |
| Non-system | 9.4 | 11.7 | 12.8 | 3.3 | 12.5 | 12.4 | 12.4 | 12.6 | 12.7 |
| **Total** | **39.7** | **47.5** | **55.7** | **19.0** | **66.3** | **67.1** | **66.8** | **67.4** | **67.9** |
| Total in nominal terms | | | | 19.5 | 70.1 | 73.2 | 75.1 | 78.2 | 81.2 |
| Adjustment to normalise for scope change | 1.2 | 1.2 | 3.3 | 2.4 | 10.2 | 10.2 | 10.3 | 10.3 | 10.4 |
| **Total on same service scope** | **38.5** | **46.3** | **52.4** | **16.6** | **56.1** | **56.9** | **56.5** | **57.1** | **57.6** |

In order to make more valid comparisons, the costs of activities not undertaken prior to 2003/04 or those where there has been a change in the scope of the activity (e.g. rebate scheme) have been removed and the net shown in the "total on same service scope" row of Table 3. The costs backed out were for VNSC, rebate scheme and non-insured risks.

SPI PowerNet has forecast that its system recurrent operating expenditure will increase by $3.3m in 2003/04 as a result of including VNSC in the regulated asset base from 1st January 2003.

The rebate scheme, which is a transmission circuit availability incentive scheme with VENCorp, is expected to increase operating expenditure by $4.8m 2003/04 over the level in 1998. The balance of the increase of expenditure over 1998 levels was due to maintenance ($1.2m), health, safety and environment ($0.7m), taxes/leases ($1.6m), insurance ($1.5m) and support ($2.5m).

System non-recurrent cost increases from 1998 onwards were due to the introduction of more corrosion related works, condition assessment initiatives, significant repairs, and preventative works. This step change in the level of non-recurrent costs reflects the age of the assets and the fact the SPI PowerNet recognised that an increase was required to improve the condition of the older assets.

Non-system cost increases from 1998 onwards were due to higher IT costs, regulatory costs, credit rating and other fees.

Section 6 will examine specific areas of the operating expenditure and consider movements in more detail.

In developing operating expenditure forecasts, SPI PowerNet has made provision for a 2% pa increase real in salary costs. In developing this forecast, SPI PowerNet took into account previous movements in salary costs. SPI PowerNet provided information to PB Associates that demonstrated that from the period ending March 1997 to the period ending March 2002 there had been an annual average in increase in salary expenses of over 2% above inflation. On this basis the inclusion of a 2% pa factor on salaries in the real projections is considered appropriate.

Furthermore, SPI PowerNet added a contingency for unidentified events that could not be passed through and were also not covered by the risk allowance. This allowance (2%) represents its judgement of the probable expenditure on unanticipated items. Section 6.3.2 will further discuss the appropriateness of this 2% allowance when other risk factors are considered.

## 3.3 SUMMARY

SPI PowerNet's approach to budgeting is to forecast expenditure using an expected value approach rather than using median or typical year values. In addition to pass through options, operating costs are categorised as deterministic (70%), probabilistic (22%), defined risks (6%) and contingency (2%).

The significant increases in expenditure from 1998 to 2003/04 are due to the transfer of VNSC to SPI PowerNet, adjustments to the transmission circuit availability incentive scheme with VENCorp, increases in maintenance, taxes and leases, insurance, and corrosion/condition initiative and support costs.

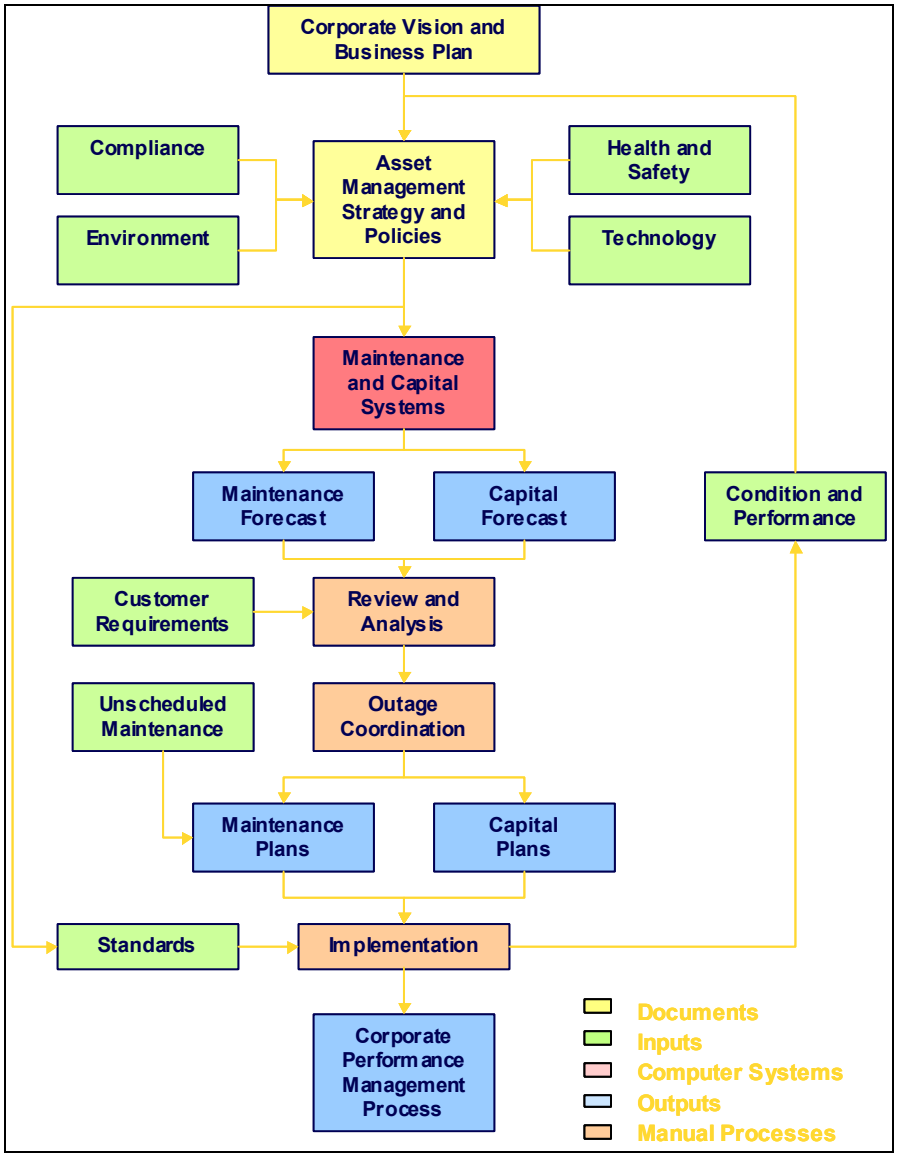
SPI PowerNet has included a 2% pa increase for salaries based on past trends. The overall operating expenditure also has a 2% contingency for unidentified events that could not be passed through and were not covered by specific risk allowances.

# 4. ASSET MANAGEMENT EFFECTIVENESS

## 4.1 ASSET MANAGEMENT PRACTICES

SPI PowerNet has developed an Asset Management Strategy to provide high-level guidance and provide a framework for the development of operating expenditure and capital plans and programs. The process adopted is shown in Figure 4.

**Figure 4 - Asset Management Development Process**




The Asset Management Strategy sets out broad strategies and polices. Capital and maintenance five-year forecasts are based on the output from the asset management model (driven by technical life and asset condition), asset management policies, schedule maintenance, plant condition and performance information.

Asset Management Plans are also developed for some specific types of equipment (e.g. for each type of circuit breaker). However, detailed Asset Management Plans have not been established for other key assets such as transmission lines and transformers at this stage with asset management carried out through routine inspections, condition assessments, routine maintenance, refurbishment and replacement. Cost control for those assets not covered by Asset Management Plans is managed by the work management system, which determines when plant is to receive particular maintenance. The lack of integrated Asset Management Plans covering all plant may result in particular assets not being maintained appropriately over the long term. Asset Management Plans would also enable condition information and performance requirements to be better incorporated into particular maintenance initiatives.

The International Transmission Operations and Maintenance Study (ITOMS) provides not only relative performance information (cost and service level) but also practices adopted by best performers. SPI PowerNet uses this practice information to review and update their practices.

SPI PowerNet did not have a comprehensive document that easily linked the Asset Management Strategy with various spend plans. It was difficult establish how the Asset Management Strategies were translated into specifically costed plans and programs.

The Asset Management Strategy is an evolution from earlier versions, differing from its predecessors by the changing circumstances with it must deal such as progressively ageing network and increased environmental requirements. Additional planning may identify increasing expenditure to address newly identified issues, but conversely the results of the INDEC review (see Section 4.2) may lead to efficiencies not allowed for in the expenditure forecasts,

## 4.2 INDEC REVIEW OF ASSET MANAGEMENT

INDEC was engaged by SPI PowerNet to review policies, processes, plans and practices using its Asset Management Diagnostic, identify opportunities for process and efficiency improvements, potential areas of risk along with asset management issues that may impact on future regulatory reviews. PB Associates has reviewed the resulting INDEC report and recommendations.

Deficiencies identified include the need for more robust feedback between field and asset management personnel, improved project reviews to ascertain if benefits were obtained, more rigour to manage and mitigate risk in asset management, and a need to implement a strategic network planning function to ensure optimal asset management decisions and enhance management of facilities.

INDEC concluded that SPI PowerNet rated reasonably high across most of the process areas reviewed with an overall score of 77%. INDEC advises that this score places SPI PowerNet in the highest 10% of organisations reviewed and that demonstrates the SPI PowerNet processes are generally being used to manage assets well, where possible.

SPI PowerNet noted the following actions in its response to PB Associates on the implementation of the INDEC recommendations:

- A Strategic Network Plan is to be developed to allow SPI PowerNet to be more involved in third party planning. The recently formed Strategic Network Planning department is preparing this document.
- Post project reviews are to be completed on all projects over $0.5m
- A Risk Manager has been appointed at a corporate level to develop a company wide risk management tool, complying with the Australian Standard

- The maintenance management system (MAXIMO) is to be extended to include workflow and improve visibility, tracking, alerting and prompting across the company on asset management issues. A project is also planned to better enhance maintenance scheduling and job control with the aim of achieving better outage management.
- An additional three maintenance engineers have been recruited to improve the link with field maintenance personnel

These initiatives will improve SPI PowerNet's ability to achieve a more integrated approach to asset management. It will be necessary for SPI PowerNet to monitor their integration into the overall business processes to ensure that all the desired benefits are achieved. A number of these initiatives will benefit capital programmes more than operating and maintenance expenditure.

## 4.3 FUTURE COST SAVINGS

SPI PowerNet notes that since disaggregation, it has focused on cost reduction. Initiatives have included restructuring, outsourcing, reviews of major expenditure categories such as insurance and a number of operational initiatives. SPI PowerNet has also been involved (and intends to continue to be so) in benchmarking to identify more efficient ways of undertaking maintenance activities.

SPI PowerNet considers that the only significant opportunities for further cost reduction will derive from innovation and will only manifest in five years time at the next reset.

However, PB Associates considers that the proposed improvements in asset management plans and processes could result in further cost savings.

## 4.4 SUMMARY

SPI PowerNet has developed an Asset Management Strategy to provide high-level guidance and a framework for the development of operating expenditure and capital plans and programs, setting out broad strategy and polices. There are only asset management plans for certain types of plant with programs for the balance based on the asset modelling, policies, plant condition and performance information. Benchmarking best practice information also drives strategies and policies.

The Asset Management Strategy is an evolution from earlier versions, differing from its predecessors by the changing circumstances with it must deal such as progressively ageing network and increased environmental requirements. Additional planning may identify increasing expenditure to address newly identified issues, but conversely the results of the INDEC review (see Section 4.2) may lead to efficiencies not allowed for in the expenditure forecasts,

INDEC was engaged by SPI PowerNet to review policies, processes, plans and practices to, identify opportunities for process and efficiency improvements and potential areas of risk. A range of deficiencies were identified although IDEC rated SPI PowerNet with an overall score of 77%, demonstrating SPI PowerNet as being in the highest 10% of organisations reviewed. SPI PowerNet has established a range on initiatives to address the deficiencies.

SPI PowerNet considers that the only significant opportunities for further cost reduction will derive from innovation and will only manifest in five years time at the next reset. However, PB Associates considers that the proposed improvements in asset management plans and processes are likely to result in further cost savings.

# 5. ACCOUNTING PRACTICES

## 5.1 ROUTINE MAINTENANCE VERSUS RENEWALS

SPI PowerNet has continued with the same capitalisation policy since privatisation in 1997. In general, expenditure on existing components or asset units of the transmission system which:

- replaces existing asset components or units with assets components or units that increase the capacity or functionality of the system; or
- replaces existing asset components or units with new asset components or units that extend the service life of the system beyond its expected service life on installation; or
- significantly reduces ongoing maintenance expenditure of an asset unit or component

are capitalised on the basis that these expenditures will contribute to service potential of the network and subsequently generate economic benefits to SPI PowerNet.

Assets replacement is capitalised if a complete asset recorded on the fixed asset register is replaced or if the service life or efficiency/economy of operation of the asset unit, not just the replaced component, is significantly improved.

Although the 1994 SKM valuation was done at a high level, SPI PowerNet, with the assistance of SKM, has disaggregated secondary assets from station assets, busbars and main rack structures from switchbays. Towers and spans have also been disaggregated from lines. The 1994 SKM valuation did not include communication assets and in 2001, an asset register was constructed using manufacturers' types and quantities of each category recorded.

For transmission lines, where assets such as insulators are replaced as part of a major replacement program, these costs are capitalised. The new insulators are included in the register on a program basis and the value of the old insulators retired. Routine replacement of single insulators is treated as expense.

For switchbays individual components such as current transformers, circuit breakers, disconnectors, capacitor voltage transformers and line traps, may be included as a separate asset where a replacement has taken place without changing the complete switchbay. In this case, the written down value of the asset in the switchbay is calculated and this value removed from the value of the switchbay at the time of replacement and the new asset recorded as a separate asset in the asset register.

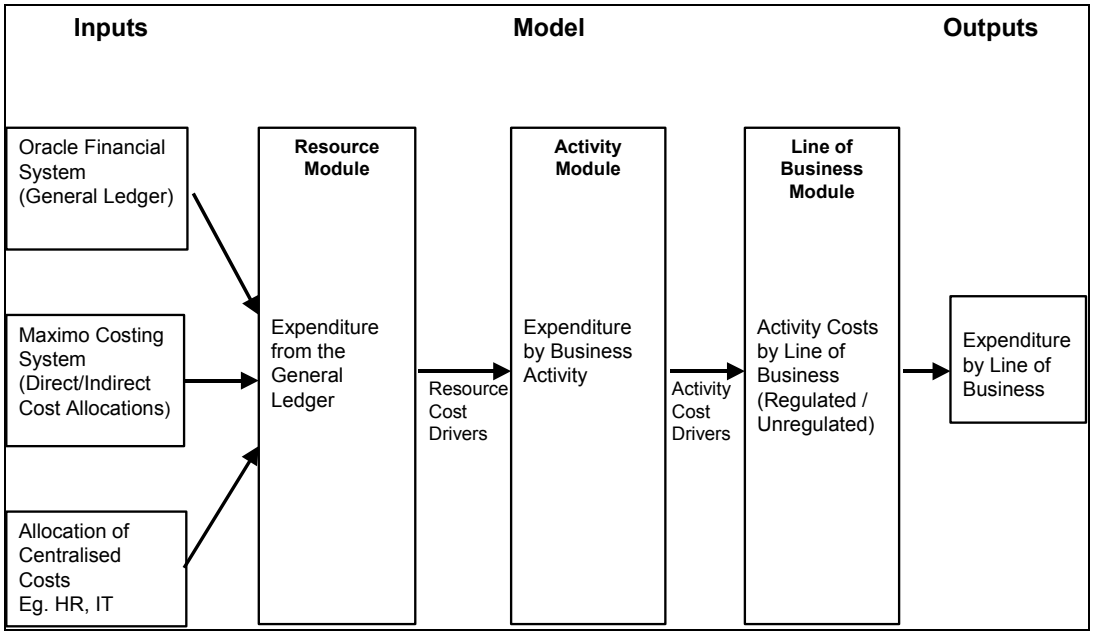
A similar approach is adopted for establishment, secondary assets, transformers and communications. Where mid life refurbishment is carried out on a transformer, which is expected to extend the life of the transformer, then this cost is capitalised.

Asset write-offs are based on modelling of the asset removed and the written down value of the asset replaced is expensed at the time of replacement.

## 5.2 COST ALLOCATION

SPI PowerNet has developed a cost allocation system using OROS to allocate costs to regulated and non-regulated lines of business. The model is shown in Figure 5.

**Figure 5 Cost Allocation Model**




Direct costs are identified through the Maximo costing system where all operating and maintenance expenditure is job costed. Each work order is flagged to show if the cost is direct and if it is regulated or non-regulated. IT costs are allocated to departments using IT systems and IT application drivers. Centralised costs such as HR etc are allocated to departments using drivers that best represent usage such as employee numbers, vehicles etc.

The resource module contains operating and maintenance costs split into direct and indirect costs. The activity model allocates resource costs to various activities using resource drivers. Activities include asset management, technical services, projects VNSC, work planning etc.

Activities are then allocated to lines of business. For example, direct costs are allocated based on the asset type. Some activities have a one to one relationship and are allocated accordingly. Lines of business included regulated shared, regulated connection, excluded shared, excluded connection, external work, property and VNSC.

In forecasting its costs for the revenue cap application, overhead costs that cannot be fully allocated to either the contestable or non- contestable parts of the business were allocated to the regulated business on the basis that only 3% of SPI PowerNet business is from non revenue-capped services. SPI PowerNet considers that the proportion of these costs that would be avoided if its non revenue-capped business did not exist is not material.

This approach is different from that adopted by SPI PowerNet for the current regulatory period, where provision for an assumed growth in the services it provided was made. This approach typically resulted in an O&M charge of 1.59% of asset value being applied to these contracts. The 1.59% rate covered both the direct and indirect costs of the augmentation.

This methodology was reviewed by the Essential Services Commission (ESC) in relation to a connection augmentation at Keilor as to whether this approach was fair and reasonable. The ESC guidance issued subsequent to this review was that an incremental approach would be more appropriate, and only direct costs relating to the augmentation should be included in the cost of the augmentation.

SPI PowerNet now proposes that O&M charges for new non-contestable services will incorporate direct costs only after 1st January 2003. These services are expected to be rolled into the RAB at the beginning of the following regulatory period. The typical rate proposed for O&M would be 0.7% of the augmentation value, compared with the previous 1.59% rate.

PB Associates does not consider the avoidable cost overhead allocation methodology proposed by SPI PowerNet for allocation of overheads that cannot be directly allocated to either the contestable or non-contestable parts of the business to be appropriate. This is because it allows costs that other businesses in the contestable market may have to carry to be allocated to the non-contestable regulated business. This potentially places SPI PowerNet at an advantage compared to its competitors in the contestable market.

A preferred approach would be for overhead costs that cannot be directly allocated to either the contestable of non-contestable parts of the business to be allocated between the two parts of the business on the basis of a suitable cost driver, such as the proportion of the asset base in each part of the business. SPI PowerNet advises that this approach would increase the revenue capped cost allocation by about $110k. This approach is not inconsistent with the ESC decision on Keilor, which related to a non-contestable augmentation that is expected to be included the regulated asset base for the 2003-2008 regulatory period.

## 5.3 SUMMARY

SPI PowerNet has continued with the same capitalisation policy since privatisation in 1997. In essence, asset replacement is capitalised if a complete asset recorded on the fixed asset register is replaced or if the service life or efficiency/economy of operation of the asset unit, not just the replaced component, is significantly improved. This would for example capitalise the replacement of a circuit breaker. This is not the same approach as some other TNSPs whose unit of plant is a “bay” and the circuit breaker replacement would be expensed. SPI PowerNet also capitalises major refurbishments of transmission lines. Asset write-offs are based on modelling of the asset removed and the written down value of the asset replaced is then expensed at the time of replacement.

SPI PowerNet has developed a comprehensive cost allocation system to allocate costs between various lines of business (e.g. regulated shared, regulated connection, excluded shared, excluded connection, external work, property and VNSC).

In forecasting its costs for the revenue cap application, overhead costs that cannot be directly allocated to either the contestable or non-contestable parts of the business were fully allocated to the regulated business on the basis that only 3% of SPI PowerNet’s business is from non revenue-capped services. PB Associates considers that a preferred approach would be for these overhead costs to be allocated between the two parts of the business on the basis of a suitable cost driver, such as the proportion of the asset base in each part of the business. SPI PowerNet advises that this approach would increase the revenue capped cost allocation by about $110k.

# 6. ANALYSIS OF OPERATING EXPENDITURE

This section examines the specific areas of expenditure for each of system recurrent, system non-recurrent and non-system operating expenditure. As discussed in section 3, the labour component increases at 2% pa above CPI which is reflected in the specific budget areas.

## 6.1 SYSTEM RECURRENT

System recurrent expenditure is outlined in Table 4. This expenditure includes costs of a regular and on-going nature. Drivers that increase costs over the 2003 to 2007/08 period are: the implementation of additional asset improvement processes such as increased condition monitoring and assessment programs; the development of a separate risk management function; the formation of the strategic network planning group; increased resources for environment; health and safety; recruitment to replenish the aging workforce and tightening constraints on windows for plant outages.

**Table 4 - System Recurrent Expenditure ($m)**

| | 2001/02 | 2002/03 | Q1 2003 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 |
|---|---|---|---|---|---|---|---|---|
| Maintenance | 18.7 | 19.0 | 5.4 | 20.7 | 21.6 | 21.4 | 21.7 | 21.9 |
| System operation | 0.0 | 0.7 | 0.7 | 3.3 | 3.4 | 3.4 | 3.5 | 3.5 |
| Health, safety & Environment | 0.5 | 0.8 | 0.3 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 |
| Rebates | 1.2 | 2.4 | 1.5 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Taxes/leases | 2.8 | 4.0 | 0.9 | 4.2 | 4.2 | 4.2 | 4.2 | 4.2 |
| Insurance | 1.6 | 2.1 | 0.6 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |
| Support | 3.0 | 4.1 | 1.8 | 4.6 | 4.6 | 4.5 | 4.6 | 4.6 |
| **Total** | **27.8** | **33.1** | **11.2** | **42.3** | **43.2** | **43.1** | **43.4** | **43.8** |

### 6.1.1 Maintenance

Routine maintenance, which comprises 57% of maintenance expenditure, is forecast using a computer-based system (Maximo), which generates the future work plan for plant items using maintenance intervals for that particular item. The time required for each scheduled service is based on historical experience for a particular type of plant.

Non-routine maintenance, which comprises 43% maintenance expenditure, is forecast based on historical levels. Historical levels are also used for easement and site maintenance.

The routine and non-routine maintenance expenditure on particular groups of plant items is switchgear 16%, transformers/reactors 7%, secondary equipment 18%, site work 25% and transmission lines 26%.

From 1998 to 2001/02 SPI PowerNet achieved a reduction of approximately $0.5m in routine maintenance expenditure in spite of the average age of the assets increasing over the period. There was essentially no change in non-routine maintenance over this same period.

From 2001/02 to 2003/04 the increases were due to additional costs for carrying out more intensive assessments of asset condition and additional routine inspections driven partly by the cyclical nature for routine maintenance on circuit breakers and auxiliary equipment. Routine maintenance on communication assets increased over the period as more optical fibre is installed and more reliance is being placed on this essential infrastructure. These factors also increase maintenance cost from 2003/04 with costs from then on being static.

SPI PowerNet stated in its application that costs are increasing due to additional overtime required as outages were becoming more difficult to achieve in normal working hours. SPI PowerNet has confirmed that in 2001/02 only $117k was spent, indicating that additional overtime costs are not significant. Future forecasts allow for a maximum increase of $200k due to additional overtime costs.

The maintenance cost projections have been based on detailed analysis and equipment condition information. The costs are considered appropriate.

### 6.1.2 System Operation

The forecast increase in system operation costs in 2003/04 is due to the transfer of operation for Victorian Network Switching Centre (VNSC) from VENCorp to SPI PowerNet on 1st January 2003. The assets associated with VNSC have been incorporated in the regulated asset base. The costs for operating VNSC are considered appropriate.

### 6.1.3 Health, Safety and Environment

During 2001/02 health, safety and environment was formed into one group with resources increased to meet additional requirements following a fatality, an increased focus on lost time injuries, an OCEI safety audit and increased demands from environmental guidelines.

Increases in costs from 2001/02 are due to terminal station landscaping and revegetation, noise investigations, vermin control, preparation of environmental and external audit program and oil spill remediation works.

The forecast costs for health, safety and environment are considered appropriate.

### 6.1.4 Rebates

The Network Agreement between SPI PowerNet and VENCorp provides for rebates to be paid to VENCorp when network elements are not available for service. The scheme is designed to encourage SPI PowerNet to seek plant outage times when the cost of the outage minimises the costs to wholesale market participants and encourage more effective asset management practices. The scheme has now been reviewed by VENCorp and SPI PowerNet jointly to establish rates for each network element for various times of the year, day of the week and time of the day. Outage times have been grouped into “peak”, “intermediate” and “off-peak”. The original scheme did not differentiate the rate according to when the outage occurred.

The rates were determined for each element of the shared network and based on the load at risk of interruption and the incremental transmission losses in the event of a contingency while that element is out of service. The load at risk is valued at the new market VOLL ($10,000 per MWh). Where the load at risk is expected to be managed by generation rescheduling, the estimated impact on fuel cost is used rather than VOLL.

The expected annual cost of the scheme ($6m) was determined using the historical planned and unplanned outages combined with SPI PowerNet's forecast requirements for planned outages. If there is no change to past practices, the entire $6m will be returned to VENCorp and thence to end customers. SPI PowerNet's liability has been capped at $12m.

The $6m shown in the SPI PowerNet application is based on continuation of past practices. If SPI PowerNet outages were greater (in either duration or at a less than appropriate time), SPI PowerNet would be subject to increased costs. Conversely, if SPI PowerNet can decrease outages at critical times, the SPI PowerNet benefits by not have to rebate the full $6m to VENCorp.

The scheme has a number of exclusions such as planned outages where requested by connected parties, planned outages for augmentation projects initiated and contracted by VENCorp, outages requested by landowners to carry out construction or demolition activities on transmission line easements (except for peak period without prior permission of VENCorp), failure of shunt capacitor bank reactors etc.

The rebate in 2001/02 ($1.2m) was based on the previous scheme that commenced in 1994 and the expenditure of $6m in 2003/04 is based on the new scheme.

In addition to the above scheme for shared network assets, SPI PowerNet also has a rebate scheme with generators, which is paid when connection to the network is constrained. SPI PowerNet has made no allowance for costs to be paid to generators under this scheme on the basis that network outages will be co-ordinated with generator shutdowns.

The $6m provided for in the regulatory application has been calculated on the basis that there will be no change to current practices in the pattern of outages. Nevertheless, the revenue application also requests funding for initiatives such as a higher level of strategic spares and shorter time widows for scheduled outages, which are designed to increase equipment availability. These initiatives should reduce SPI PowerNet's exposure to the rebate scheme. The scheme is to incentivise SPI PowerNet to adopt new and more efficient practices and make the appropriate capital investments funded through the revenue cap.

The rebate scheme improves incentives for outage management but may need to be reviewed depending on the outcome of the ACCC review of TNSP service standards.

### 6.1.5 Taxes and Leases

The increase in taxes relates to a change in the way the State Revenue Office (SRO) charges land tax. Land tax was previously based on four yearly council land valuations but the SRO has recently introduced an equalisation factor, which takes into account movements in prices measured by sale values in the area. Many of the terminal stations are located within prime real estate areas and subject to movements that are more volatile.

The costs are zero based and the increase from 2001/02 is the result of costs being allocated fully to regulated activities as they relate directly to providing regulated services,

### 6.1.6 Insurance

The insurance cost of $2.7m includes $0.3m for self-insurance of transmission lines. Transmission companies have found it difficult to obtain economic insurance cover for transmission lines and have found the most appropriate approach is to self-insure for

these assets. This covers situations where there is a catastrophic failure of a number of transmission towers following an event such as a windstorm.

The balance represents an increase from the level in 2001/02 due the changing insurance market. SPI PowerNet has not included any increase in insurance for the market and system operator services (for NEMMCO as against VNSC) in their forecast, treating them as outside the regulated services.

The level of costs for insurance including the self-insurance for transmission lines is considered appropriate.

### 6.1.7 Support

System support costs are those costs not directly related to the carrying out of work in the field. As the costs cover the same group of people whose costs have been allocated between recurrent and non-recurrent, costs in both of these areas were considered jointly.

System recurrent and system non-recurrent support costs increase by $1.6m and $1.1m respectively from 2001/02 to 2003/04 and then remain reasonably static. The programme of hiring additional apprentices and graduate engineers has contributed $0.5m to the overall increase. Other significant components in the increase are additional lease costs ($0.5m) following relocation of technical staff to CBD, technical specialist advice ($0.4m) and support for non-recurrent programme ($0.4m).

From 1998 to 2001/02, the combined system support cost increased by $1.8m. Key components for this increase were radio licence/communication costs because of the change of frequency band ($0.7m) and introduction of more formal asset management and condition assessment programs and an increased focusing on performance and reporting ($0.8m). Also included in the asset management cost increase was the establishment of the maintenance system incident reporting system and calculating more precise ratings of transmission equipment.

The increase in support costs is significant although SPI PowerNet has provided evidence substantiating the increases. Cost increases have been driven by the increasing demand on the static capacity grid, resulting in a need for more intensive management of assets. An example of this is the introduction of a scheme introduced to shed demand when load exceeds the rating of equipment.

## 6.2 SYSTEM NON-RECURRENT

System non-recurrent expenditure is outlined in Table 5. Support costs for system non-recurrent have been considered in section 6.1.7.

**Table 5 System Non-Recurrent Expenditure ($m)**

| | 2001/02 | 2002/03 | Q1 2003 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 |
|---|---|---|---|---|---|---|---|---|
| Corrosion/condition monitoring etc | 6.0 | 6.9 | 3.8 | 8.3 | 8.4 | 8.1 | 8.2 | 8.2 |
| Support | 2.0 | 2.9 | 0.8 | 3.1 | 3.1 | 3.2 | 3.2 | 3.2 |
| **Total** | **8.0** | **9.8** | **4.5** | **11.5** | **11.5** | **11.3** | **11.4** | **11.4** |

### 6.2.1 Corrosion, Condition Monitoring etc

The key components of system non-recurrent costs are those associated with corrosion related works, condition assessment initiatives and significant repairs and preventative works (e.g. SF6 circuit breakers and GIS repairs). Costs have been identified through performance factors, condition assessments and detailed investigations. The cost projections were also subject to risk analysis.

Over the period 2002/03 to 2007/08, the significant components of the corrosion and condition monitoring programme are tower painting ($5.6m), tower foundation corrosion repairs ($5.5m), tower ground level corrosion repairs ($5.9m), Bolte Bridge tower painting ($2.9m), SF6 circuit breaker refurbishments ($3.0m) and additional facilities maintenance ($2.5m). These costs are for the external component of the work with costs associated with investigation and evaluation, approval, tendering, project management, site access and management being additional to these, although these other costs are expected to have already been incorporated in support costs within the revenue cap application.

Tower painting due to corrosion is now an on-going program that other transmission companies are also adopting and is considered an appropriate economic option for extending the life of transmission lines. SPI PowerNet has carried out trials to evaluate the methodology to be adopted. The Bolte bridge work is required, as it has been established during condition assessment that the original paint was lead based and is flaking. The paint is to be removed and captured to prevent the lead particles falling into the water, and the towers repainted.

SPI PowerNet has approximately 4,400 towers that have direct buried steel foundations. Pilot investigations have been carried out to determine the need for foundation repairs. While some repairs are being undertaken in 2002/03, it is planned to expand the repair work from 2003/04 onwards. This work has the potential to be one of the most significant maintenance expenditure components in future years. Tower ground level corrosion related works commenced at around the same time as tower painting and has also become a significant expenditure.

SPI PowerNet has a number of GIS and circuit breakers with flange corrosion. Programs have commenced to address this problem. Aging terminal station buildings and grounds drive the facilities maintenance programme.

The most significant component in the increase in corrosion and condition monitoring expenditure from 2001/02 to 2003/04 is major repairs to SF6 gas sealing systems and corrosion related work on lines including tower painting. Increases from 1998 to 2001/02 ($3.9m) were due to tower painting, ground level remedial work, tower foundation investigation and site infrastructure works.

Increasing costs in condition and corrosion work are driven mainly by the age of the assets. Until recently there has not been major maintenance carried out. SPI PowerNet has developed a comprehensive programme to address the situation and the level of the proposed expenditure is considered appropriate. The level may need to be reviewed on an on going basis depending on the outcome of condition assessments.

## 6.3 NON-SYSTEM

Non-system expenditure is shown in Table 6.

**Table 6 Non System Expenditure ($m)**

| | 2001/02 | 2002/03 | Q1 2003 | 2003/04 | 2004/05 | 2005/06 | 2006/07 | 2007/08 |
|---|---|---|---|---|---|---|---|---|
| Finance | 4.1 | 4.6 | 1.1 | 3.6 | 3.6 | 3.6 | 3.6 | 3.7 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| HR | 1.0 | 1.4 | 0.4 | 1.5 | 1.6 | 1.6 | 1.6 | 1.6 |
| IT | 2.0 | 2.5 | 0.6 | 2.6 | 2.6 | 2.6 | 2.7 | 2.7 |
| Other corporate | 4.6 | 4.0 | 0.9 | 3.8 | 3.8 | 3.8 | 3.9 | 3.9 |
| Non-insured risks | 0.0 | 0.2 | 0.2 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| **Total** | **11.7** | **12.8** | **3.3** | **12.5** | **12.4** | **12.4** | **12.6** | **12.7** |

### 6.3.1 Finance, HR, IT and Other Corporate

The total cost of finance, HR, IT and other corporate costs are static from 2001/02 to 2007/08. This total is $2.8m higher than the level in 1998. This increase is attributed to greater use of IT services, regulatory costs, credit rating and loan legal fees, bank fees, board services and greater risk management focus. A number of these costs were paid by the parent company under GPU ownership but under SPI ownership are required to be funded internally.

The level of these costs appears to be appropriate but will be considered further in section 7.

### 6.3.2 Non-Insured Risk

In SPI PowerNet's application, extensive information is provided on its approach to risks including additional confidential information provided to PB Associates. The projections in Table 6 are based on an actuarial assessment of the cost of bearing such risks undertaken by Trowbridge Consulting. Most of the Trowbridge Consulting report in included in appendix B of SPI PowerNet's revenue cap application. The methodology used by Trowbridge Consulting to determine the appropriate revenue provision for non-insured risk was to estimate the potential cost and probability of an event occurring and then calculate an appropriate insurance premium.

SPI PowerNet believes that the Trowbridge Consulting report is forward looking and that previous expenditure does not reflect these costs as they are probabilistic in nature and only manifest relatively infrequently in a loss event. SPI PowerNet also advises that the costs covered by non-insured risk have not been separately budgeted and that they would not be seeking pass through for the risks quantified.

The non-insured risk element is a component of the risk allowance for identified events.

The significant components in the non-risk element are liability claim insurance ($0.248m), easements contractual disputes ($0.175m) and costs of handling public liability claims ($0.1m).

The liability claim insurance is within the current insurance policy deductibles and is based on actual claims made against SPI PowerNet together with expected settlement levels and frequency of claims. The easement component is based on an assessment of previous property value related claims and includes tree clearance and other landowner issues. Trowbridge also identified costs of handling public liability claims, driven mainly by EMF concerns.

While it is not a specialist in actuarial or insurance matters PB Associates has reviewed the Trowbridge analysis. The approach taken to quantifying the appropriate revenue provision for the risks identified in the report would seem reasonable.

However, SPI PowerNet's revenue cap application includes the following provisions:

- 2% pa above inflation on salary costs based on past movements (see section 3.2)
- non-insured risk allowance ($0.8m pa)

- self insurance for transmission tower or circuit failure which is not covered by external insurance ($0.3m pa)
- 2% contingency for unidentified events added centrally to all zero based budgets including salaries (see section 3.2)
- pass through for service standard, tax change, terrorism and insurance events

It is apparent that SPI PowerNet has allowed for a wide range of contingencies in its operating cost forecast.

It is also noted that non-recurrent expenditure has increased over historical levels to reflect additional maintenance requirements of the aging asset base and system recurrent and system non-recurrent support costs have increased overall from $3.2m in 1998 to $7.8m in 2003/04 (see section 6.1.7)

The revenue cap application does not identify what specific risks have been allowed for in the 2% contingency factor or the basis on which the 2% provision was determined. SPI PowerNet gave examples of potential expenditure not included in the submission that may arise. These included replacement of assets before their classified life. These write off costs, although expensed, are classified as depreciation and not operating costs being considered by this report. PB Associates has been unable to assess whether the provision is reasonable or to confirm that the risks have not been covered in other provisions of the application.

While it is true that situations will arise, that are not specifically included in cost forecasts, this occurs on an ongoing basis and such costs will therefore be included in historical cost levels. SPI PowerNet's cost forecast includes few categories where historical levels of spend have been reduced. Further PB Associates' review has not indicated that historical levels of unbudgeted spend have been backed out of SPI PowerNet's cost projections. The provision for risk in the revenue cap application appears to have been comprehensively covered.

## 6.4 SUMMARY

The routine maintenance forecast is based on equipment maintenance schedules and the non-routine maintenance forecast is based on historical levels. The increase in maintenance costs is driven by the costs of additional condition assessments, cyclical nature of work and greater maintenance requirements on communications assets. Cost forecasts are based on detailed analysis and equipment condition information and are considered appropriate.

Forecast non-recurrent maintenance expenditure has increased over the 1998 level due to extensive tower painting, tower foundation and ground level corrosion repairs, circuit breaker refurbishment and other works. The details for these programmes have been reviewed and are considered appropriate.

The transfer of VNSC increased costs by $3.3m and the modified rebate for the network availability scheme has an expected annual cost increase of $4.8m, being set to better reflect the actual cost of circuit outages to other users. Taxes and leases have increased due to a change in the valuation methodology by councils. The operating expenditure of these is considered appropriate.

The $6m rebate cost provided for in the regulatory application has been calculated on the basis that there will be no change to current practices in the pattern of outages. Nevertheless, the revenue application also requests funding for initiatives such as a higher level of strategic spares and shorter time widows for scheduled outages, which are designed to increase equipment availability. These initiatives should reduce SPI

PowerNet's exposure to the rebate scheme. The scheme is to incentivise SPI PowerNet to adopt new and more efficient practices and make the appropriate capital investments funded through the revenue cap.

Support costs increase by $2.7m from 2001/02 to 2003/04, driven by additional lease cost for centralising staff, technical specialist advice, and additional resources to replace future retiring staff and support for field programs. SPI PowerNet has provided detail substantiating the increases.

SPI PowerNet has proposed $0.8m pa for non-insured risk identified events, based on an actuarial assessment of the cost of bearing such risks. It advises that the costs have not been separately budgeted and that it would not be seeking pass through should any of the identified events occur. The significant components in the non-risk element are liability claim insurance ($0.248m), easements contractual disputes ($0.175m) and costs of handling public liability claims ($0.1m).

SPI PowerNet has allowed for a wide range of contingencies in its operating cost forecast including 2% for unidentified events. PB Associates has been unable to assess whether this 2% contingency provision is reasonable or to confirm that the risks have not been covered in other provisions in the application. Some of the examples provided related to asset write-offs and not operating expenditure being considered by this report. Nevertheless the total provision for risk in the revenue cap application appears to have been comprehensively covered.

# 7. SPI POWERNET PERFORMANCE COMPARISONS

This section considers the performance of SPI PowerNet against a range of measures. A number of factors can influence the ability to make absolute comparisons between transmission companies. These include varying load density, age profile, network design, load profiles, local regulatory requirements, accounting practices etc. Performance comparisons are also influenced by the fact that, in the case of SPI PowerNet, where there is no network planning function and that the asset base is essentially static.

In considering performance comparisons, the change in relative position is as important as the absolute comparison. Performance comparisons are more useful in establishing whether a particular company is in the "correct space" rather than establishing the precise relative position.

In making performance comparisons, decomposing costs into areas where comparisons that are more meaningful can be made is also helpful in establishing opportunities for improvement. Studies at the disaggregated level can also be designed to take better account of differing network factors better than at an overall company level.

PB Associates notes the differing environmental factors affecting each TNSP. The impact of factors such as line density, load factors, terrain and accessibility are difficult to assess and may result in certain companies being advantaged or disadvantaged with respect to the group averages.

## 7.1 SPI POWERNET COST TRENDS

When SPI PowerNet was established in 1994, a number of efficiency initiatives were taken that impacted both engineering and corporate costs. Documentation provided by SPI PowerNet demonstrates the savings made and equate to a cumulative reduction from 1995/96 to 1999/00 in the order of $60m nominal.

Over the period, staff numbers were reduced by 50%. This was a result of a number of organisational reviews, rationalising records management, rationalising depot facilities, establishing a central store, de-manning terminal stations, outsourcing field maintenance in northern/western Victoria, adjusting maintenance practices based on benchmarking best practices, accommodation rationalising, reducing FBT by adopting alternative vehicle configuration and implementing more appropriate information systems.

The initiatives taken achieved real savings, although costs are now increasing due to the aging asset population.

## 7.2 BENCHMARKING STUDIES

SPI PowerNet in its revenue cap application presented information on OPEX cost benchmarks, a standalone cost model, network performance benchmarks and international cost benchmarks.

In reviewing these studies, one important factor to consider is what has been included and what has been excluded in the studies. For example, information provided by Australian transmission companies to ESAA excludes, for most companies, assets below 100kV and system operation (including the costs of managing control centres). The International Transmission Operations and Maintenance Study (ITOMS), which most Australasian companies participate in, only includes direct cost for assets above 100kV.

A number of Australian transmission companies have more assets below 100kV than SPI PowerNet, which influences the results of comparisons made using overall company operating costs against those made using ESAA and ITOMS information.

### 7.2.1 International Transmission Operations and Maintenance Study (ITOMS)

SPI PowerNet has participated in the ITOMS study for about 5 years, presenting results for the 2001 study in its application. ITOMS has approximately 20 international transmission companies participating and is repeated every two years. The study compares performance (both cost and service level) over a range of sub-functions. The study excludes assets below 100kV. Approximately 60% of SPI PowerNet's total direct maintenance costs were included in the 2001 study, with the balance being for 22 and 66kV assets. Some of the SPI PowerNet assets (example: 66kV supply equipment) are excluded from the study.

Figures 4.16 and 4.17 of SPI PowerNet's application shows that SPI PowerNet is positioned with other best performers (top right-hand quadrant) for composite transmission line and substation performance. These composite graphs combine the performance of the various sub-functions. In both cases, SPI PowerNet's performance is superior to the Australia/New Zealand average (ANZ 2001).

Figure 6 and Figure 7 show the composite ITOMS substation and line performance, together with SPI PowerNet movements from previous studies.

**Figure 6 ITOMS Composite Substation Performance**

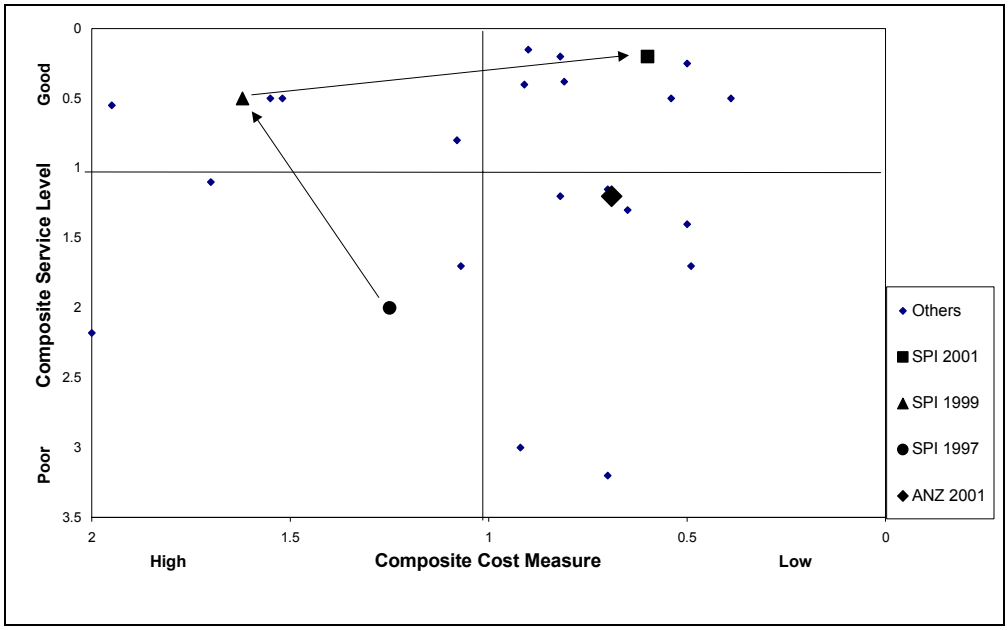
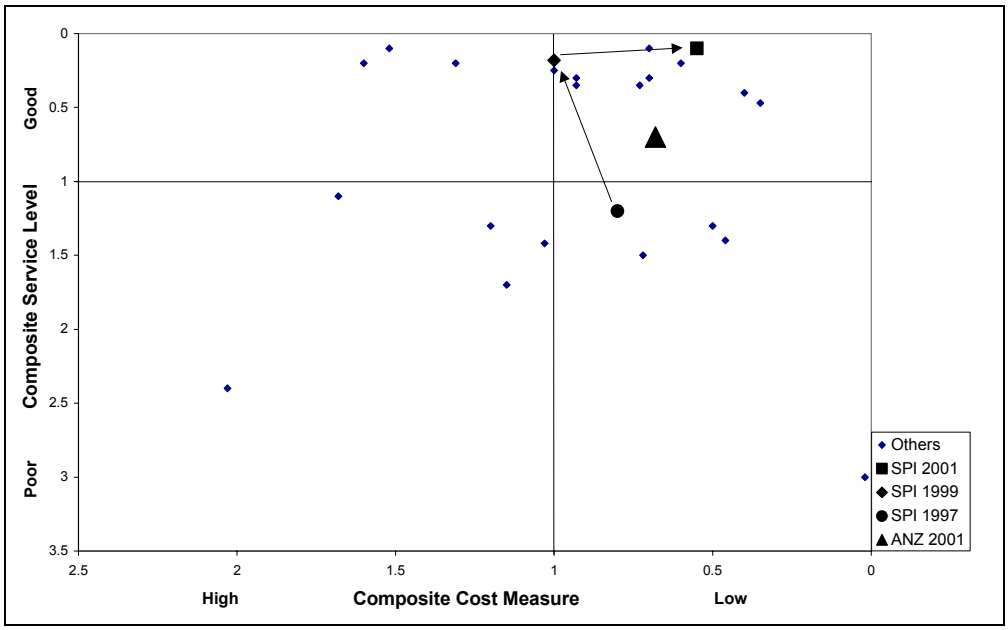


**Figure 7 ITOMS Composite Line Performance**




From 1997 to 1999 service levels improved and from 1999 to 2001 cost levels improved. The "other" are other participants in the 2001 study. It should also be noted that the trend is for all participants to reduce costs and improve service level as they adopt the practices of best performers. This means that the group average (cross hairs) also typically trends towards the top right hand corner. Should a participant maintain its overall efficiency from one review to the next, it would be likely that its position relative to the group average would deteriorate. It is not always possible to improve service levels without capital expenditure. However this is not reflected in ITOMS cost comparison.

The ITOMS study is a closed study with participation available only by invitation. However, PB Associates believes that the study participants represent a reasonable and representative selection of transmission companies for the purposes of a comparative study.

PB Associates was not provided with the underlying formula or mechanisms for determining the ITOMS comparative indicators and is unable to comment on the appropriateness or treatment of the submitted data in determining the final results.

The ITOMS results indicate that SPI PowerNet has made significant improvements in recent years and is now a best performer for both substations and lines.

### 7.2.2 Standalone Cost Model

SPI PowerNet commissioned an independent cost model taking into account the type of network and business environment. This model was developed from a zero base and used costs associated with best practice benchmarks. For indirect costs, the model used cost information developed by KPMG for the Victorian 2001 Electricity Distribution Price Review in order assist in benchmarking. INDEC note that the KPMG report states that the indirect cost benchmarks and estimates were based on the electricity and energy sector and by implication, not specifically to distribution networks.

PB Associates has reviewed the detailed INDEC report and further information provided by INDEC. The study confirmed that SPI PowerNet total costs are below the industry average with indirect costs being below the benchmarks set for the Victorian Electricity Distribution Review.

## 7.3 OTHER PERFORMANCE COMPARISONS

This section considers operating expenditure in terms of a range of normalisers.

Information is available from ESAA Electricity Australia but, as noted previously, this only includes assets above 100kV. Information is also available from company annual reports and other sources such as revenue cap applications, which include information on the operating costs. Non-ESAA information enables more accurate information on asset values to be obtained.

Figure 8 and Figure 9 show operating costs against asset value based on ESAA information and overall cost basis. The graphs also project the ratio in the future based on revenue application information. Due to underlying difference in asset valuations used for ESAA measures, the results based on other sources, which include overall costs, is considered more robust.

**Figure 8 OPEX per Asset Value (%) – based on ESAA information**

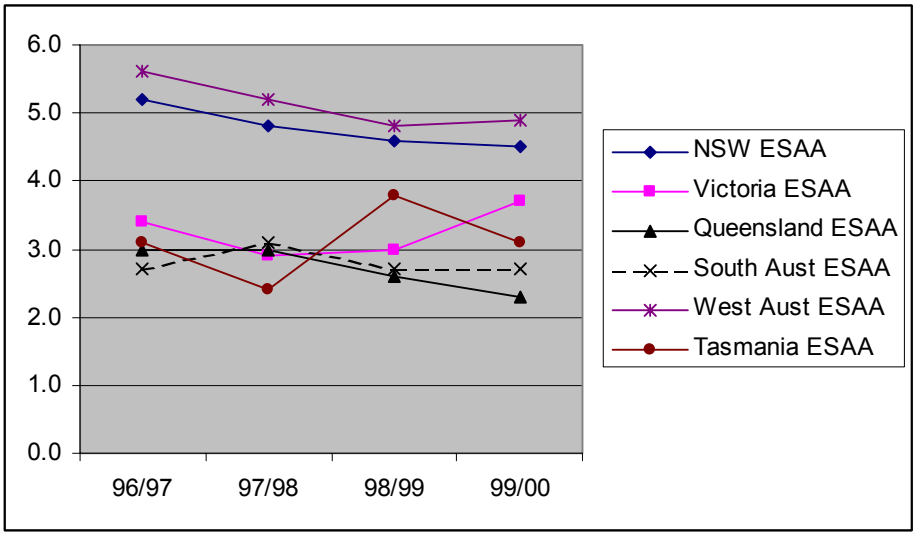
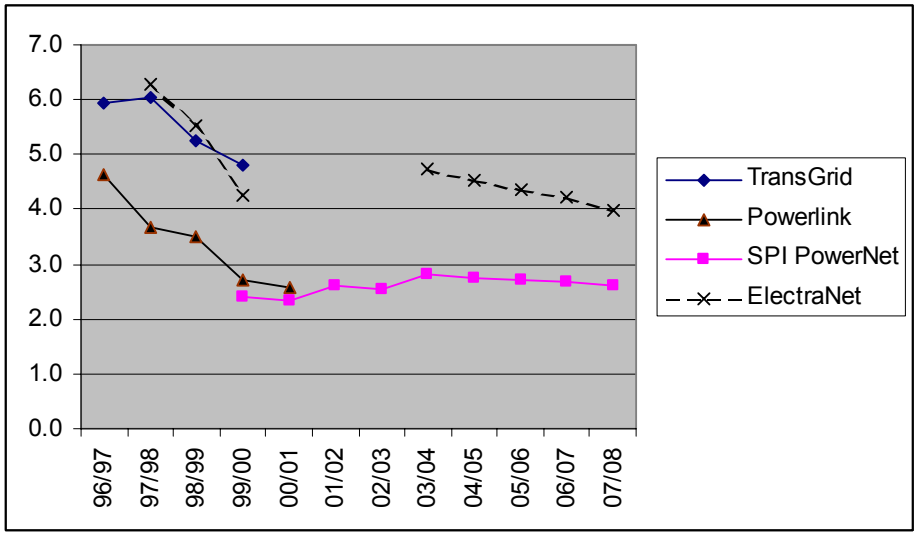


**Figure 9 OPEX per Asset Value (%) - based on overall costs**




ElectraNet SA costs are higher when the overall costs are considered. SPI PowerNet costs are in line with those for Powerlink. TransGrid costs in both cases exceed those of both Powerlink and SPI PowerNet and are similar to ElectraNet SA.

Figure 10 and Figure 11 show operating costs against MWh for ESAA sourced information and overall company information.

**Figure 10 - OPEX per MWh ($) - based on ESAA information**

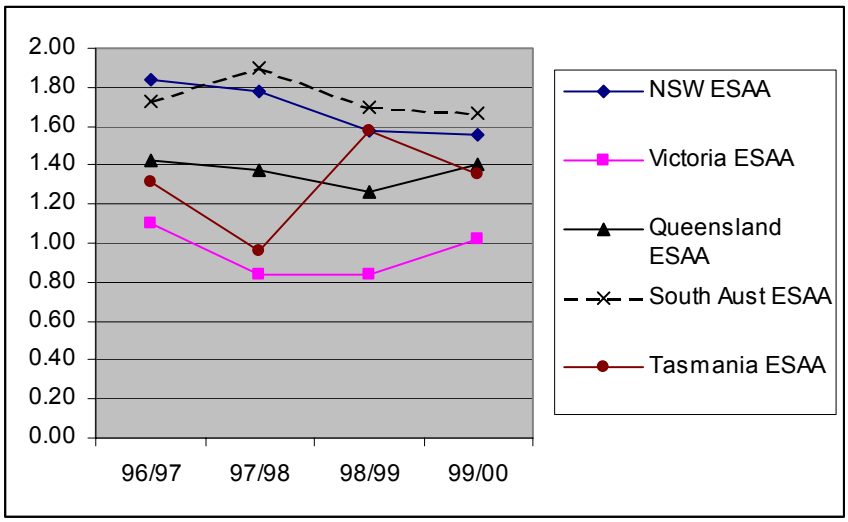
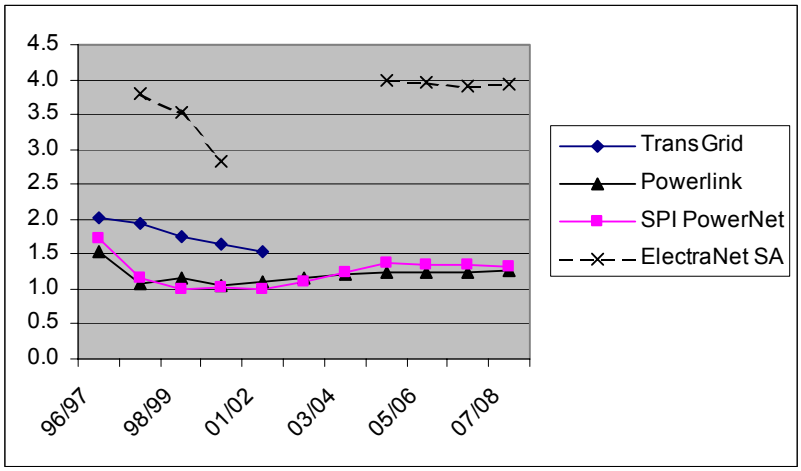


**Figure 11 - OPEX per MWh - based on overall costs**




SPI PowerNet operating costs per MWh are the lowest in both Figure 10 and Figure 11. When overall costs are considered, Powerlink costs are similar to SPI PowerNet.

Figure 12 shows the overall operating costs per circuit km. Historical overall costs for SPI PowerNet and Powerlink are similar but Powerlink projected costs are lower. The graph does not make any allowance of increasing circuit km from 2001/02.

**Figure 12 OPEX/1000 circuit km ($) - based on overall costs**

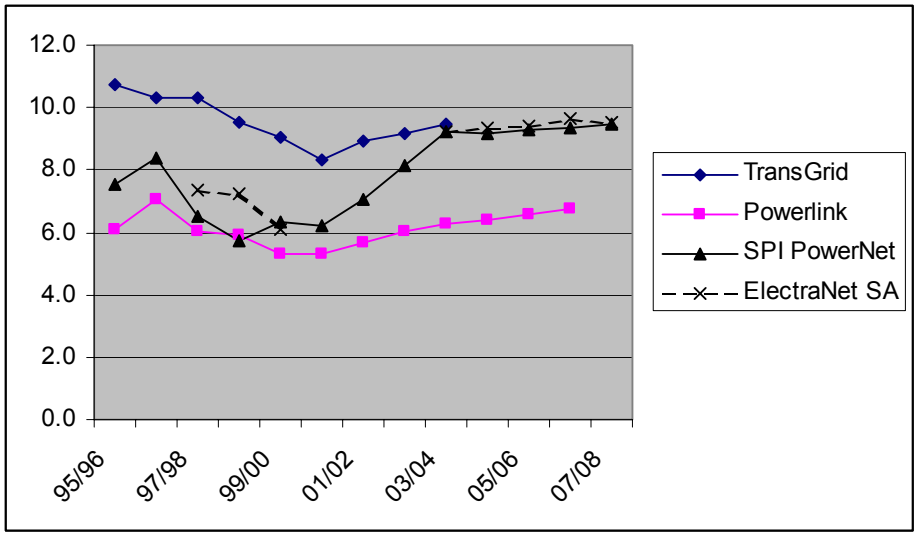
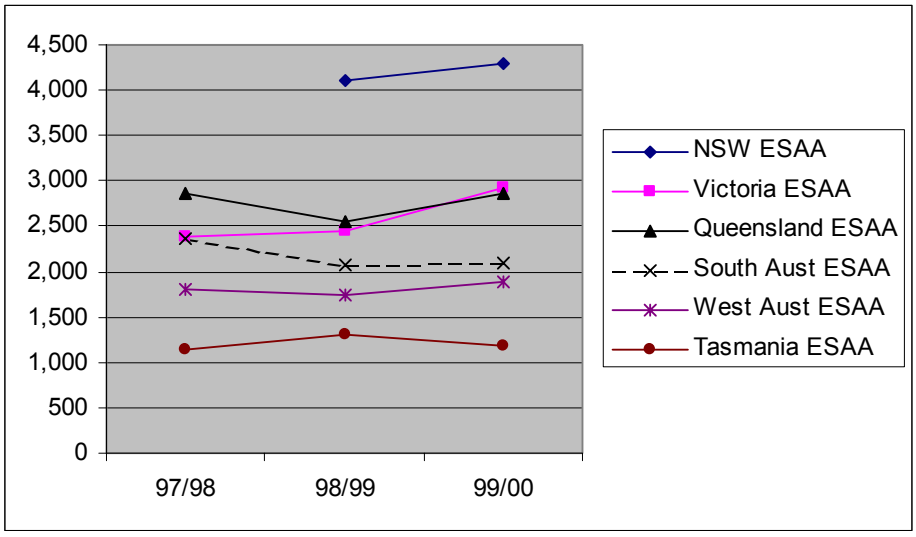



Figure 13 shows the operating costs per maintenance unit based on ESAA information. Maintenance units take into account the varying workloads on transmission lines against substations. For this measure, SPI PowerNet costs are comparable with those for Powerlink and less than those for TransGrid. ElectraNet SA costs are lower reflecting the greater number of maintenance units.

**Figure 13 OPEX per Maintenance Unit - based on ESAA information**




## 7.4 SUMMARY

From 1995/96 to 1999/00, SPI PowerNet achieved cumulative reduction of $60m nominal due to reductions in staff numbers and a range of rationalising initiatives.

Performance comparisons can establish whether a particular company is in the “correct” space but not necessarily establishing the precise relative position. From 1995/96 to 1999/00, SPI PowerNet achieved cumulative reductions of $60m nominal due to reductions in staff numbers through a range of rationalising initiatives.

SPI PowerNet has participated in International Transmission Operations and Maintenance Study (ITOMS) for the past five years. Over 60% of SPI PowerNet, direct costs are included in this study. In both substations and transmission lines SPI PowerNet is one of the top performers, surpassing the Australasian average. Over the last three studies (carried out every two years), SPI PowerNet has made significant improvements.

Comparisons of operating costs per asset value and operating costs per MWh shows SPI PowerNet to be comparable with Powerlink and more efficient than TransGrid and ElectraNet SA. Powerlink has lower operating costs per circuit km than SPI PowerNet. On a maintenance unit basis, Powerlink and SPI PowerNet are not as good as ElectraNet SA but much better than TransGrid.

# 8. CONCLUDING REMARKS

## 8.1 SPI POWERNET FORECAST EXPENDITURE

SPI PowerNet is showing an increasing trend in operating expenditure, after achieving significant reductions in operating costs in earlier years. The increase is due to increasing asset age and deteriorating asset condition along with changes to business scope (e.g. transfer of VNSC and revision of rebate scheme). Asset management practices are considered effective with some improvements identified. Cost allocations between regulated and un-regulated along with the treatment of common costs and overheads are considered appropriate.

SPI PowerNet does not face grid support costs, as was the case for Powerlink. If any were applicable, they would be included in VENCorp operating costs.

## 8.2 SPI POWERNET BENCHMARKS

Independent benchmarks show SPI PowerNet to be a very efficient transmission operator.

However, it should also be noted that most external factors affecting operating expenditure and reliability are more favourable to SPI PowerNet compared to other states. These include:

- The network covers a comparatively small area. Further, a very high proportion of network is either in, or close Melbourne
- The network contains only a limited number of radial spurs
- There are no light 110kV lines on the network

## 8.3 EXTERNAL AND INTERNAL INFLUENCING FACTORS

A number of influencing factors that create uncertainty in operating expenditure over the 2003-2008 regulatory period include:

- The Commission's review of service standard may affect the level of operating expenditure although the rebate scheme provides an arrangement similar to that which may result from the review. In any case, SPI PowerNet has noted that it would want to revisit its operating expenditure based on the outcome of the Commission's service standard work.
- Industry restructuring
- Weather and environmental factors could result in extraordinary maintenance expenditure although SPI PowerNet have maintained responsibility for these as part of the non-risk allowance and would not seek an additional pass through following such an event.

## 8.4 EFFICIENCY AND EFFECTIVENESS OPPORTUNITIES

SPI PowerNet considers that the only significant opportunities for further cost reduction will derive from innovation and are not expected to manifest in the 2003-2008 regulatory period. Better asset management plans may provide further opportunities for cost savings. SPI PowerNet has more than adequately mitigated risks in its operating expenditure forecast.

# 9. GLOSSARY OF TERMS AND ABBREVIATIONS

| | |
|---|---|
| ACCC | Australian Competition and Consumer Commission |
| CAPEX | Capital Expenditure |
| ESC | Emergency Services Commission |
| 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 |
| OPEX | Operating expenditure |
| TNSP | Transmission Network Service Provider |
| VNSC | Victorian Network Switching Centre |

# 10. REFERENCE DOCUMENTS


- ACCC decisions for TransGrid and Powerlink revenue caps
- Company Annual Reports
- ESAA Electricity Australia.
- SPI PowerNet's Revenue Cap Application for the period 1 January 2003 to 31 March 2008 and associated appendices
- Supplementary information supplied by SPI PowerNet to PB Associates
- Transmission Revenue Cap Commencing January 2002, Powerlink, February 2002. Powerlink application to ACCC
- Transmission Network Revenue Cap Application 2003 – 2007/08 ElectraNet SA 16 April 2002