PB ASSOCIATES

REVIEW OF

VENCorp Overall Operating Expenditure

CONFIDENTIAL

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 VENCorp regulatory revenue application in respect of operating and augmentation expenditure. The review was undertaken by PB Associates for the Australian Competition and Consumer Commission.

Relevant background and main findings of the review are as follows:

I. VENCorp performs statutory and non-statutory functions in the gas and electricity industry in Victoria. Electricity functions are the provision of shared electricity transmission network services from owners under long-term service contracts, planning and directing augmentation, management of electrical emergencies, technical compliance monitoring and demand-side management. VENCorp is required to perform in a commercially neutral and cost effective manner.

II. VENCorp operating expenditure is composed of payments to SPI PowerNet for prescribed services, internal operational expenditure for the running of VENCorp and annual fees ('charges') for augmentations. As VENCorp is a not-for-profit organisation with contestable augmentation works, it is proposing to only cap internal operating expenditure and pass through the costs of prescribed services and annual augmentation costs. VENCorp proposes to adjust TUoS charges annually to reflect the actual operating costs. Payments to SPI PowerNet for prescribed services are constrained by the revenue cap set by the commission.

III. The approach being proposed by VENCorp is different from the normal CPI-X approach adopted for other TNSP's by the Commission, in that all variations from forecast operating costs will be reflected in adjustments to the TUoS charges payable by network users. However, all VENCorp's costs, except the relatively small cost of running its own operation are already either contestable or subject to regulatory oversight. Cost overruns cannot be absorbed internally and therefore, in the case of VENCorp, it is not clear what purpose is served by using an incentive based regulatory model. The planning and forecasting methodologies used and the processes in place should ensure that only necessary expenditure is committed. The approach proposed by VENCorp should deliver acceptable regulatory outcomes. The Commission may wish to consider setting a level of annual augmentation expenditure (or aggregate level over the regulatory period) below which VENCorp would not be required to seek a pass through approval from the Commission.

IV. The forecasts for VENCorp's operating expenditure have been based on the assumption that there will be no significant change in their TNSP function or change cost allocation due to organisation restructuring. In estimating the annual cost of planned augmentations, VENCorp has adopted the WACC and proposals for operating charges for augmentations outlined in SPI PowerNet application to the Commission. Cash flows will need to be revised once the Commission finalises its SPI PowerNet decision. No specific allowance for grid support payments has been made on the basis that VENCorp will always implement the most cost effective solution.

V. PB Associates considers, given the overall impact of the additional responsibilities, that the increase of $0.7m in internal operating expenditure over the regulatory period is appropriate. Planned annual augmentation charges are based on the lowest cost scenario. VENCorp cost movements from the historical levels to those proposed in the regulatory period are considered appropriate. The historical net operational expenditure has been significantly influenced by the impact of interest income but this has been forecast to reduce due to interconnector and NEM pricing changes. The mechanism for allocating costs is considered appropriate. VENCorp has not set targets for reducing controllable costs on the basis that their application is based on delivering services on an efficient cost of service basis, and they are a not-for-profit organisation managed by a Board which has a number of Directors drawn from participant organisations.

VI. VENCorp uses a probabilistic approach to the planning of network augmentations. This is resulting in deferral of network augmentation investment. The VENCorp planning process used to justify all augmentations satisfies part (b) of the regulatory test, i.e. the market benefits

test. VENCorp has undertaken sufficient analysis to justify the majority of planned projects in the application in accordance with the regulatory test (i.e. projects which are not yet at the detailed planning stage have had the regulatory test applied except for the detailed analysis accounting for market scenarios and sensitivity studies, and assumed levels of load shedding and re-dispatch). PB Associates is therefore satisfied that the VENCorp planning process undertaken is a reasonable and robust process and ensures that only necessary and efficient expenditure is included in the forecast.

VII. The load forecasts assumed in the planning process are a significant factor in defining the network augmentation requirement. PB Associates considers that the process employed by VENCorp in the development and application of the load growth forecasts is reasonable and in accordance industry best practice. It is also evident from our review that the use of short-term ratings, dynamic ratings, network operation and control have been considered where appropriate.

VIII. Although non-network options were not explicitly studied, the probabilistic economic modelling implicitly accounts for economic support from generators. It would be expected that within the consultation process required during performance of the regulatory test, non-network solution proponents may arise and could price their service below the expected network solution charge. It is also important to note that a level of embedded generation and demand side response is allowed for in the load forecasts used in the planning process.

IX. Due to the limited amount of network augmentation investment in recent years on the Victorian system, VENCorp appears to have limited historical cost information. It is also important to note that for augmentation work, VENCorp only pays a service charge. These issues appear to limit the ability of VENCorp to maintain a cost database based on actual historical costs and market impacts. We would expect that the tendering process applied by VENCorp should produce some efficiency that could be factored into project costs estimates. The budgetary capital cost estimate used for the planned projects appear reasonable for the scope of works, noting the large variance that is expected in this estimation ($\pm$ 20 %).

X. Augmentations implemented by VENCorp on a contestable basis are considered outside the regulated asset base of the TNSP (i.e. if provided by another TNSP) providing the service but these assets could still require optimisation at some time in the future. VENCorp argues that the optimisation risk is low, given that it has no commercial interest in developing or owning transmission assets and a governance arrangement to ensure only cost effective investments are made. PB Associates would agree that the risk of asset stranding is low, particularly in the short term. VENCorp typically contracts for a shorter period for contestable augmentations than for non-contestable augmentations with SPI PowerNet to minimise the total present-valued life cycle costs.

XI. VENCorp has developed guidelines for determining if an augmentation project is to be contestable or non-contestable. Typically, projects above $15m are considered contestable, depending on how embedded that the augmentation is, whether it would be practical for a third party to implement, whether it is operationally feasible (can be separated from other services), whether there is a competitive market and the timing required. In order the evaluate the implementation of proposed planning decisions, PB Associates reviewed confidential VENCorp Board papers for two projects. PB Associates is satisfied that for the two projects reviewed, the process followed was appropriate and the decisions confirmed by the VENCorp board satisfied the criteria outlined on which the evaluation would be based.

XII. Direct cost comparisons of VENCorp against other TNSP's are difficult as the VENCorp equivalent function is embodied within both TransGrid and Powerlink. Taking into account the differing augmentation plans and possible accounting treatment for capitalising staff costs for project work by Powerlink and TransGrid, VENCorp's net operating expenditure is considered to be lower than that of Powerlink and TransGrid's higher than Powerlink.

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 requirements for the non-contestable elements of the transmission services provided by the Victorian transmission network manager, VENCorp, from 1 January 2003. The Commission expects to release a draft decision in August 2002.

VENCorp 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 30 June 2008[1].

PB Associates has been engaged to review VENCorp's revenue requirements for operational and augmentation expenditure requirement over the regulatory period to establishing the appropriate revenue cap. Augmentation expenditure consists of existing committed work and future proposed work, which is then presented as annual charges based on an assumed WACC, depreciation factor and maintenance charges that VENCorp incurs.

This report is a review of VENCorp's overall operational expenditure requirement over the regulatory period.

A review of operating expenditure and network augmentation expenditure is required to assist the Commission in assessing the performance of VENCorp relative to the requirements of the Chapter 6 and clause 9.8.4 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 seeks 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 overall operating expenditure forecast stated in VENCorp'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 required this review to analyse and comment on the following matters in relation to the contribution of operating expenditure to VENCorp PowerNet's delivery of transmission services:

- an assessment of whether VENCorp'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;
- an assessment of VENCorp's operating expenditure 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;

[1] VENCorp's Revenue Cap Application for the period 1 January 2003 to 30 June 2008.

- the appropriateness of VENCorp's allocation of operating 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 VENCorp's operating practices and asset management system in ensuring that only necessary (and efficient) operating 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 operating 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 VENCorp. 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 Commission and VENCorp in carrying out this review.

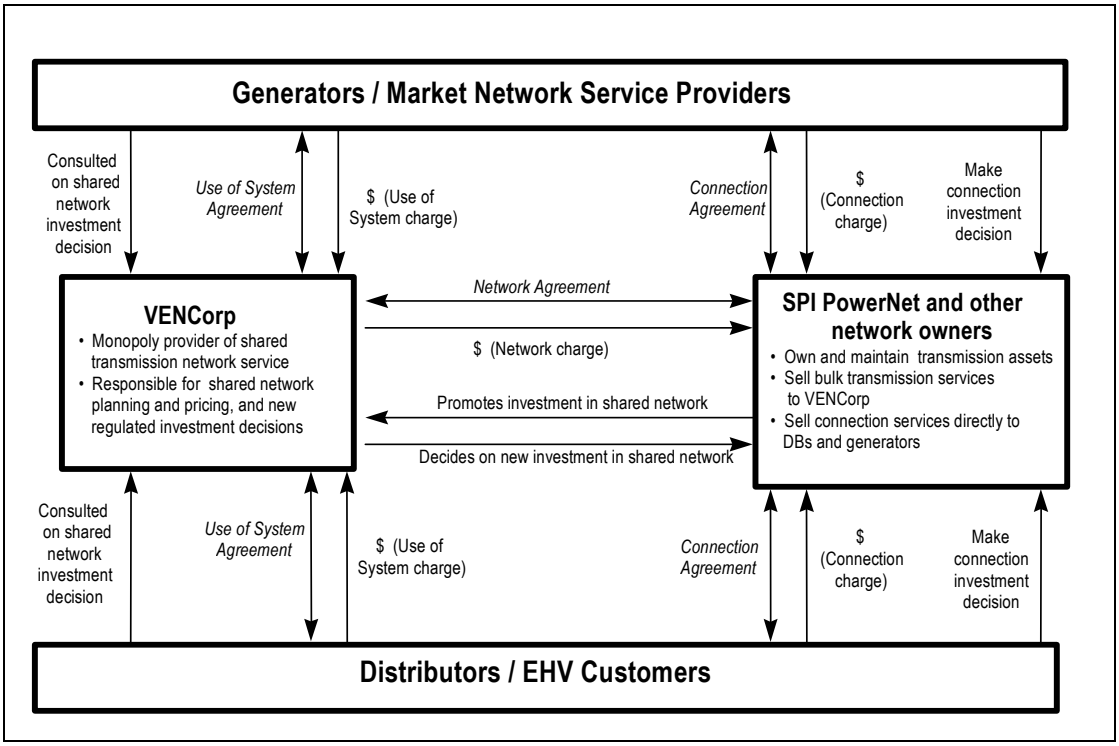
2. BUSINESS OVERVIEW

2.1 BUSINESS STRUCTURE AND FUNCTIONS

VENCorp performs statutory and non-statutory functions in the gas and electricity industry in Victoria. One of the core functions is the provision of shared electricity network services. The shared network is the main extra high voltage network that provides or potentially provides supply to more than one single point. This includes all lines rated above 66kV and main single tie transformers that operate between two voltage levels above 66kV.

VENCorp does not own transmission assets or have any commercial interest in developing or owning transmission assets. Figure 1 shows the commercial relationships in Victoria.

Figure 1 Commercial Arrangements



VENCorp is a non-profit making organisation established by the Victorian Government to manage the provision of shared network transmission services in Victoria. It obtains the bulk of its revenue through use of system charges paid by generators, distributors and other users of the shared network. These charges are levied under the terms of Use of System agreements, which VENCorp signs with the network users. VENCorp also obtains revenue from settlement residues received from NEMMCO.

In turn VENCorp procures bulk shared network services from TNSP's under long term take or pay contracts. VENCorp can execute such contracts with:

- SPI PowerNet for prescribed services
- SPI PowerNet for non-contestable services
- Service Providers for services provided under contestable contracts.

Under this arrangement, and unlike the situation in other States, users of the network in Victoria do not contract directly with the asset owners for use of the *shared* network.

Prescribed services (as distinct from non-contestable services) are those provided by SPI PowerNet to cover the levels required as of 3 October 1994 plus a limited number of augmentation projects over the period 1994/95 to 1999/00 that were identified in 1994 as being required.

Augmentations to the shared network are arranged by VENCorp and can be provided on a non-contestable basis by SPI PowerNet or on a contestable basis by any service provider (including TNSPs), including SPI PowerNet.

It is anticipated that non-contestable services provided by SPI PowerNet will form part of the SPI PowerNet, regulated asset base along with the prescribed services, from the beginning of the regulatory period following the date of commissioning. Between the date of commissioning and the beginning of the following regulatory period VENCorp would pay SPI PowerNet an agreed charge for the services, which would be included in VENCorp's augmentation operating expenditure.

Contestable contracts between VENCorp and TNSP asset owners do not form part of that TNSP's regulated asset base. These contestable contracts are based on annual charges, which also form part of the augmentation operating expenditure of VENCorp.

Hence the electricity related functions carried out by VENCorp can be summarised as:

- provision of shared electricity transmission network services to customers under long term service contracts;
- procurement of bulk electricity transmission services from network owners under long term contracts;
- planning and directing augmentation of the shared electricity network to meet existing and future customer needs
- provision of services and support to NEMMCO pursuant to the National Code to ensure secure operation of the power system;
- management of electrical emergencies, technical compliance monitoring, administering the Victorian Government's Special Powers Payment scheme to rural and regional domestic customers, and facilitation of demand-side management and
- provision of information to facilitate decisions for economically efficient investment in the electricity industry.

As a not-for-profit organisation VENCorp is explicitly required to deliver its services, and to perform is functions, in a commercially neutral and cost effective manner. VENCorp is governed by a Board of up to ten directors from the gas and electricity industry and appointed by Governor-in-Council. The Board approves goals and direction, considers strategic plans, approves performance targets and provides overall policy guidelines.

There is no equivalent organisation to VENCorp in other states participating in the NEM. In these other states, such as Queensland and NSW, planning for and direction of the implementation of network augmentations is carried out by the incumbent monopoly TNSP (Powerlink and TransGrid respectively).

It should be noted that, in Victoria, these arrangements apply to the shared network only. VENCorp is not involved in the provision of connection assets, which are those parts of the transmission system that are dedicated to the connector of generator(s) or customer(s) at a single point and which connect these customers to the shared network. These assets are provided by TNSP's, which contract directly with connection customers (e.g. Distribution Businesses) to meet their requirements for connection assets.

Key business functions associated with electricity within VENCorp are network development, system performance, load forecasting and reliability together with energy strategy. Of the 96 VENCorp employees in 2000/01, 20 full time equivalents were involved in electricity.

2.2 OVERVIEW OF VICTORIAN NETWORK

Figure 2 and Figure 3 provide an overview of the Victorian transmission network and Table 1 transmission network parameters for NEM participants. Currently SPI PowerNet, owns the whole of the transmission network in Victoria, except for 500/220 kV interconnecting transformers at Rowville terminal station.

Figure 2 Victorian Transmission Network

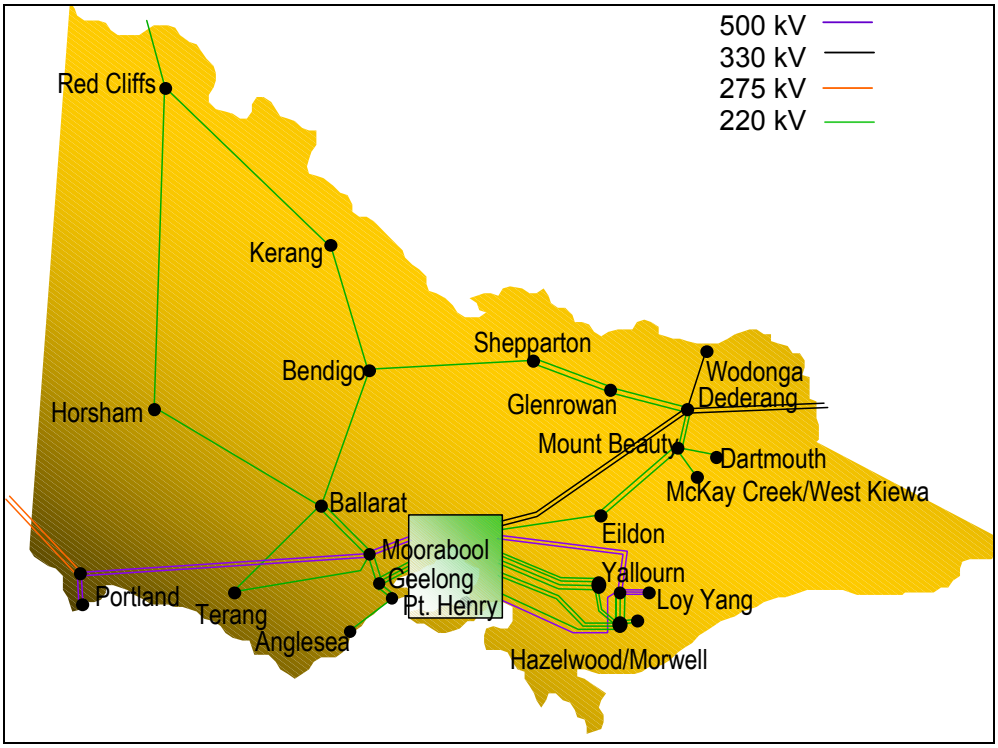


Figure 3 Melbourne Metropolitan Transmission Network

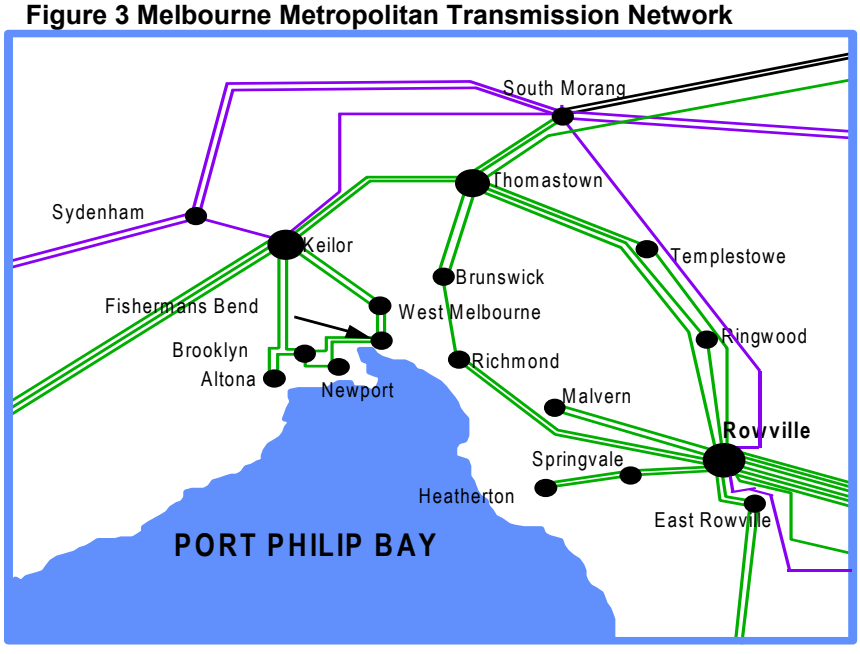


Table 1 Network Parameters for Australian NEM Participants

	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
Cables	12	20	11	-

Note: Energy delivered based on ESAA generation sent out plus interconnectors with other states

In Victoria, 500kV lines connect generators in the Latrobe Valley in the southeast of the State to Melbourne and then on to the major smelter load in the southwest and the interconnection with South Australia. 330kV lines interconnect with NSW and 275kV lines with South Australia. 220kV lines service the rest of Victoria.

SPI PowerNet and TransGrid are the only companies with 500kV lines, with SPI PowerNet having only two lines below 220kV (East Rowville to Frankston and Morwell to Loy Yang) . All other companies have significantly more substations than SPI PowerNet with Powerlink and TransGrid having about twice the length of line than both SPI PowerNet and ElectraNet SA. Powerlink, TransGrid and ElectraNet SA (there is some state planning function in SA) are responsible for planning and implementing network augmentations whereas in Victoria the responsibility for shared network augmentation is with VENCorp. In SA, the Planning Council also provides an overview of planning.

Performance comparisons to assess the efficiency with which VENCorp undertakes its network management and planning activities are difficult as similar services are embedded within other TNSP's. Factors such as environment, network age and design, customer requirements and accounting practices influence such comparisons No one measure will provide an absolute comparison, as the various stakeholders will have different perspectives. For example, rural customers with low energy use at the end of long lines are more likely to be concerned about costs per km whereas urban customers are more likely to be concerned about costs per MWh of energy.

2.3 SUMMARY

VENCorp performs statutory and non-statutory functions in the gas and electricity industry in Victoria. One of the core function is the provision of shared electricity transmission network services from owners under long-term service contracts, planning and directing augmentation, management of electrical emergencies, technical compliance monitoring, demand-side management and providing information to facilitate decisions for economically efficient investment in the electricity industry. Of the overall 96 VENCorp employees in 2000/01, 20 full time equivalents were involved in electricity.

VENCorp is a not-for-profit organisation that is explicitly required to deliver its services, and to perform is functions, in a commercially neutral and cost effective manner. It

obtains the bulk of its revenue for electricity related services through use of system charges paid by generators, distributors and other uses of the shared network.

In turn VENCorp procures bulk shared network services from TNSP's under long term take or pay contracts. It can execute such contracts with:

- SPI PowerNet for prescribed services;
- SPI PowerNet for non-contestable augmentation services
- SPI PowerNet and/or other TNSP's for contestable augmentation services

SPI PowerNet and TransGrid are the only companies with 500kV lines, with SPI PowerNet having only two lines below 220kV. All other companies have significantly more substations than SPI PowerNet with Powerlink and TransGrid having about twice the length of line than both SPI PowerNet and ElectraNet SA.

Performance comparisons for VENCorp are difficult as similar services are embedded within other TNSP's. Other factors such as environment, demand growth, network age and design, customer requirements and accounting practices also influence comparisons. No one measure will provide an absolute comparison, as the various stakeholders will have different perspectives.

3. EXPENDITURE OVERVIEW

3.1 BACKGROUND

VENCorp's operating expenditure is comprised of payments to SPI PowerNet for proscribed services, internal expenditure for the running of VENCorp's transmission related activities and annual charges for augmentations. As indicated in Section 2.1, VENCorp implements augmentations on either a contestable or non-contestable basis. A specific contract is prepared for each augmentation with payment for services based on annual charges, except where provision is made for SPI PowerNet to roll in augmentation assets to the RAB from the beginning of the following regulatory period.

Payments to SPI PowerNet for prescribed services are constrained by the revenue cap set by the Commission.

The different financial treatments for augmentations are:

- contestable augmentations are implemented by competitive tender. VENCorp pays the service provider (which may be a TNSP) an agreed annual charge; or
- non-contestable augmentations are where VENCorp seeks a sole source price from a TNSP with payment again based on an annual charge. The cost of such augmentations is agreed between VENCorp and the augmentation provider, usually SPI PowerNet, with the cost subject to oversight by the ESC. Further, in the case of SPI PowerNet, there is the ability for these augmentations to be rolled into the Regulated Asset Base (RAB) at the beginning of each regulatory period.

As VENCorp is a not-for-profit organisation all operating costs must be effectively passed through at cost to the users of the shared network. While costs for prescribed services are regulated through the SPI PowerNet revenue cap, an incentive based regulatory mechanism may not be appropriate for regulating its other operating costs, given that VENCorp is not structured as a profit-making organisation.

3.2 MANAGING REVENUE

VENCorp is proposing to recover on an annual basis, its actual net operating expenditure on a full cost recovery basis. It is proposing an aggregated net operational expenditure of $31.5m (excluding the payment to SPI PowerNet for prescribed services) for the 5½ years and budgeting to ensure that annual expenditures do not exceed the annual forecast level. It may in any one year recover more that the forecast level, but would still maintain the aggregate net operational expenditure cap over the longer term.

For augmentation work, VENCorp is proposing that any forecast costs in excess of those set out in their application should be permitted, subject to the augmentation being justified under the Regulatory Test (if required) and approved by ACCC. Only the actual augmentation expenditure would be recovered.

VENCorp is proposing to cover its actual cost by adjusting TUoS charges annually based on the actual expected level of overall expenditure required. These adjustments would be subject to the approval of the Commission.

VENCorp is also proposing the budgets would be subject to CPI, and that under/over recovery of costs should be carried forward from year to year including transition effects from Victorian Electricity Supply Tariff Order and provisions from changes in National Electricity Code or other relevant instruments.

The approach being proposed by VENCorp is different than the normal CPI-X approach adopted for other TNSP's by the Commission. In these other situations, a revenue cap is applied taking into account operating expenditure, the asset base requirements, capital programmes, service levels, WACC and importantly an allowance for profit. VENCorp, as a not-for-profit entity, is only proposing a "cap" on the net operating expenditure that would be set by the Commission, although its application provides for its TUoS charges to be adjusted annually to provide for variations between actual operating costs and the "cap" set by the Commission. Costs relating to augmentation works would be treated as pass through and would be recovered by adjusting TUoS charges in the year the assets entered service.

The purpose served by setting a revenue cap at the beginning of a regulatory period is not clear. All VENCorp's costs, except the relatively small cost of running its own operation are already either contestable or subject to regulatory oversight. Given that VENCorp is a not-for-profit organisation, cost overruns cannot be absorbed internally. The demonstrated rigour of the planning and forecasting methodologies used and the processes in place to ensure that only necessary expenditure is committed, should ensure that costs remain under tight control and that the approach proposed by VENCorp will deliver acceptable regulatory outcomes.

In this regard, the review carried out by PB Associates is not so much an in depth assessment of an appropriate revenue cap, but rather an appraisal of VENCorp's processes for controlling augmentation expenditure and an analysis of VENCorp's forecast of its own operating costs and the probable costs of augmentation over the next five years of the regulatory period.

The Commission may wish to consider setting a level of annual augmentation expenditure (or aggregated level over the regulatory period) below which VENCorp would not be required to seek a pass through approval from the Commission. VENCorp could still be required to apply an appropriate test to ensure the expenditure was necessary. Under this option, VENCorp would need to seek the Commission's approval for work above the approved level(s), before proceeding with the augmentation work.

3.3 OPERATING EXPENDITURE

When VENCorp seeks prices for augmentations, these can either be on a contestable or non-contestable basis.

Contestable augmentations are commissioned by VENCorp by competitive tender. On this basis the cost of such augmentations is not subject to regulatory oversight. However, contestability is generally only used for augmentations with a cost in excess of $15m and where the assets can be effectively managed by a separate service provider. The Commission requires such projects to be subject to a Regulatory Test, to ensure the expenditure is both necessary and efficient, before they are allowed to proceed.

Non-contestable augmentations are those provided to VENCorp on a sole source basis by SPI PowerNet. These augmentations would be subject to the Commission's oversight and the assets would be expected to form part of the regulated SPI PowerNet asset base at the next revenue reset.

VENCorp proposes that the regulatory period be for a period of five and half years from 1st January 2003 to 30th June 2008. The first six months would be a transition period from the Victorian Electricity Tariff Order to align the regulatory period with VENCorp's and the Code's financial year.

The forecasts for VENCorp's operating expenditure have been based on the assumption that there will be no significant change to the TNSP function undertaken by VENCorp or significant changes in organisation structure of VENCorp, which may impact on the allocation of overheads to VENCorp electricity functions.

In estimating the cash flow for planned augmentation, VENCorp has assumed the WACC and proposals for operating charges for augmentations outlined in SPI PowerNet's application to the Commission.

In preparing the forecasts, VENCorp has not included any costs for ancillary services that would be expected to be included in TUoS. These are currently purchased, and the costs recovered, by NEMMCO.

Grid support payments formed a significant component in Powerlink's revenue cap application. VENCorp has made no specific allowance for grid support payments to generators in their revenue application. When a full project has been justified, VENCorp would typically seek offers for the network solution or alternative offers (such as grid support contracts with appropriate generators), and seeks to recover these costs via TUoS. The augmentation plan is based on a range of scenarios and the annual cost reflected in the plans. If grid support costs were lower than proceeding with an augmentation, this approach would be adopted, still within the previously projected annual augmentation costs.

Some projects initiated by VENCorp are excluded from TUoS and from the operating expenditure projections. These are situations where a specific customer has requested an augmentation to the shared network, generally as part of a new or modified connection, and therefore may not meet the regulatory test. The customer would be expected to fund such a project directly. Examples of these types of projects are the Yallourn reconfiguration and MurrayLink connection.

SPI PowerNet has made provision in its revenue cap application for $6m pa for availability incentive payments within the prescribed services payment. This is the expected cost to SPI PowerNet that would be paid to VENCorp. The actual availability incentive payment would depend on SPI PowerNet's performance. VENCorp would pass these payments through to customers by adjusting the TUoS charges on an annual basis.

3.4 VENCORP OVERALL OPERATING EXPENDITURE

Table 2 shows the overall revenue requirement specified by VENCorp.

Table 2 Overall Real Revenue Requirements

Overall Revenue Requirement	Forecast Financials (in 2002 $M) for Year ending 30 June					
	2003 6 mths	**2004**	**2005**	**2006**	**2007**	**2008**
Net Operational Expenditure	2.7	5.4	5.5	5.9	5.9	6.1
Committed Annual Augmentation charges	5.9	10.9	10.6	10.2	9.7	9.5
Planned Annual Augmentation charges	0.2	3.6	7.5	12.2	15.6	17.2
Total VENCorp forecast expenditure	**8.8**	**19.9**	**23.6**	**28.3**	**31.2**	**32.8**

This report examines the net operating expenditure, committed annual augmentation charges and planned annual augmentation charges.

3.4.1 Net Operational Expenditure

The net operating expenditure increases by $0.7m over the regulatory period. The reasons given by VENCorp for this increase are:

- an increase in the requirement for technical and analytical capability to plan and facilitate significant augmentation works that are expected to be required over the period;
- an expected increase in connection applications from new generators;
- the new Network and Distributed Resources code change promulgated in February 2002, which imposes new obligations on consultation;
- the impact of further code changes arising from the Transmission and Distribution Pricing Review together with the impact of other NEM and code issues;
- an anticipated requirement to obtain local government planning and building permits for significant augmentations within the existing infrastructure or on greenfield sites;

PB Associates considers, given the overall impact of the additional responsibilities, that the increase of $0.7m in net operating expenditure over the period is appropriate. Section 7 will examine net operating expenditure in more detail.

3.4.2 Committed Annual Augmentation Charges

The committed expenditure is for payments to SPI PowerNet and other TNSP's for transmission services provided under existing long-term contracts. Contestable projects provided by SPI PowerNet remain outside SPI PowerNet's regulated asset base (classed as contestable services by SPI PowerNet). Typical projects have included capacitor banks, Rowville transformer augmentation, upgrades to 500kV lines and other minor works.

A number of committed and in-service projects with SPI PowerNet are to be rolled into SPI PowerNet's regulated asset base from 1st January 2003. These include the Victorian Network Switching Centre, battery duplication, Rowville transformer interface services and shunt capacitors. These costs are included in the SPI PowerNet prescribed service charges rather than the augmentation charges shown in Table 2.

The committed and in-service annual charges reduce from 2003/04 due to the nature of the contracts, with some short-term contracts beginning to roll out.

In Table 2, previously implemented non-contestable augmentations rolled into SPI PowerNet RAB on 1st January 2003 are included within SPI PowerNet revenue requirement and not within committed augmentations.

Section 6 reviews the process applied to committed and in-service projects to ensure the decision making process applied resulted in cost effective and appropriate solutions.

3.4.3 Planned Annual Augmentation Charges

Planned annual augmentation charges are based on the outcome of the Annual Planning Review, which contains details of the projects involved. Four different generation scenarios were considered. Two of the higher costed scenarios involve projects that may be built by other parties and involve a higher proportion of expenditure occurring later in the regulatory period, with consequential greater uncertainty.

If these higher cost projects satisfy the regulatory test, VENCorp would make an application to the Commission for pass through of the additional costs.

The projected annual cost of the scenario on which the projection in Table 2 is based, used the scenario capital cost and the WACC rate and O&M charge methodology presented in SPI PowerNet's revenue application.

Sections 4 and 5 will consider in more detail the planning process and projects proposed as part of planned augmentation charges.

3.5 SUMMARY

VENCorp operating expenditure is composed of payments to SPI PowerNet for prescribed services, internal operational expenditure for the running of VENCorp and annual charges for augmentations. As VENCorp is a not-for-profit organisation with contestable augmentation works, it is proposing to only cap internal operating expenditure and pass through the costs of prescribed services and annual augmentation costs. VENCorp proposes to adjust TUoS charges annually to reflect the actual operating costs.

Payments to SPI PowerNet for prescribed services are constrained by the revenue cap set by the commission.

The approach being proposed by VENCorp is different from the normal CPI-X approach adopted for other TNSP's by the Commission, in that all variations from forecast operating costs will be reflected in adjustments to the TUos charges payable by network users. However, all VENCorp's costs, except the relatively small cost of running its own operation are already either contestable or subject to regulatory oversight

Given that VENCorp is a not-for-profit organisation, cost overruns cannot be absorbed internally and it is therefore not clear what purpose is served by using an incentive based regulatory model.

The planning and forecasting methodologies used and the processes in place should ensure that only necessary expenditure is committed. This means makes the approach proposed by VENCorp should deliver acceptable regulatory outcomes.

The Commission may wish to consider setting a level of annual augmentation expenditure (or aggregate level over the regulatory period) below which VENCorp would not be required to seek a pass through approval from the Commission. VENCorp would still be required to apply the appropriate test e.g. Regulatory Test for this work.

VENCorp, under this option, would need to seek the Commission's approval for work above the preset level(s), before proceeding with the augmentation work.

The forecasts for VENCorp's operating expenditure have been based on the assumption that there will be no significant change in their TNSP function or change cost allocation due organisation restructuring

In estimating the annual cost of planned augmentations, VENCorp has adopted the WACC and proposals for operating charges for augmentations outlined in SPI PowerNet application to the Commission. Cash flows will need to be revised once the Commission finalises its SPI PowerNet decision.

VENCorp has made no specific allowance for grid support payments to generators in their revenue application on the basis that it selects the most cost effective solution when implementing planning decisions. Should grid support payments be required these would be a lower cost alternative to one of the planned augmentations.

PB Associates considers, given the overall impact of the additional responsibilities, that the increase of $0.7m in internal operating expenditure over the regulatory period is appropriate.

Committed annual augmentation charges reduce slightly over the period as some of the contracts roll out. Planned annual augmentation charges are based on the lowest cost scenario.

4. AUGMENTATION PLANNING

4.1 INTRODUCTION

The disaggregating of the network planning and ownership roles in Victoria, and the associated regulatory arrangements has resulted in a distinct difference for the impact of network augmentation planning on the revenue setting process. VENCorp has proposed that the planned augmentation projects' estimated capital expenditure and related service charges, although they may be used to set a revenue cap, should not be used to set the actual TUoS. The TUoS component due to the service payments for network augmentation investment would be based upon the actual charges following commissioning of the project. This project would only be initiated following the performance of the regulatory test and associated consultation, and tender process. This proposed setting of shared network augmentation TUoS is as applied in the present Victorian pricing arrangements.

It is also important to note that VENCorp is proposing only a small number of distinct planned projects, above those already committed, over the regulatory period. The timing and costs of these projects is beyond the control of VENCorp if the regulatory test is applied correctly. This small number of projects results in the total capital expenditure requirement being very sensitive to variations in individual project outcomes.

The sensitivity of the total network investment related charge to individual project outcomes would be expected to be greater than other TNSP's that have joint planning and maintenance functions, and therefore have a much larger number of projects over the revenue period. For these TNSP's, it would be expected that there would be some trade off in under and over recovery of individual projects resulting in a lower risk of a pass through requirement on a per project basis.

4.2 PLANNING PROCESS AND CRITERIA

Discussions have been held with VENCorp to better understand the planning process and criteria that is adopted by VENCorp, both with respect to that performed for the committed projects and planned projects in their submission.

The VENCorp planning process is summarised in its revenue application[2], and discussed in more detail in various public documents available from VENCorp, most notably, the 2002 Annual Planning Review (APR)[3], and the consultation documents produced by VENCorp relating to its recent review of its planning criteria.

VENCorp state within its Application that

> "*VENCorp's network planning is aimed at ensuring that the security of the power system can be maintained following the loss of the most critical transmission element at times of peak demand. However, VENCorp does not apply a deterministic (n-1) planning basis in considering the impact of transmission outages on supply reliability (that is, customer load shedding). Transmission investment decisions are based on a probabilistic analysis of energy at risk. That analysis includes consideration of the probability-weighted impacts on supply reliability of unlikely, high cost events such as single and multiple outages of generation or rotating reactive compensation plant, and unexpectedly high levels of demand. This approach provides a sound actuarial estimate of the expected value of energy at risk. However, implicit in its use is acceptance of the risk that there*

[2] Section 7.1 of VENCorp Revenue Application

[3] Sections 3.3 to 3.7, Appendix 2 and 3 of APR

may be circumstances when the planned capability of the network will be insufficient to meet actual demand."

The probabilistic planning approach adopted by VENCorp to justify network investment is different from the deterministic approach adopted by the other jurisdictions in the NEM. The VENCorp approach uses cost/benefit analysis to determine the appropriate timing for most shared network investment. The cost/benefit analysis must be performed for all credible options in order to define the preferred option and timing. The deterministic approach generally results in defining the need and timing for network investment to ensure compliance with a set of standards such as those defined under Schedule 5.1 of the Code or other standards defined in relevant transmission and system Codes. The preferred option is selected from a range of credible options through a cost minimisation exercise.

PB Associates would agree that the process and criteria adopted by VENCorp is consistent with part (b) of the regulatory test (i.e. the augmentation maximises the net present value of the market benefits), and as such is appropriate for determining the need and timing for shared network investment.

Generally, the additional work required to quantify the benefits and perform the cost/benefit analysis in the probabilistic planning approach results in an increased level of studies and analysis, over that required under a deterministic approach, to plan the future development of the network. The trade off in increased planning effort is the expected economic efficiency in network development. This makes the probabilistic approach suitable for network investment justifications, but can impose significant analysis burdens when used to produce longer-term network development plans.

VENCorp advised during the course of our review that the later projects in their ten-year planning review may have been planned using a more deterministic planning approach, with some subjective reasoning to account for the probabilistic impact.

For this reason PB Associates has examined the planning process and criteria adopted by VENCorp in determining the need, timing and cost of the projects listed in Section 7 of the VENCorp revenue application.

4.2.1 Overview of VENCorp Planning Process to Determine Network Investment

The following is a brief summary of the planning process as adopted by VENCorp to determine the requirement for network investment. The aim of this section is to assist in clarifying the relevance of items that will be addressed in the following sections. It should be noted that this is not an exhaustive description of the VENCorp planning process, and minor variations to that described here may occur if deemed appropriate by VENCorp.

Network analysis is performed to forecast power flows on the shared network. The network analysis is performed using power system models (e.g. PSS/E). These models contain a physical representation of the power system network. The models take a node point load forecast (i.e. load forecast of exit points to the transmission network) and a generation dispatch forecast, and simulates the real and reactive power flows on the network. The power flow can be assessed for a range of operation conditions (i.e. under different network configurations and contingency events).

The transfer capability of network components is assessed based upon thermal ratings, quality of supply and stability criteria.

Under deterministic planning criteria or for defining projects in the long term, the outputs of this stage (i.e. credible power flows above capability) can be used to initiate a project requirement and timing.

Under the probabilistic planning process adopted by VENCorp, the network analysis is used to define constraint equations. These equations define the power flow through a network element as a linear function of generation dispatch and regional loading levels. These equations are defined for critical network elements under specific network operating regimes (e.g. system normal, credible contingent event).

Probabilistic market modelling is undertaken using the VENCorp VISION software. This application takes annual load profile forecasts, and generation operating and outage parameters and cost data[4], and forecasts expected generation dispatch profiles for load profile scenarios.

The outputs of the VISION study, the constraint equations, and transfer capability information is processed to give a forecast of expected energy above capability. This is the energy transmitted through the network element that must be either load shed or removed through generation re-dispatch to alleviate an overload.

VENCorp has advised that to perform the regulatory test, further VISION studies are performed to ascertain the economic level of re-dispatch, the cost for this re-dispatch and hence the level that must be load shed. By applying VOLL to the energy that must be load shed, the total expected cost of the constraint could be calculated.

Prior to the requirement to perform the regulatory test, the total expected cost of the constrained energy is calculated by assuming the proportion of energy that is load shed and that removed due to re-dispatch. Due to the increased effort to perform the market modelling to determine the actual economic proportion, this would appear a reasonable approximation and PB Associates has not found any evidence indicating this assumption is being used to increase forecast network investment.

It should also be noted that the regulatory test also requires additional market modelling scenarios to be performed (e.g. generation dispatch based upon long run marginal cost (LRMC) bidding).

For supply type problems, such as when a node point or group of node points is supplied via a radial type network, in which a network element may exceed its capability, generation dispatch is not relevant. The energy above the capability can be assessed via a spreadsheet type analysis accounting for the load forecasts, power flows and associated probabilities in network elements, and equipment ratings. The expected energy above rating is then assigned a cost by applying VOLL.

Based upon the present value of the energy above rating costs and those related to network investment to remove the constraint (possibly including cost of losses and O&M if significant), the economic timing of network investments can be calculated and a preferred investment option selected based upon maximising the NPV (i.e. market benefit) across the options.

During the course of this review, VENCorp has supplied a summary of the planning process it follows in applying the regulatory test. This is contained in Appendix A of this report.

4.2.2 Load Forecasts

The requirement for network augmentation, and hence capital expenditure, is strongly dependent upon the level and pattern of demand on the network. Therefore, it is important to adopt a reasonably robust method of forecasting the load growth that is to be used to produce the capital expenditure forecast.

[4] VENCorp has stated that generation operating parameters and cost data is taken from public information from recent studies undertaken by the IRPC in assessing SNOVIC and SNI. See NEMMCO website.

The load forecasts used by VENCorp in the development of the capital expenditure forecast are based on two sources:

- The distributors and other customers connected to the Victorian transmission network have supplied 10-year forecasts of demand at each transmission connection point. These forecasts relate to a *most likely* economic growth and include a 10% and 50% probability of exceedance due to temperature. VENCorp collates these forecasts into a single document. This document is not made public as it is considered confidential by the distribution businesses. This document has been made available to PB Associates during the course of this review but has not been examined in detail.

- VENCorp also prepares its own forecast of the energy and demand for Victoria. This forecast is currently produced by the NIEIR. The NIEIR forecasts include a high, medium and low economic growth forecasts, and peak demand forecasts based upon 10%, 50% and 90% probability of exceedance due to temperature. Factors such as estimated levels of embedded generation, demand side response, and air conditioner uptake are included in the forecast. The forecast is summarised in Section 7.2 of the VENCorp submission and in greater detail in Section 4 of VENCorp's 2002 APR.

The forecast diversity of the peak demand between connection points has been estimated based upon historic records. Section 4.10 in the VENCorp 2002 APR shows a reasonable comparison of the DB and NIEIR forecasts. VENCorp has stated that the distributors' forecasts are used for node point forecasts with scaling based upon the NIEIR forecast to arrive at an appropriate gross forecast consistent with the NIEIR forecast.

The node point forecasts are required to assess network adequacy within PSS/E and supply issues where the spatial knowledge of the load is required.

Hour by hour load profile forecasts are generated from actual historic readings appropriate for relevant demand scenarios. These are scaled using the NIEIR forecast. These load profile forecasts applicable for the scenarios are input into the VISION market modelling application to derive appropriate generation dispatch profiles.

PB Associates considers that the process employed by VENCorp in the development and application of the load growth forecasts is reasonable and in accordance with accepted industry best practice.

4.2.3 Generation and Interconnection Flow Forecasts

VENCorp uses its VISION market modelling application to forecast generation and interconnection dispatch profiles based upon generation operating and outage parameters and costs. It should be noted that VENCorp advises that dispatch is calculated for the base case economic costs short run marginal cost (SRMC) as required by the regulatory test, rather than price predictions based upon commercial bidding strategies.

PB Associates agrees that this method of generating dispatch profiles is appropriate for forecasting network augmentation developments in the Application as it matches that required for performing the regulatory test.

VENCorp does not appear to have performed or commissioned any market analysis to forecast the most likely future generation developments. Generation developments appear to have been assumed based upon subjective reasoning. This has resulted in new generation being sited only at Latrobe Valley and embedded into the metropolitan region or sourced from additional import from Snowy/NSW. It is also important to note that the levels of new generation indicated in Table 7.3 of the VENCorp submission relate to 10-year requirements and not the regulatory period to which the projects relate. The level of new generation is staged for entry against the load forecast.

Although PB Associates would agree that it is reasonable to assume that the majority of new generation development will be in the Latrobe Valley and metropolitan regions, it would be expected that some generation may eventuate in the other locations such as the stage grid region[5], noting particularly the possible opportunities for future grid support in this region.

It is difficult to estimate the impact state grid generation will have on the capital plan proposed in the VENCorp Application. However, unless a significant amount of generation is located in the state grid region and offsets that assumed to be located in the Latrobe Valley and Metropolitan regions, which is less likely, then it would not be expected that the need or timing of the majority of projects in the VENCorp application would be changed significantly. It is also important to note that a reduction in network investment in the stage grid region due to grid support supplied by state grid generation may be offset somewhat by payments that may be required to procure that support at the service level required.

4.2.4 Equipment Ratings

VENCorp accounts for short-term ratings in its planning process, both for transformers and lines if appropriate.

For lines, it also applies a time sensitive thermal rating profile based upon an assumed time dependent ambient temperature profile and the temperature impact on overheads line thermal ratings. This has the effect of reducing energy above ratings from levels based upon a constant thermal rating, and hence defers augmentation.

This time dependant rating of lines within the planning process is possible due to the use of the System Overload Control Scheme (SOCS) utilised in Victoria. This system applies real time ratings to lines based upon real time measurements such as ambient temperature and line current.

PB Associates considers that the process employed by VENCorp in the application of the equipment ratings in its planning process is reasonable and in accordance with industry best practice. It is PB Associates' understanding that other TNSP's in the NEM do not currently use a time profiled line rating in their planning process in such a rigorous and objective manner.

4.2.5 Contingency Probabilities

The timing of network investment in the probabilistic planning process is dependent on the power system equipment outage rates (probabilities), both planned and unplanned.

VENCorp has advised that the following sources are used to assign probabilities:

- outage database maintained by SPI PowerNet, which contains historical planned and unplanned outage rates for the last 20 years;
- System Code, which includes defined benchmark performance levels; and
- other international sources such as CIGRE.

[5] VENCorp 2002 APR Section 5.2.3 – "*The 220 kV "State Grid" network supplies regional Victoria including terminal stations at Terang, Ballarat, Bendigo, Shepparton, Glenrowan, Kerang, Horsham, Dederang, Mt Beauty and Red Cliffs*"

The issue of appropriate outage rates has been discussed to some degree in the recent public consultation undertaken by VENCorp on its planning criteria. The use of inappropriate outage rates can significantly under or overestimate the risk costs associated with network investment. It is not within the scope of this review to examine in detail the actual outage rates applied by VENCorp. The sources used by VENCorp appear reasonable, and the undertaking of the consultation process within the regulatory test that is required before a project can be accepted should result in the use of appropriate outage rates, and the sensitivity to these rates, being addressed.

4.2.6 Non Network Solutions

In the VENCorp Application only transmission network solutions have been proposed. In some respects, this is a result of the planning criteria and process adopted by VENCorp. Due to the application of economic dispatch profiles from the VISION market modelling, a level of generation grid support is assumed in the costing exercise. Essentially, generation that is economic to re-dispatch is implicitly assumed within the process resulting in deferral of augmentation. This is in line with the economic principles within the regulatory test.

Although a network solution is proposed within the VENCorp application, it would be expected that within the consultation process required during performance of the regulatory test, non-network solution proponents would arise if they exist and would price their service to the expected network solution charge.

VENCorp does not have sufficient historical information to cost the possible efficiencies due to non-network solutions. Although it would be difficult within this review to forecast individual non-network solutions and economic costs associated with such, based upon their listed projects, we would not expect any significant efficiencies due to non-network proponents.

4.2.7 Estimating Capital Expenditure

Estimated capital costs for the planned augmentations within the VENCorp submission appear to be sourced from SPI PowerNet or budgetary estimates are used.

VENCorp has indicated that it considers its capital cost estimates to be in the range $\pm$20%.

PB Associates considers that due to increased commercial and regulatory incentives, preparing and maintaining cost databases is receiving greater effort within the network businesses.

Due to the limited amount of network augmentation investment in recent years on the Victorian system, VENCorp appears to have limited historical cost information. It is also important to note that for contestable work, VENCorp only receives the service charge, and therefore, the capital cost can only be estimated based upon an assumed pricing model. From this estimate, it is also difficult to breakdown the capital cost into components. These issues appear to limit the ability of VENCorp to maintain a cost database based on actual historical costs and market impacts. This may result in a drift in budgetary estimates from market levels and/or asymmetry in the tolerance of the estimate.

PB Associates has questioned VENCorp as to whether expected capital efficiencies due to their consultation and tendering process have been factored into their capital forecast. VENCorp has advised that it considers that it has insufficient historical data to reliably make those predictions and this efficiency may well be hidden within the variance of the capital costs.

PB Associates would agree that based upon the limited historical data available to VENCorp, it is reasonable to use unadjusted budgetary estimates for the planned projects in this revenue cap application. However the Commission should give this issue further consideration in any future revenue application by VENCorp.

4.3 REGULATORY TEST

VENCorp is required to apply the regulatory test to justify any regulated shared network augmentation. VENCorp has advised that all committed projects included in its application have passed the regulatory test. The 4th 500 kV line project within the planned projects in the VENCorp application is the most recent VENCorp project to undergo the regulatory test.

PB Associates has briefly reviewed the consultation documents related to the 4th 500 kV line project[6]. Based upon information contained within these documents, PB Associates is satisfied that VENCorp is applying the regulatory test to justify regulated network investment, and the test is in line with VENCorp's planning criteria.

Although the VENCorp planning process undertaken to justify the planned projects in the application does not satisfy the regulatory test in full (i.e. does not account for market scenarios and sensitivity studies, and assumed levels of load shedding and re-dispatch), PB Associates is satisfied that the VENCorp planning process undertaken is a reasonable process and is a sufficiently close to the regulatory test to provide a suitable outcome for the revenue cap application.

4.4 SUMMARY

VENCorp are now using a probabilistic approach to the planning of network augmentations. This is resulting in deferral of network augmentation investment. Examples of this are the 4th 500 kV line project, the 4th Dederang Transformer project, the Moorabool transformer project, and the Metropolitan transformer project, which could all have been brought forward under a deterministic N-1 criteria. In the recent public consultation on the VENCorp probabilistic planning criteria, VENCorp estimated the benefit to be $5.5 million per annum at a VOLL of $5k, or $2.5 million at a VOLL of $10k, over the investment levels indicated by using an N-1 deterministic criteria.

The VENCorp planning process undertaken to justify the majority of planned projects in the application satisfies part (b) of the regulatory test (i.e. does not account for market scenarios and sensitivity studies, and assumed levels of load shedding and re-dispatch). PB Associates is satisfied that the VENCorp planning process undertaken is a reasonable and robust process to ensure that only necessary and efficient expenditure is included in the forecast.

The load forecasts assumed in the planning process are a significant factor in defining the network augmentation requirement. PB Associates considers that the process employed by VENCorp in the development and application of the load growth forecasts is reasonable and in accordance industry best practice.

It is also evident from our review that the use of short-term ratings, dynamic rating, and network operation and control have been considered where appropriate.

[6] See VENCorp website

Although non-network options were not explicitly studied, the probabilistic economic modelling implicitly accounts for economic support from generators. It would be expected that within the consultation process required during performance of the regulatory test, non-network solution proponents may arise and could price their service below expected network solution charge. It is also important to note that a level of embedded generation and demand side response is allowed for in the load forecasts used in the planning process.

Due to the limited amount of network augmentation investment in recent years on the Victorian system, VENCorp appears to have limited historical cost information. It is also important to note that for augmentation work, VENCorp only pays a service charge. These issues appear to limit the ability of VENCorp to maintain a cost database based on actual historical costs and market impacts. This may result in a drift in budgetary estimates from market levels and/or asymmetry in the tolerance of the estimate.

We would expect that the tendering process applied by VENCorp should produce some efficiency that could be factored into project costs estimates. Without some analysis of historical tenders, it is difficult to gauge this impact, and it may well be lost within the variance of the estimate. The inability to extract the actual capital costs associated with contestable work also limits the ability to analyse the efficiency.

5. AUGMENTATION PROJECTS

5.1 OVERVIEW OF AUGMENTATION SCENARIOS

VENCorp has proposed four generation and import level scenarios. In these scenarios, the increased generation required to sustain the load forecast is assumed to be located in either the Latrobe Valley or metropolitan Melbourne regions, or is sourced via increase imports from NSW.

The rational behind the choice of these scenarios is subjective and a probability or qualitative likelihood has not been assigned. This is discussed further in the Section 6.8 of the VENCorp 2002 APR.

VENCorp has selected Scenario 1 (Latrobe Valley generation up 1900 MW, Metro Gen/DSM up 600 MW) as the most likely and based its Application on this forecast. The other scenarios serve as an indication of the level of uncertainty in the shared network investment requirement.

It should be noted that if VENCorp applied a probability-weighted approach to the capital plan as adopted by Powerlink and ElectraNet SA in their recent revenue cap applications then the VENCorp forecast revenue requirement could have been higher.

It would be difficult within this review process to define the most likely generation/import scenario. Although it is possible to propose scenarios that appear as reasonable as scenario 1, and that may result in a slight reduction in network investment, it is clear that VENCorp has not attempted to unreasonably inflate its application by the adoption of the scenario, and therefore, PB Associates would consider the scenario selected by VENCorp to be appropriate.

5.2 PROJECTS PROPOSED

VENCorp has 10 planned projects listed in their Application[7] under scenario 1. Of these projects, seven are specific locational projects to overcome an impending (or existing) constraint. Three projects, namely Fault Level Mitigation, Reactive Support, and Miscellaneous Works, are more general projects based around a number of smaller prospective works of the indicated nature that are difficult to define at this stage.

Based upon discussion with appropriate VENCorp personnel, Table 3 summarises the planning process applied for the planned projects in the VENCorp Application.

[7] VENCorp also list a number of committed projects. As these have undergone and satisfied the regulatory test, they are not discussed here.

Table 3 Planning Process Applied to Projects

Planned Project	Estimated Cost	Planning Process and Status Summary
4th 500 kV line project and associated 1000 MVA transformer at Cranbourne or Rowville	$36m	Full Regulatory Test and public consultation performed.
4th Dederang 330/220 kV transformer and Mt Beauty 220 kV switchgear replacement	$12m	Network modelling and VISION studies. Preliminary economic analysis to define project.
Moorabool 1000 MVA 500/220 kV transformer spare phase	$4m	Network modelling and VISION studies. Preliminary economic analysis to define project.
Fault Level Mitigation	$10m	Fault level studies to define fault margin on existing circuit breakers and expected upgrades based upon expected fault level increase.
Reactive Support	$30m	Network studies to define 10 year reactive requirement
Upgrade Rowville – Springvale – Heatherton 220kV lines	$2m	Supply Issue. Network studies to define energy above line capability. Preliminary economic analysis to define project.
Upgrade Ringwood 220kV supply	$4m	Supply Issue. Network studies to define energy above line capability. Preliminary economic analysis to define project.
Metropolitan 1000 MVA 500/220 kV transformer	$3m	Network modelling and VISION studies. Preliminary economic analysis to define project.
Miscellaneous Works	$15m	Estimated value based upon subjective reasoning.
Rowville – Richmond 220kV lines upgrade (Dec 2007)	$4m	Supply Issue. Preliminary network studies to define energy above line capability. Assumed project and timing including accounting for some expected deferment.

The following is a brief overview of specific issues relating to the individual projects.

5.2.1 4th 500 kV Line Project and Associated 1000 MVA Transformer at Cranbourne or Rowville

The 4th 500 kV line project is required to improve the transfer capability between the Latrobe Valley and Melbourne regions at an estimated capital cost of $36 million. The project has undergone the regulatory test and public consultation. The project is discussed in some detail in the public documents associated with this consultation[8].

The public consultation has been carried out and received general support of the project. This consultation agreed with the costs, solution options, and preferred options studied by VENCorp.

Two variants of this project are considered the possible preferred options. The Rowville option involves the 4th 500 kV line works and an additional 1000 MVA, 500/220 kV transformer at Rowville at an estimated capital cost of $24 million. The Cranbourne option includes the 4th line works and the establishment of a new 500/220 kV transformation station at Cranbourne at an estimated capital cost of $36 million.

Both the Cranbourne and Rowville options satisfy the regulatory test. VENCorp is set to begin the tendering process including both possible options.

VENCorp has assumed the Cranbourne option ($36 million) in their application, although the Rowville option ($24 million) resulted in higher benefits for most credible scenarios. The net benefits for both options are reasonable close; hence VENCorp's decision to tender for both options.

VENCorp has also advised that the Cranbourne option includes for switching of the East Rowville to Tyabb lines at a cost of $9 million. This switching is not included for in the $24 million for the Rowville option. However, if the distribution businesses develop the Cranbourne 220/66 kV terminal station then this line switching will be required irrespective of the Rowville or Cranbourne option. The development of the Cranbourne terminal station is looking increasingly likely[9] and therefore there is a significant probability that the equivalent cost for the Rowville option, accounting for the additional switching works for Cranbourne terminal station, would be $33 million rather than $24 million. This would favour the Cranbourne option as being the most economic.

The analysis performed by VENCorp is an example of how the probabilistic planning approach can produce project options with large variances in capital cost but small variances in NPV. Due to the setting of TUoS, based upon actual tendered project charges and not the revenue cap setting, the customer benefit should reflect the NPV.

5.2.2 4th Dederang 330/220 kV transformer and Mt Beauty 220 kV switchgear replacement

The 4th Dederang 330/220 kV transformer project is required to increase the supply capability into the Dederang 220 kV bus. The project is described in Section 6.3.1 of the VENCorp 2002 APR.

Discussions have been held with appropriate VENCorp engineers to confirm the requirement for this project, understand the level of analysis performed in defining this project, and explain the scope of works associated with the project.

[8] See VENCorp website

[9] The development of the Cranbourne terminal station is discussed in the public document "Transmission Connection Planning Report" – October 2001 - available from the Victorian Distributors.

The main project options considered by VENCorp are:

- procure an additional transformer 330/220 kV 240/340 MVA as spare at a cost of $5 million; or
- install a new 330/220 kV 240/340 MVA, with two additional bays at 330 kV and one additional bay at 220 kV, and upgrade of 2 x 220 kV circuit breakers at Mt Beauty for fault level mitigation at total cost of $12 million.

Preliminary economic analysis undertaken by VENCorp indicates that the $12 million option maximises the NPV (market benefit). Although the spare transformer option has lower capital costs, it has greater risk costs associated with higher levels of expected energy above ratings.

VENCorp notes that some deferment of this project is possible with increased levels of State grid generation (2-4 years per 100 MW).

VENCorp has stated that this project will be required when SNI is in service.

Based upon the review of this project, it is clear that the planning approach adopted by VENCorp has resulted in some deferment of this project from a strict N-1 deterministic approach. The installation of the new transformer and associated substation works option in the VENCorp application would appear reasonable. Based upon the scope of works, the $12 million estimate does not appear unreasonable, however, it is important to note the large variance possible in budgetary capital costs (± 20 %).

5.2.3 Moorabool 1000 MVA 500/220 kV transformer spare phase

The Moorabool 1000 MVA 500/220 kV transformer spare phase project is required to increase the supply capability to the Moorabool 220 kV bus at an estimated cost of $4 million. The project is described in Section 6.3.3 of the VENCorp 2002 APR.

This project has not been examined in detail as part of this review. However, PB Associates understands that there is presently some deferment of this project from the timing indicated by application of strict N-1 deterministic criteria. The $4 million estimate to procure and store the spare phase of a 1000 MVA, 500/220 kV transformer does not appear unreasonable.

5.2.4 Fault Level Mitigation

The fault level mitigation project is required to replace 220 kV circuit breakers that are forecast to exceed their short circuit rating, particularly in the metropolitan Melbourne region at a total cost of $10 million. The issue is described in Section 5.3.2 of the VENCorp 2002 APR.

VENCorp has stated that its budgetary cost for a single circuit breaker replacement is $300-$400000. The $10 million amounts to approximately 25-30 circuit breaker replacements during the regulatory period.

VENCorp has stated that this figure is additional to circuit breaker upgrades budgeted in other projects. VENCorp has also stated that it has examined the age/condition related upgrades of circuit breakers being proposed by SPI PowerNet, but there does not appear to be a significant overlap.

PB Associates has not examined the fault level mitigation project in detail, but based upon the discussion with VENCorp and the existing low fault margins on a significant number of stations on the Victorian network[10] the $10 million in the VENCorp application would appear reasonable.

5.2.5 Reactive Support

The reactive support project is required to account for the forecast growth in reactive demand during the regulatory period at a total cost of $30 million. The issue is described in some detail in Section 6.9 of the VENCorp 2002 APR.

VENCorp has advised that an average of 250 MVAr of additional reactive capability per annum is required in scenario 1. The figure of 200 MVAr quoted in Appendix 2 of the VENCorp Application relates to the average figure across all four scenarios.

The reactive support required is net of that provided by the additional generation assuming the Code requirements of reactive capability.

The requirement for the reactive plant is from 2003/04 in the regulatory period including the additional 200 MVAr of reactive plant held as an option in the reactive support project in the committed projects. This amounts to a total of 1,250 MVAr of planned reactive support during the regulatory period at an estimated average cost of $24,000 per MVAr.

PB Associates has not examined the planned reactive support project in detail, but based upon the discussion with VENCorp, the $30 million in the VENCorp application would appear reasonable.

5.2.6 Upgrade Rowville – Springvale – Heatherton 220kV lines

The upgrade to the Rowville-Springvale-Heatherton 220 kV lines project is required to alleviate existing potential overloads on these radial 220 kV lines that supply the Spingvale and Heatherton terminal substations from Rowville at an estimated cost of $2 million to up-rate the lines. The present risk of overload and loads shedding has been reduced by the use of wind monitoring equipment. The use of wind monitoring equipment is an example of the techniques VENCorp and SPI PowerNet are utilising to defer the need for augmentation.

The project is described in more detail in Section 6.5 of the VENCorp 2002 APR.

VENCorp has estimated the timing for this project as 2004/05 in its Application. However, it may be that the requirement for this project will be deferred if the Cranbourne terminal station is constructed and loading is transferred to this new station from Springvale and Heatherton. Presently, the distributors have made no firm commitment to off-load Springvale or Heatherton if the Cranbourne terminal station is constructed.

5.2.7 Upgrade Ringwood 220kV supply

The upgrade to the Ringwood supply project is required to alleviate potential overloads on the 220 kV line that supplies the Ringwood terminal substations from Thomastown at an estimated cost of $4 million. The project is described in more detail in Section 6.4 of the VENCorp 2002 APR.

VENCorp has advised that the preferred option at present is to switch the line from Templestowe to Rowville into the Ringwood substation.

[10] See Table 5.5 in VENCorp 2002 APR

VENCorp has estimated the timing for the potential overload as 2003/04 in its 2002 APR. Their Application estimates the timing of the project as December 2003. It would appear that the 2003/04 potential overload date is based on a deterministic N-1 timing, and therefore some deferment may be possible from the estimated timing in the VENCorp Application. It is not clear what deferment may be economic and what costs, if any, may be incurred in mitigating the risk.

5.2.8 Metropolitan 1000 MVA 500/220 kV transformer

The Metropolitan transformer project is required to increase the transformation capability into the Metropolitan region. The project is described in some detail Section 6.2 of the VENCorp 2002 APR.

Discussions have been held with appropriate VENCorp engineers to confirm the requirement for this project, understand the level of analysis performed in defining this project, and explain the scope of works associated with the project.

The main project options considered by VENCorp are:

- installation of new 500/330 kV 1000 MVA and 330/220 kV 700 MVA transformers at South Morang, requiring two additional bays at 330 kV and two additional bays at 220 kV (500 kV bay already present) at total cost of $30 million; or
- installation of a new 500/220 kV 1000 MVA transformer at South Morang, requiring two additional bays at 220 kV (500 kV bay already present) at total cost of $20 million; or
- establishment of a new substation at Templestowe or Ringwood including a new 500/220 kV 1000 MVA transformer, requiring 3 x switch bays at 500 kV and two switch bays at 220 kV at total cost of $30 million; or
- installation of an additional 500/220 kV 1000 MVA transformer at established substations at Rowville, Cranbourne, requiring a single switch at 500 kV, and doubled switched at 220 kV at total cost of $20 million.

VENCorp has advised that due to the Latrobe Valley to Melbourne 4th 500 kV line project resulting in additional transformer capability to the east of Metropolitan Melbourne, then preliminary network analysis indicates that the preferred location for the additional transformation capability is likely to be South Morang.

Preliminary analysis undertaken by VENCorp indicates that the $30 million South Morang option should maximise the NPV. Although the $20 million South Morang option has lower capital costs, it has greater risk costs associated with higher levels of expected energy above ratings.

VENCorp notes that some deferment of this project is possible with increased levels of embedded Metropolitan generation or DSM (1 year per 150 to 200 MW).

Based upon the review of this project, it is clear that the planning approach adopted by VENCorp has resulted in some deferment of metropolitan transformation capability from a strict N-1 deterministic approach. The installation of the new transformer and associated substation works option in the VENCorp application would appear reasonable. Based upon the scope of works, the $30 million estimate does not appear unreasonable. However, it is important to note the large variance possible in budgetary capital costs ($\pm$ 20 %).

5.2.9 Miscellaneous Works

The miscellaneous works category represents provisions for minor works (generally < $1 million) that have not been identified as specific projects during the planning process, but are expected to eventuate during the regulatory period.

VENCorp notes in its application that "*As with other projects, works in this category will only proceed if justified in accordance with the regulatory test*"

The miscellaneous works amount to on average $3 million per annum in the VENCorp Application. VENCorp has provided additional information covering the range of possible projects in this category:

> **"*Line Termination equipment upgrades*.**
> *Many of Victoria's transmission lines are limited by their termination equipment (such as isolator, protection or metering ratings). Small expenditures on some of these (say in the range of $50k - $250k) have the potential to unlock material capacity in the network. VENCorp will, as per normal practice, only upgrade these elements as required and economically justify any of these prior to augmentation.*
>
> ***Unknown Works*.**
> *In the past, the requirement for projects has materialised at short notice, with the need for the project being made aware to us due to either unusual system conditions, system incidents, or reviews of various parts of the system. As examples, in recent times we have had the 500kV line protection upgrade as one such project (approx$1.5M), and the DC duplication project (approx $2M), which arose following a review of protection standards and risks.*
>
> ***DB Connection Works*.**
> *A number of DB transmission connection points are beyond their n-1 rating, and it is highly likely that a number of terminal station projects will be initiated by DBs over the regulatory period to address this. The miscellaneous works category makes allowance for works required on the shared transmission network associated with such projects, such as protection modifications and line termination works.*
>
> ***General Protection & Control Works*.**
> *Due to general load growth, a range of general protection, control and metering upgrades would be expected to be required.*"

It is difficult to predict the expected expenditure that will arise in a miscellaneous works category. However, PB Associates considers the $3 million per annum estimate to be reasonable considering the utilisation of the existing assets, operating and control complexity of the existing network, the forecast growth, and the probabilistic planning approach adopted by VENCorp.

5.2.10 Rowville – Richmond 220kV lines upgrade

The upgrade to the Rowville-Richmond 220 kV lines project is required to alleviate potential overloads on these 220 kV lines at an estimated cost of $4 million to uprate the lines.

VENCorp has only performed preliminary analysis on this potential overload, as it is not expected to eventuate until 2007/08.

PB Associates has not examined the Rowville-Richmond 220 kV line upgrade project in detail. Although, the $4 million in the VENCorp application for line upgrade would appear reasonable, a lower capital cost solution may well be economic. However, until a more detailed assessment is performed it is difficult to gauge the potential.

5.3 SUMMARY

Due to the low number of individual projects, it is difficult to see any systematic attempt to inflate costs associated with types of work. The budgetary capital cost estimates used for the planned projects appear reasonable for the scope of works, noting the large variance that is expected in this estimation (± 20 %).

The main issues with respect to the need and timing of planned projects within the VENCorp application are as follows:

- **4th 500 kV line and associated substation works**. VENCorp has assumed the Cranbourne option ($36 million) in their application, although the Rowville option ($24 million) resulted in higher benefits for most credible scenarios. The net benefits for both options are reasonably close; hence VENCorp's decision to tender for both options. VENCorp has also advised that the Cranbourne option includes for switching of the East Rowville to Tyabb lines at a cost of $9 million. This switching is not included for in the $24 million for the Rowville option. However, if the distribution businesses develop the Cranbourne 220 /66 kV terminal station then this line switching will be required irrespective of the Rowville or Cranbourne option. The development of the Cranbourne terminal station is looking increasingly likely and therefore there is a significant probability that the equivalent cost for the Rowville option, accounting for the additional switching works for Cranbourne terminal station, would be $33 million rather than $24 million. This may favour the Cranbourne option as being the most economic.
- **Rowville-Springvale-Heatherton 220 kV line upgrade** at a cost of $2 million. VENCorp has proposed an in service date of December 2004. The requirement for this project will be deferred if the Cranbourne terminal station is constructed and loading is transfer to this new station from Springvale and Heatherton. Presently, the distributors have made no firm commitment to off-load Springvale or Heatherton if the Cranbourne terminal station is constructed.
- **Ringwood 220 kV supply**. VENCorp has estimated the timing for the potential overload as 2003/04 in their 2002 APR. The Application estimates the timing of the project as December 2003. It would appear that the 2003/04 potential overload date is a deterministic N-1 timing, and therefore some deferment may be possible from the estimated timing in the VENCorp Application. It is not clear what deferment may be economic and what costs, if any, may be incurred in mitigating the risk.

6. EFFECTIVENESS OF AUGMENTATION IMPLEMENTATION

6.1 INTRODUCTION

As indicated in the Draft Statement of Regulatory Principles, TNSP's are subject to possible network optimisation when an asset is considered not to be required as the result of a valuation carried out by the Commission. Mechanisms for handling the optimised out asset include write-down in the asset base or faster rate of depreciation for a specific period.

For augmentations that are provided by SPI PowerNet, these write-downs would be expected to be reflected in its regulated asset base at the next revenue reset. It is not clear to what extent VENCorp would face the optimisation risk for these augmentations VENCorp would face some risk as they have a take or pay contract still with SPI PowerNet, which allows the Commission to set the WACC and O&M. VENCorp takes the planning risk. It is not clear who takes the technology risk that may lead to a lowing of the capital value of a project in the future..

Augmentations implemented by VENCorp on a contestable basis are considered outside the regulated asset base of the TNSP/Service provider providing the service. VENCorp as a TNSP would still face the risk that at some time in the future that the asset may no longer be required even though there may still be a contract in place with the service provider and a commitment to the service provider from VENCorp for ongoing annual payments. VENCorp could presumably apply accelerated depreciation and pay off contracts earlier in accordance with the Draft Regulatory Principles

It is unclear who would face the risk in this situation. In the case of VENCorp , it could be assumed that the government, as owner, bears the ultimate risk. The options available appear to be continue paying the annual charges under the contract or adopt a faster rate of payment to terminate the contract similar to the faster depreciation option for TNSP's. Terminating the contract may also not be the appropriate long-term solution as the assets may be required again at some stage in the future beyond the optimising planning horizon.

VENCorp advises that no optimisation should be applied to future augmentation on the basis that:

- VENCorp is an independent, not-for-profit network planner;
- VENCorp has no commercial interest in developing or owning transmission assets;
- VENCorp's governance arrangement along with its consultative and transparent planning process ensure that only cost effective investments are made;

This approach does not necessarily protect VENCorp from the introduction of new technologies in the 10-20 year horizon period when the contract terms are not yet completed.

VENCorp in its revenue application has assumed that no optimisation would be applied to the committed augmentation services and reserves the right to resubmit its application in the event that the Commission intends to apply optimisation.

In order to mitigate the risk of future optimisation, VENCorp adopts the following process:

- produces an Annual Planning Statement in consultation with stakeholders
- completes an assessment of the project under the regulatory test including producing technical reports, consults with the public and obtains VENCorp Board approval

- obtains approval from Essential Services Commission for non-contestable work and then negotiates with SPI PowerNet the detailed scope and cost. This same approach is taken for the interface requirements of contestable projects
- for contestable work, VENCorp issues an invitation to tender (ITT) to network service providers on a build-own-operate basis under a long term take or pay contract. The ITT includes a draft Network and Project agreement with VENCorp and for future ITT, a draft Connection and Land Lease Agreement, which the contestable service provider would enter in with SPI PowerNet.
- the evaluation of tenders for contestable projects is completed and submitted to the VENCorp Board for approval

The augmentation planning was considered in section 4 and appropriateness of the proposed projects in section 5. The balance of this section will comment to the evaluation process used for contestable projects.

6.2 EVALUATION OF AUGMENTATION PROJECTS

Key inputs into the appropriateness of a particular project are the extensive consultation carried out including the provision of technical analysis supporting the proposal and the application of the Regulatory Test as discussed in section 4.3.

VENCorp typically contracts for a shorter period for contestable augmentations than for non-contestable augmentations with SPI PowerNet. VENCorp's experience indicates that tenders generally apply a risk premium if the duration of the contract exceeds 20 years and so offers shorter-term contracts to minimise the total present-valued life cycle costs.

Service providers are also required to maintain the assets in sound condition over it's the contract term and negotiate with VENCorp for an extension of the contract on the basis that there would be no further capital charges other than incremental capital investment (such as refurbishment).

VENCorp has developed guidelines for determining if an augmentation project is to be contestable or non-contestable. Typically, projects above $15m are considered contestable, depending on how embedded that the augmentation is, whether it would be practical for a third party to implement, whether it is operationally feasible (can be separated from other services), the availability of a competitive market and the timing required. Recent VENCorp experience has shown that effective competition can be obtained at around $10m. One issue not yet resolved between VENCorp and SPI PowerNet is the fact that, if VENCorp deems a project contestable and SPI PowerNet is the only bidder, then VENCorp considers there to be no competitive market and would reclassify the augmentation as non-contestable.

In order to establish whether appropriate augmentation implementation decisions were being made, PB Associates reviewed two VENCorp Board papers presenting the results of the ITT process. The process ensures that conforming offers are received including technical and commercial factors so that a like for like comparison can be made. Alternative offers are considered only after the preferred tenderer has been selected.

Evaluation of the tenderer is made using criteria listed in the ITT, which include capability to provide the services, competence of principals and employees, ability to satisfy timeframe, methodology to be followed, industry knowledge and experience etc.

Evaluation is also made on the service criteria listed in the ITT which includes design, procurement, construction, commissioning, operation and maintenance, total costs of the service including operation and maintenance over the life time and assessed reliability and predictability of the service and the risk of non-provision.

The total net present value cost of the service over the life of the contract is determined, taking into account total costs to VENCorp such as SPI PowerNet connection costs, VENCorp project management, legal costs and on-going costs. A sensitivity analysis is undertaken on key variable in the total analysis, which may include long term CPI, swap rates and discount rates.

PB Associates considers that tender evaluation for the two projects considered was appropriate and the decisions confirmed by the VENCorp board satisfied the criteria outlined on which the evaluation would be based.

6.3 SUMMARY

Augmentations implemented by VENCorp on a contestable basis are considered outside the regulated asset base of the TNSP providing the service but these assets could still require optimisation at some time in the future. However, given that the assets are subject to long term take-or pay contracts, and that VENCorp is a not-for-profit organisation, under the proposed pricing arrangements this risk will be carried by the network users. VENCorp argues that the optimisation risk is low, given that it, has no commercial interest in developing or owning transmission assets and a governance arrangement to ensure only cost effective investments are made. PB Associates would agree that the risk of asset stranding is low, particularly in the short term.

VENCorp typically contracts for a shorter period for contestable augmentations than for non-contestable augmentations with SPI PowerNet. VENCorp's experience indicates that tenders generally apply a risk premium if the duration of the contract exceeds 20 years and so offers shorter-term contracts to minimise the total present-valued life cycle costs. Service providers are also required to maintain the assets in sound condition over the contract term and, at the end of the term, negotiate with VENCorp for an extension of the contract.

VENCorp has developed guidelines for determining if an augmentation project is to be contestable or non-contestable. Typically, projects above $15m are considered contestable, depending on how embedded that the augmentation is, whether it would be practical for a third party to implement, whether it is operationally feasible (can be separated from other services), whether there is a competitive market and the timing required.

In order to evaluate the implementation of proposed planning decisions, PB Associates reviewed confidential VENCorp Board papers for two projects. PB Associates is satisfied that for the two projects reviewed, the process followed was appropriate and the decisions confirmed by the VENCorp board satisfied the criteria outlined on which the evaluation would be based.

7. ANALYSIS OF OPERATING EXPENDITURE

7.1 ACCOUNTING PRACTICES

VENCorp allocates costs between electricity and gas using an activity recording system called Timecontrol where all VENCorp personnel record their hours of work on a time sheet. This information is used to allocate staff costs directly between electricity and gas. All costs are considered to be regulated either by the Commission or the Essential Services Commission.

Corporate costs which include insurance, computer maintenance and licences, occupancy and corporate system depreciation are apportioned on the numbers allocated to each function respectively based on head count and workstations.

The only CAPEX that VENCorp has is for office services and the charges for this are allocated on the same basis as OPEX. VENCorp does not have the opportunity to capitalise some the augmentation project related costs as the capital expenditure is with the service provider who submits an annual revenue costs requirement for the augmentation.

7.2 NET OPERATING EXPENDITURE

Table 4 shows VENCorp's historical and forecast net operational expenditure.

The increase in the forecasts cost over the regulatory period was discussed in section 3.4.1.

The historical net operational expenditure has been significantly influenced by the impact of interest income. Future forecasts have assumed an income of $100k pa compared with past levels ranging from $803k to $1,746k pa.

Most of the previous interest income has been the result of handling the settlement residues paid by NEMMCO to VENCorp and TUoS revenue over-recoveries. In relation to settlement residues, VENCorp does not propose to budget for such high levels as the inter-regional settlement residues are very volatile, and in relation to the Snowy to Victoria interconnector, they may actually decrease.

In relation to TUoS over-recoveries, these are unpredictable as they depend on actual summer conditions. Due to Victoria's recent mild summer, VENCorp currently looks like under recovering around $8m. In future, under the new NEC network pricing arrangements, a lower proportion of the TUoS charges will be depend on the actual summer conditions, so VENCorp expect less volatility and therefore less chance of over or under recoveries.

Historical labour costs have increased to the forecast 2003 level due to cessation of superannuation and work cover holiday along with filling vacancies which had been previously difficult to fill.

Contracted services have reduced over historical levels due to the reduction in ESC licence fees and a change in the nature of communication process within SPI PowerNet,

Computing and communications along with occupancy where included within service allocation costs, but have now been classed as specific items. The new software for billing systems associated with the new transmission pricing arrangements in the NEM also contributed to the computing costs. Service allocations had a gross increase before the transfer of these items, due to communications and risk management being moved into the corporate area from directly allocated to gas, thus increasing corporate cost allocation to electricity.

Table 4 Historical and Forecast Operational Expenditure

Activity	Historical Financials ($000) for Year ending 30 June				Forecast Financials (in 2002 $'000) for Year ending 30 June					
	Actual 2000	Actual 2001	Apvd 2002	Fcast 2002	2003[11]	2004	2005	2006	2007	2008
Labour	1,550	1,489	1,969	1,772	2,235	2,357	2,436	2,636	2,722	2,814
Contracted services	501	36	216	27	219	204	205	209	211	212
Computing and communications	84	203	292	162	506	467	469	479	480	486
Consultancies and contractors	161	283	676	661	573	534	546	559	570	582
Occupancy	7	3	-	3	168	168	168	168	168	168
Vehicles and travel	58	70	197	129	161	164	166	174	176	179
Administrative	31	18	59	47	44	44	44	44	44	44
Service allocations	1,721	1,332	1,429	1,377	1,265	1,318	1,320	1,397	1,385	1,442
Depreciation	143	131	63	95	258	277	315	378	329	282
Operational Expenditure	**4,256**	**3,565**	**4,901**	**4,273**	**5,429**	**5,533**	**5,668**	**6,045**	**6,087**	**6,209**
Consulting and other income	(155)	(379)	(150)	(100)	(120)	(120)	(120)	(120)	(120)	(120)
Interest income	(803)	(1,410)	(950)	(1,771)	-	(100)	(100)	(100)	(100)	(100)
Bank fees and financial expenses	-	-	95	75	73	72	70	68	67	65
Non TUOS Revenues	**(958)**	**(1,789)**	**(1,005)**	**(1,771)**	**(47)**	**(148)**	**(150)**	**(152)**	**(153)**	**(154)**
Net Operational Expenditure	**3,298**	**1,776**	**3,896**	**2,502**	**5,382**	**5,385**	**5,518**	**5,893**	**5,934**	**6,055**

Vehicles and travel costs have been forecast to increase due to increase NEM activity. Depreciation increased due to the transfer of $0.2m from service allocation to this category. Superannuation holiday and work cover holiday cessation in the corporate area was also a driver for overall corporate cost increase, which are then allocated as a service allowance.

VENCorp has not set targets for reducing controllable costs on the basis that they are a not-for-profit organisation manage by an industry Board.

7.3 SUMMARY

Costs are allocated between gas and electricity using an activity recording system with staff recording work on a time sheet. Overhead costs are allocated on staff numbers and computer workstations used. The allocation mechanism is considered appropriate.

[11] Values are shown for a full financial year (year ending 30 June), although VENCorp is only seeking operating revenue from 1 January 2003, which is 50% of the values shown for year ending 2003.

The historical net operational expenditure has been significantly influenced by the impact of interest income. Future forecasts have assumed an income of $100k pa compared with past levels ranging from $803k to $1,746k pa. Most of the previous interest income has been the result of handling the settlement residues paid by NEMMCO to VENCorp and TUoS revenue over-recoveries. These levels are not forecast to continue in the future due to interconnector and NEM pricing changes.

The cessation of a superannuation and work cover holiday has increased the 2003 forecast on internal expenditure over historical levels. Further, the transfer of risk management and communications from the gas area to corporate has increased the corporate service allocation to electricity. This move is driven by the change in VENCorp electricity responsibilities in emergencies. Filling of vacancies, which had been difficult to fill in the past, has also increased labour costs.

VENCorp cost movements from the historical levels to those proposed in the regulatory period are considered appropriate. VENCorp has not set targets for reducing controllable costs on the basis that they are a not-for-profit organisation managed by an industry Board.

8. VENCORP COST COMPARISONS

Direct cost comparisons of VENCorp against other TNSP's are difficult as the VENCorp equivalent function is embodied within both TransGrid and Powerlink. Making comparisons on network parameters alone will also not provide direct comparison, as a significant driver is the network demand growth and the consequential capital programme.

Overall, capital augmentation plan comparisons must also be treated with caution as integrated companies such as Powerlink and TransGrid can capitalise project costs, whereas VENCorp costs are all treated as expense.

Table 5 shows comparative TNSP information.

Table 5 TNSP Comparative Information

	VENCorp	SPI PowerNet	TransGrid	Powerlink
Maximum demand (MW)		8,205	11,360	6,585
Energy (MWh)		51,692	64,443	40,353
Number of substations		44	75	85
Length of line		6,552	12,011	11,088
Planning and Engineering	$6.1m	N/A	$9.5m[12]	$10.2m[13]
5-year Augmentation Plan	$147[14]		$550m*	$435m[15]
5-year Capital Plan		$313m[16]	$882m[17]	$855m

5-year Capital Plan shown where 5-year Augmentation Plan not readily available
N/A not applicable
* estimated

It should be noted that "Planning and Engineering" for VENCorp is an all inclusive figure including the planning and engineering functions, load forecasting and market modelling for the regulatory test, all corporate overheads and commercial functions.

The TransGrid 2001 Annual report states that in addition to Planning and Engineering ($9.5m), there is also a group titled Corporate Administration and Development ($32.4m). PB Associates' OPEX review for the Commission as part of TransGrid's revenue cap application in April 1999 noted Corporate Development ($17.6m) and Engineering ($3.3m) functions, which are expected to be within Corporate Administration and Development. The VENCorp equivalent function within TransGrid is likely to be in excess of $9.5m.

Based on the level of SPI PowerNet capital expenditure, the augmentation component of capital expenditure for TransGrid could be in the order of $550m compared with

[12] TransGrid 2001 Annual Report

[13] Asset Manager Support cost - PB Associates review of OPEX for Commission as part of Powerlink revenue reset application

[14] VENCorp Revenue Application

[15] Commission Revenue Cap Decision using $87m pa for medium demand growth

[16] SPI PowerNet Revenue Cap Application

[17] ACCC Revenue Cap Decision January 2000

VENCorp's $147m expenditure. Powerlink's estimated comparable costs to perform a similar service to VENCorp are expected to be in the order of $10m with augmentation expenditure of $435m.

Taking into account the differing augmentation plans and possible accounting treatment for capitalising staff involved in project work by Powerlink and TransGrid, VENCorp's net operating expenditure is considered to be lower than to Powerlink, with TransGrid's equivalent costs being higher than Powerlink.

8.1 SUMMARY

Direct cost comparisons of VENCorp against other TNSP's are difficult as the VENCorp equivalent function is embodied within both TransGrid and Powerlink. Making comparisons on network parameters alone will also not provide direct comparisons, as a significant driver is the network demand growth and the consequential capital programme. Powerlink and TransGrid can also capitalise project costs whereas VENCorp costs are all treated as expense, which can also distort comparisons.

Taking into account the differing augmentation plans and possible accounting treatment for capitalising staff costs for project work by Powerlink and TransGrid, VENCorp's net operating expenditure is considered to be lower than that of Powerlink and TransGrid's higher than Powerlink.

9. CONCLUDING COMMENTS

9.1 EXTERNAL AND INTERNAL INFLUENCING FACTORS

Due to the size of the overall operating costs, external factors can appear to have a significant impact on VENCorp's operating expenditure, although this should only affect annual augmentation charges. Net operating costs should remain reasonably static as forecast. A change in the gas responsibilities could impact electricity costs due to the allocation methodology adopted for corporate costs.

External factors are only expected to influence augmentation expenditure where project timing and scope could be affected by requirements imposed by third parties. VENCorp proposes to only charge actual costs.

The Commission will need to consider the approach to the annual augmentation charges and whether a cap mechanism is required. VENCorp are only proposing a cap on the net operating costs and proposing to pass through augmentation costs.

The Commission will need to review the planned VENCorp augmentation charges as these were based on the SPI PowerNet proposed charging (WACC and O&M charges in particular) in their revenue application which may differ for those in the Commission's decision for SPI PowerNet.

9.2 EFFICIENCY AND EFFECTIVENESS OPPORTUNITIES

VENCorp have not identified opportunities for cost reductions in net operating costs. The nature of the governance arrangement should provide an incentive for cost minimisation through the industry related board. The process adopted for determining and implementing shared network augmentation, which is based on the market benefits component of the regulatory test, should continue to provide incentives for efficiency and effectiveness.

9.3 VENCORP COST COMPARISIONS

Explicit comparisons of VENCorp net operating costs were not possible but implicit analysis indicates that VENCorp costs are below comparable costs of similar functions undertaken by other TNSPs.

10. OVERALL SUMMARY

10.1 BUSINESS OVERVIEW

VENCorp performs statutory and non-statutory functions in the gas and electricity industry in Victoria. One of the core functions is the provision of shared electricity transmission network services from owners under long-term service contracts, planning and directing augmentation, management of electrical emergencies, technical compliance monitoring, demand-side management and providing information to facilitate decisions for economically efficient investment in the electricity industry. Of the overall 96 VENCorp employees in 2000/01, 20 full time equivalents were involved in electricity.

VENCorp is a not-for-profit organisation that is explicitly required to deliver its services, and to perform is functions, in a commercially neutral and cost effective manner. It obtains the bulk of its revenue for electricity related services through use of system charges paid by generators, distributors and other uses of the shared network.

In turn VENCorp procures bulk shared network services from TNSP's under long term take or pay contracts. It can execute such contracts with:

- SPI PowerNet for prescribed services;
- SPI PowerNet for non-contestable augmentation services
- SPI PowerNet and/or other TNSP's for contestable augmentation services

SPI PowerNet and TransGrid are the only companies with 500kV lines, with SPI PowerNet having no lines below 220kV. All other companies have significantly more substations than SPI PowerNet with Powerlink and TransGrid having about twice the length of line than both SPI PowerNet and ElectraNet SA.

Performance comparisons for VENCorp are difficult as similar services are embedded within other TNSP's. Other factors such as environment, demand growth, network age and design, customer requirements and accounting practices also influence comparisons. No one measure will provide an absolute comparison, as the various stakeholders will have different perspectives.

10.2 EXPENDITURE OVERVIEW

VENCorp operating expenditure is composed of payments to SPI PowerNet for prescribed services, internal operational expenditure for the running of VENCorp and annual charges for augmentations. As VENCorp is a not-for-profit organisation with contestable augmentation works, it is proposing to only cap internal operating expenditure and pass through the costs of prescribed services and annual augmentation costs. VENCorp proposes to adjust TUoS charges annually to reflect the actual operating costs.

Payments to SPI PowerNet for prescribed services are constrained by the revenue cap set by the commission.

The approach being proposed by VENCorp is different from the normal CPI-X approach adopted for other TNSP's by the Commission, in that all variations from forecast operating costs will be reflected in adjustments to the TUos charges payable by network users. However, all VENCorp's costs, except the relatively small cost of running its own operation are already either contestable or subject to regulatory oversight

Given that VENCorp is a not-for-profit organisation, cost overruns cannot be absorbed internally and it is therefore not clear what purpose is served by using an incentive based regulatory model.

The planning and forecasting methodologies used and the processes in place should ensure that only necessary expenditure is committed. This means makes the approach proposed by VENCorp should deliver acceptable regulatory outcomes.

The Commission may wish to consider setting a level of annual augmentation expenditure (or aggregate level over the regulatory period) below which VENCorp would not be required to seek a pass through approval from the Commission. VENCorp would still be required to apply the appropriate test e.g. Regulatory Test for this work. VENCorp, under this option, would need to seek the Commission's approval for work above the preset level(s), before proceeding with the augmentation work.

The forecasts for VENCorp's operating expenditure have been based on the assumption that there will be no significant change in their TNSP function or change cost allocation due organisation restructuring

In estimating the annual cost of planned augmentations, VENCorp has adopted the WACC and proposals for operating charges for augmentations outlined in SPI PowerNet application to the Commission. Cash flows will need to be revised once the Commission finalises its SPI PowerNet decision.

VENCorp has made no specific allowance for grid support payments to generators in their revenue application on the basis that it selects the most cost effective solution when implementing planning decisions. Should grid support payments be required these would be a lower cost alternative to one of the planned augmentations.

PB Associates considers, given the overall impact of the additional responsibilities, that the increase of $0.7m in internal operating expenditure over the regulatory period is appropriate.

Committed annual augmentation charges reduce slightly over the period as some of the contracts roll out. Planned annual augmentation charges are based on the lowest cost scenario.

10.3 AUGMENTATION PLANNING

VENCorp are now using a probabilistic approach to the planning of network augmentations. This is resulting in deferral of network augmentation investment. Examples of this are the 4th 500 kV line project, the 4th Dederang Transformer project, the Moorabool transformer project, and the Metropolitan transformer project, which could all have been brought forward under a deterministic N-1 criteria. In the recent public consultation on the VENCorp probabilistic planning criteria, VENCorp estimated the benefit to be $5.5 million per annum at a VOLL of $5k, or $2.5 million at a VOLL of $10k, over a the investment levels indicated by using an N-1 deterministic criteria.

The VENCorp planning process used to justify all augmentations satisfies part (b) of the regulatory test, i.e. the market benefits test. VENCorp has undertaken sufficient analysis to justify the majority of planned projects in the application in accordance with the regulatory test (i.e. projects which are not yet at the detailed planning stage have had the regulatory test applied except for the detailed analysis accounting for market scenarios and sensitivity studies , an assumed levels of load shedding and re-dispatch). PB Associates is therefore satisfied that the VENCorp planning process undertaken is a reasonable and robust process and ensures that only necessary and efficient expenditure is included in the forecast.

The load forecasts assumed in the planning process are a significant factor in defining the network augmentation requirement. PB Associates considers that the process employed by VENCorp in the development and application of the load growth forecasts is reasonable and in accordance industry best practice.

It is also evident from our review that the use of short-term ratings, dynamic rating, and network operation and control have been considered where appropriate.

Although non-network options were not explicitly studied, the probabilistic economic modelling implicitly accounts for economic support from generators. It would be expected that within the consultation process required during performance of the regulatory test, non-network solution proponents may arise and could price their service below expected network solution charge. It is also important to note that a level of embedded generation and demand side response is allowed for in the load forecasts used in the planning process.

Due to the limited amount of network augmentation investment in recent years on the Victorian system, VENCorp appears to have limited historical cost information. It is also important to note that for augmentation work, VENCorp only pays a service charge. These issues appear to limit the ability of VENCorp to maintain a cost database based on actual historical costs and market impacts. This may result in a drift in budgetary estimates from market levels and/or asymmetry in the tolerance of the estimate.

We would expect that the tendering process applied by VENCorp should produce some efficiency that could be factored into project costs estimates. Without some analysis of historical tenders, it is difficult to gauge this impact, and it may well be lost within the variance of the estimate. The inability to extract the actual capital costs associated with contestable work also limits the ability to analyse the efficiency.

10.4 AUGMENTATION PROJECTS

Due to the low number of individual projects, it is difficult to see any systematic attempt to inflate costs associated with types of work. The budgetary capital cost estimates used for the planned projects appear reasonable for the scope of works, noting the large variance that is expected in this estimation ($\pm$ 20 %).

The main issues with respect to the need and timing of planned projects within the VENCorp application are as follows:

- **4th 500 kV line and associated substation works**. VENCorp has assumed the Cranbourne option ($36 million) in their application, although the Rowville option ($24 million) resulted in higher benefits for most credible scenarios. The net benefits for both options are reasonably close; hence VENCorp's decision to tender for both options. VENCorp has also advised that the Cranbourne option includes for switching of the East Rowville to Tyabb lines at a cost of $9 million. This switching is not included for in the $24 million for the Rowville option. However, if the distribution businesses develop the Cranbourne 220 /66 kV terminal station then this line switching will be required irrespective of the Rowville or Cranbourne option. The development of the Cranbourne terminal station is looking increasingly likely and therefore there is a significant probability that the equivalent cost for the Rowville option, accounting for the additional switching works for Cranbourne terminal station, would be $33 million rather than $24 million. This would favour the Cranbourne option as being the most economic.
- **Rowville-Springvale-Heatherton 220 kV line upgrade** at a cost of $2 million. VENCorp has proposed an in service date of December 2004. The requirement for this project will be deferred if the Cranbourne terminal station is constructed and loading is transfer to this new station from Springvale and Heatherton. Presently, the distributors have made no firm commitment to off-load Springvale or Heatherton if the Cranbourne terminal station is constructed.

- **Ringwood 220 kV supply**. VENCorp has estimated the timing for the potential overload as 2003/04 in their 2002 APR. The Application estimates the timing of the project as December 2003. It would appear that the 2003/04 potential overload date is a deterministic N-1 timing, and therefore some deferment may be possible from the estimated timing in the VENCorp Application. It is not clear what deferment may be economic and what costs, if any, may be incurred in mitigating the risk.

10.5 EFFECTIVENESS OF AUGMENTATION IMPLEMENTATION

Augmentations implemented by VENCorp on a contestable basis are considered outside the regulated asset base of the TNSP providing the service but these assets could still require optimisation at some time in the future. However, given that the assets are subject to long term take-or pay contracts, and that VENCorp is a not-for-profit organisation, under the proposed pricing arrangements, this risk will be carried by the network users. VENCorp argues that the optimisation risk is low, given that it, has no commercial interest in developing or owning transmission assets and a governance arrangement to ensure only cost effective investments are made. PB Associates would agree that the risk of asset stranding is low, particularly in the short term.

VENCorp typically contracts for a shorter period for contestable augmentations than for non-contestable augmentations with SPI PowerNet. VENCorp's experience indicates that tenders generally apply a risk premium if the duration of the contract exceeds 20 years and so offers shorter-term contracts to minimise the total present-valued life cycle costs. Service providers are also required to maintain the assets in sound condition over the contract term and, at the end of the term, negotiate with VENCorp for an extension of the contract.

VENCorp has developed guidelines for determining if an augmentation project is to be contestable or non-contestable. Typically, projects above $15m are considered contestable, depending on how embedded that the augmentation is, whether it would be practical for a third party to implement, whether it is operationally feasible (can be separated from other services), whether there is a competitive market and the timing required.

In order to evaluate the implementation of proposed planning decisions, PB Associates reviewed confidential VENCorp Board papers for two projects. PB Associates is satisfied that for the two projects reviewed, the process followed was appropriate and the decisions confirmed by the VENCorp board satisfied the criteria outlined on which the evaluation would be based.

10.6 ANALYSIS OF OPERATING EXPENDITURE

Costs are allocated between gas and electricity using an activity recording system with staff recording work on a time sheet. Overhead costs are allocated on staff numbers and computer workstations used. The allocation mechanism is considered appropriate.

The historical net operational expenditure has been significantly influenced by the impact of interest income. Future forecasts have assumed an income of $100k pa compared with past levels ranging from $803k to $1,746k pa. Most of the previous interest income has been the result of handling the settlement residues paid by NEMMCO to VENCorp and TUoS revenue over-recoveries. These levels are not forecast to continue in the future due to interconnector and NEM pricing changes.

The cessation of a superannuation and work cover holiday has increased the 2003 forecast on internal expenditure over historical levels. Further, the transfer of risk management and communications from the gas area to corporate has increased the corporate service allocation to electricity. This move is driven by the change in VENCorp electricity responsibilities in emergencies. Filling of vacancies, which had been difficult to fill in the past, has also increased labour costs.

VENCorp cost movements from the historical levels to those proposed in the regulatory period are considered appropriate. VENCorp has not set targets for reducing controllable costs on the basis that they are a not-for-profit organisation managed by an industry Board.

10.7 VENCORP COST COMPARISONS

Direct cost comparisons of VENCorp against other TNSP are difficult as the VENCorp equivalent function is embodied within both TransGrid and Powerlink. Making comparisons on network parameters alone will also not provide direct comparisons, as a significant driver is the network demand growth and the consequential capital programme. Powerlink and TransGrid can also capitalise project costs whereas VENCorp costs are all treated as expense, which can also distort comparisons.

Taking into account the differing augmentation plans and possible accounting treatment for capitalising staff costs for project work by Powerlink and TransGrid, VENCorp's net operating expenditure is considered to be lower than that of Powerlink and TransGrid's higher than Powerlink.

11. GLOSSARY OF TERMS AND ABBREVIATIONS

ACCC	Australian Competition and Consumer Commission
APR	Annual Planning Review
CAPEX	Capital Expenditure
DSM	Demand Side Management
ESC	Essential Services Commission
ITOMS	International Transmission Operating and Maintenance Study
MLF	Marginal Loss Factor
O&M	Operations and Maintenance
GWh	Giga Watt hours (1,000,000 kWh)
kWh	kilo watt hour
ITT	Invitation to Tender
MVAr	Mega Volts Amps Reactive
MWh	Mega watt hour (1,000 kWh)
MW	Mega watt
NEC	National Electricity Code
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company
O & M	Operation/Operating and Maintenance
OPEX	Operating expenditure
PA	Per Annum
POE	Possibility of Exceedence
SRMC	Short Run Marginal Cost
TNSP	Transmission Network Service Provider
TUoS	Transmission Use of System
VNSC	Victorian Network Switching Centre
WACC	Weighted Average Cost of Capital
VOLL	Value of Lost Load

12. REFERENCE DOCUMENTS

- ACCC decisions for TransGrid and Powerlink revenue caps
- Company Annual Reports
- "Electricity Transmission Network Planning Criteria" – VENCorp consultation documents – February 2001.
- ESAA Electricity Australia.
- "Invitation to Tender for the Provision of Network Reactive Support Services for Summer 2001/02 to 2003/04" – associated VENCorp documents and Agreements – October 2000.
- "Optimising The Latrobe Valley to Melbourne Electricity Transmission Capacity" – consultation documents – February 2002.
- SPI PowerNet's Revenue Cap Application for the period 1 January 2003 to 31 March 2008 and associated appendices
- Supplementary information supplied by VENCorp 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
- VENCorp 2002 Annual Planning Review – April 2002.
- VENCorp Submission to ACCC – Electricity Revenue Cap Application for the period 1 January 2003 to 30 June 2008
- "Transmission Connection Planning Report" – October 2001 – produced jointly by the Victorian Electricity Distribution Businesses.

APPENDIX A
Application of Regulatory Test by VENCorp

The following information supplied by VENCorp summarises the process used to apply the regulatory test to VENCorp projects:

Annual Planning Review.
Systematic studies undertaken to indicate potential constraints and tentative timing for augmentation needs based on limited market modelling/probabilistic assessment in short term and N-1 deterministic assessment in longer term.

Identify network augmentation alternatives
If operational measures are insufficient to alleviate constraints, determine network augmentations that could:

- reduce the need for load shedding and the associated Energy at Risk (i.e. maintaining supply/demand balance without market price reaching VoLL);
- reduce real transmission losses (i.e. savings in marginal fuel costs);
- reduce reactive transmission losses (i.e. deferral of reactive support requirements);
- reduce maintenance charges for provision of existing network services;
- provide intangible benefits for identified externalities.

Determine network flow equations for each alternative
Linear regression equations are developed using load-flow models to calculate the relevant (critical element) network flow based on defined variables. Effectively, each equation represents the sensitivity of the network flow to critical variables and allows for calculation of the flow over all possible ranges of the variables. The variables are typically generator outputs and demand levels.

Determine network capability for each alternative
The transfer capability may be defined by thermal, voltage stability, quality of supply or transient stability constraints. If thermal limits are binding a temperature model is developed for critical plant.

Market Modelling
If network flow equations contain market sensitive variables (i.e. generation or interchange levels), full NEM modelling must be undertaken along with sensitivity studies for various market development scenarios that could arise.

- Determine analysis period, e.g. 2002/03 to 2012/13;
- Establish hourly load traces for each region based on historical profiles (10, 50, 90% POE for Medium economic growth);
- Determine generation plans for each region using reliability criteria for maintaining reserves;
- Determine base case bidding strategies (e.g. SRMC), planned outage schedules, forced outage rates and repair times, MLF's, capacities for each generating unit;
- Determine interchange capabilities and applicable inter-regional loss factor equations;
- Undertake base case market modelling to give least cost generation dispatch in each region (e.g. 100 simulations of each POE trace);
- Define market development scenarios (e.g. high and low growth, LRMC, DSM, inter-connector upgrades, etc);
- Undertake market development scenario market modelling to give least cost generation dispatch in each region for each scenario.

Benefit calculations

The least cost generation dispatch obtained from the market modelling is fed into the network flow equations for each network alternative on an hourly basis. The network loading is then compared with the network capability and an assessment of the annual energy at risk is obtained based on the probability of the critical contingency occurring. For the network alternatives considered, the annual energy at risk will be reduced from the base case (do nothing) and therefore the benefits with respect to the potential constraint quantified. Energy at risk is valued at VoLL and can be minimised by allowing for generation rescheduling which is valued at a premium above the determined regional SMP (depending on where generation can be rescheduled).

The least cost generation dispatch obtained from the market modelling is also fed into an optimal load flow package and the changes in network losses are determined on an hour by hour basis to provide an assessment of annual loss reduction benefits.

The augmentation alternatives are considered from a voltage support perspective and any changes to the annual reactive support program established.

Economic Evaluation

The net present value of the annualised cash flows associated with each alternative are determined for all the market development scenarios and a number of sensitivities such as interest rates changes, changes to VoLL, project cost adjustments, transmission forced outage rate adjustments, project timings, etc

The alternatives are ranked in order of greatest market (net) benefit and the alternative that ranks 1st the most times is deemed to be robust and satisfy the regulatory test. Consideration is given to the likelihood of the market development scenarios and sensitivities occurring. The preferred alternative must also have a positive net benefit (i.e. lower costs than benefits) in most although not all credible scenarios.

Consultation and Implementation

VENCorp undertakes a public consultation process in accordance with the NEC requirements inviting submissions on its assessment and conclusions. VENCorp reviews it proposal, giving consideration to the submissions received and then seeks Board approval to undertake a tender process to build, own and operate any network deemed contestable. After completion of the tender evaluation, Board approval is sought to award the contracts. On completion of the project, the services are provided and costs are recovered through VENCorp's approved Transmission Use of System Charges.