

**Regulatory arrangements for the
NSW Distribution Network Service Providers
from 1 July 2004**

Issues paper

**INDEPENDENT PRICING AND REGULATORY TRIBUNAL
OF NEW SOUTH WALES**

**Regulatory arrangements for the
NSW Distribution Network Service Providers
from 2004**

Issues paper

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Submissions are invited from interested parties to all Tribunal investigations. Unless confidentiality is sought, the submissions are generally available for public inspection at the Tribunal's offices and will be available on-line in PDF format from the time of processing of the submission until 3-4 weeks after the release of the final report of an inquiry. The Tribunal exercises its discretion not to exhibit any submissions based on their length or content (containing material that is defamatory, offensive, or in breach of any law).

For price reviews/determinations, submissions are initially sought from agencies or relevant associations on their pricing proposals. These proposals are available about 4-6 weeks before the due date for public submissions to allow their consideration in the preparation of other stakeholder submissions.

Submissions from the NSW DNSPs must be received by 10 April 2003 and from the public by 4 July 2003.

All submissions should be sent to:

2004 Electricity Network Review

Independent Pricing and Regulatory Tribunal
PO Box Q290
QVB Post Office NSW 1230

Comments or enquiries related to this Paper should be directed to:
Anna Brakey: (02) 9290 8438

Confidentiality

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Public information about the Tribunal's activities

Information about the role and current activities of the Tribunal, including copies of latest reports and submissions can be found on the Tribunal's web site at www.ipart.nsw.gov.au.

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1 INTRODUCTION

The Independent Pricing and Regulatory Tribunal of New South Wales (the Tribunal) is responsible for regulating the state's four Distribution Network Service Providers (DNSPs). These businesses are EnergyAustralia, Integral Energy, Country Energy and Australian Inland, and are wholly owned by the New South Wales Government. The Tribunal is required to regulate the prices DNSPs charge under the National Electricity Code (the Code), in accordance with the objectives and principles set out in the Code.

The Tribunal's current price determination will expire on 30 June 2004. In line with the requirements of the Code, the Tribunal has notified the owner of the distribution network in NSW, that it will introduce new regulatory arrangements at the start of the next regulatory period (1 July 2004). It has also advised the owner that the new arrangements will include a weighted average price cap for the distribution component of network tariffs, a pass through of transmission charges and price caps for miscellaneous charges and monopoly fees.

The Tribunal is now undertaking a review, including public consultation and analysis, to determine the detail required to apply these arrangements. It is currently seeking the views of key stakeholders and members of the public prior to making its final determination.

This paper outlines the Tribunal's process for conducting this review, and explains the context of the review and the key issues the Tribunal will consider in making its determination. It also outlines the Tribunal's preferred approach—where it has one—for addressing individual issues:

- Chapter 2 sets out the process and timetable for the review.
- Chapter 3 discusses the DNSP businesses and the tariffs and fees they charge.
- Chapter 4 provides an overview of the approach the Tribunal will use to determine in detail how these charges will be regulated.
- Chapter 5 explains the building block approach the Tribunal will use to estimate the notional revenue requirement of each DNSP, and the issues it needs to address to implement this approach.
- Chapter 6 discusses the weighted average price cap price control formula, and the issues to be addressed to specify this formula and calculate its components.
- Chapter 7 raises a range of additional issues that the Tribunal will consider in determining the new arrangements for regulating DNSP prices.

The Tribunal invites submissions on the issues raised in this paper as part of stakeholders' general submissions. The Tribunal particularly asks that those making submissions explain how their preferred approaches for addressing the issues meet the principles and objectives set out in sections 6.10.2 and 6.10.3 of the Code and other relevant parts of the Code, particularly 6.10.5(a). The principles and objectives are summarised in Chapter 4 and provided in full in Appendix 1. Details of where to send submissions and when they must be received are provided in the front of this report.

2 PROCESS AND TIMETABLE FOR THE 2004 REVIEW

The Tribunal effectively began this review of the arrangements for the period starting 1 July 2004 in 2001, when it considered the economic regulatory arrangements to apply to NSW DNSPs. To date, the Tribunal has:

- issued a discussion paper, *Form of Economic Regulation for NSW Electricity Network Charges - Discussion Paper*, DP 48, in August 2001 and received submissions
- held a public forum on 21 February 2002 and called for further submissions
- released *The Draft Notice Under Clause 6.10.3 of the National Electricity Code - Economic Regulatory Arrangements* and called for public submissions
- released the final *Notice Under Clause 6.10.3 of the National Electricity Code - Economic Regulatory Arrangements* on 25 June 2002.

Additionally, the Tribunal has released a discussion paper on defining prescribed distribution services¹ and an industry-wide paper on the weighted average cost of capital.² The Tribunal also sought public consultation on the terms of reference for its total cost review (see chapter 5).

2.1 Process for remainder of review

Over the next eighteen months, the Tribunal will further develop the economic regulatory arrangements to apply from 1 July 2004, including undertaking detailed analysis and further public consultation. Its approach will be to consider issues put to it. For most of the issues it considers, it will release its indicative decisions in a draft determination. It will then provide opportunities for stakeholders to respond to the draft determination, by making submissions and/or attending a public hearing to be held after the draft is released.

The key activities and dates for the remainder of 2004 review are set out below.

| Activity | Time frame |
|---|-----------------|
| Release issues paper | November 2002 |
| Release information request and draft model | November 2002 |
| Review total costs | |
| Release consultant's draft report on total costs review | End May 2003 |
| Receive public submissions on consultant's draft report | 4 July 2003 |
| Tribunal receives consultant's final report | 30 July 2003 |
| Receive submissions from DNSPs | 10 April 2003 |
| DNSPs present their submission to interested stakeholders | 11 April 2003 |
| Receive general public submissions | 4 July 2003 |
| Receive 2002/03 regulatory accounts from DNSPs ³ | 29 August 2003 |
| Release draft determination | November 2003 |
| Receive submissions from DNSP and public in response to draft determination | 27 January 2004 |
| Public Hearing | February 2004 |
| Release final determination | March 2004 |

¹ IPART, *Review of Prescribed Distribution Services*, Discussion Paper DP54, June 2002.

² IPART, *Weighted Average Cost of Capital - Discussion Paper*, Discussion Paper DP56, August 2002.

³ A supplementary information request may be issued at this time. Any information provided in response to this request must be consistent with that provided to the review of total costs.

In addition, the Secretariat will continue to hold the Energy Industry Consultation Group (EICG) meetings. This group comprises key energy stakeholders. The Secretariat will provide updates of its work program at the EICG meetings and attendees will have the opportunity to raise issues in these meetings.

The Tribunal is establishing consultation groups to consider selected issues in detail—for example, monopoly fees and miscellaneous charges. It also intends to establish a consultation group to consider detailed pricing issues for inclusion in the revised Pricing Principles and Methodologies.

2.2 Relationship between this paper and the information request and draft model

As indicated above, the DNSPs will be required to provide the Tribunal with information that it needs to conduct this review. The Tribunal's Secretariat has identified what data are required and has developed an Excel-based 'information request' to facilitate its collection from the DNSPs. This information will then be fed into a model that the Tribunal will use to:

- establish the revenue requirements for the NSW DNSPs for the regulatory control period commencing 1 July 2004
- calculate the X factor that will apply in the weighted average price cap control formula for the distribution component of the total network charges.

To enhance the transparency of its analysis, the Tribunal will release the information request and its draft model for public comment prior to their use. The draft model is 'work in progress' and will be refined or supplemented during the review process, as the Tribunal considers issues raised in public consultation and forms its own views on issues.

The draft model demonstrates how specific regulatory decisions may be incorporated into the Tribunal's determination. At this early stage of the review, it provides a number of options for key decisions. Interested parties should not assume that the Tribunal has a preferred position on any aspect of the model, unless it has specifically said so in this issues paper.

3 OVERVIEW OF DNSPs AND THEIR CHARGES

In NSW, the electricity industry comprises the following key players:

- generators, who make electricity and sell it to retailers through the wholesale market
- transmission network service providers, who convey electricity along the high voltage network
- distribution network service providers, or DNSPs, who convey electricity from the transmission system to individual customers via a lower voltage network
- retailers, who buy electricity from the wholesale market and sell it to individual customers.

This review relates only to the four DNSPs operating in NSW, and to the network tariffs and other fees they charge to retailers.

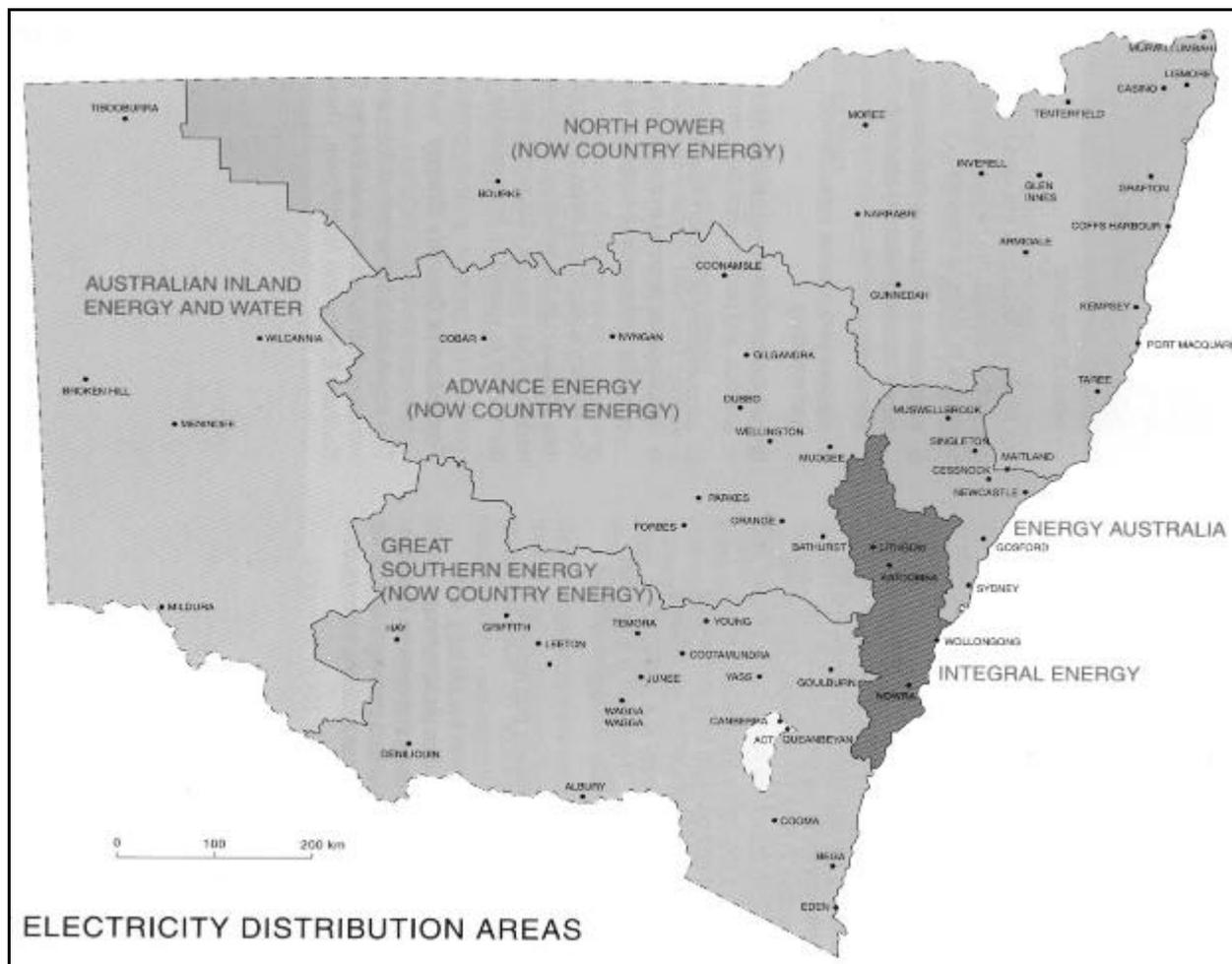
These businesses — EnergyAustralia, Integral Energy, Country Energy and Australian Inland — are owned by the NSW Government and service different regions of the state. The characteristics of their areas of operation vary widely (see Table 3.1 and Figure 3.1). For example, EnergyAustralia and Integral Energy operate predominantly in densely populated urban districts, with a larger number of customers over relatively small geographic areas. Australian Inland and Country Energy service sparsely populated rural regions that cover larger geographical areas.

Table 3.1 Operating statistics 2000/01

| | | Energy Australia | Integral Energy | Country Energy | Australian Inland | NSW |
|-------------------------------------|------------------------------|---------------------|--------------------|-------------------|----------------------|---------|
| Operating area | km ² | 22,275 | 24,500 | 582,000 | 155,000 | 783,775 |
| Network customers ('000) | no. | 1,441 | 761 | 729 | 19 | 2,950 |
| Maximum demand | MW | 4,696 | 2,966 | 1,950 | 59 | na |
| Distribution network | | | | | | |
| Underground | km | 12,611 | 8,612 | 3,806 | 31 | 25,060 |
| Overground | km | 39,267 | 24,640 | 173,887 | 9,426 | 247,220 |
| Total | km | 51,878 | 33,252 | 177,693 | 9,458 | 272,281 |
| Electricity distributed | | | | | | |
| Residential | GWh | 9,394 | 5,635 | 4,508 | 108 | 19,645 |
| Non residential | GWh | 15,881 | 8,255 | 5,500 | 308 | 29,944 |
| Total | GWh | 25,276 | 13,890 | 10,007 | 415 | 49,588 |
| Employee number | | | | | | |
| Network | no. | 2,498 | 1,229 | 1,913 | 83 | 5,723 |
| Retail | no. | 389 | 246 | 424 | 25 | 1,094 |
| Non-regulated businesses | no. | 497 | 291 | - | - | 788 |
| Total | no. | 3,384 | 1,766 | 2,337 | 108 | 7,595 |
| Customers per employee (network) | no. | 577 | 619 | 381 | 228 | 515 |
| Customer density | per 1,000 km ² | 64,693 | 31,063 | 1,253 | 122 | 16,941 |

Sources: DNSPs Price and Service Report, November 2001 and 2000-2001 regulatory accounts.

Figure 3.1 Operating areas of NSW DNSPs



Source: Ministry of Energy and Utilities, 2000/01 NSW Electricity Network Performance Report, May 2002.

The DNSPs' businesses are capital intensive. They recover their costs through the network tariffs and other fees they charge for the use of their networks. Network tariffs comprise:

- distribution use of system (DUOS) charges, which are paid by the retailers, who pass them on to the final consumers as part of the retail price of electricity
- transmission use of system (TUOS) charges which DNSPs pay to the transmission network service providers, and then pass on to retailers, who in turn pass them on to final consumers.

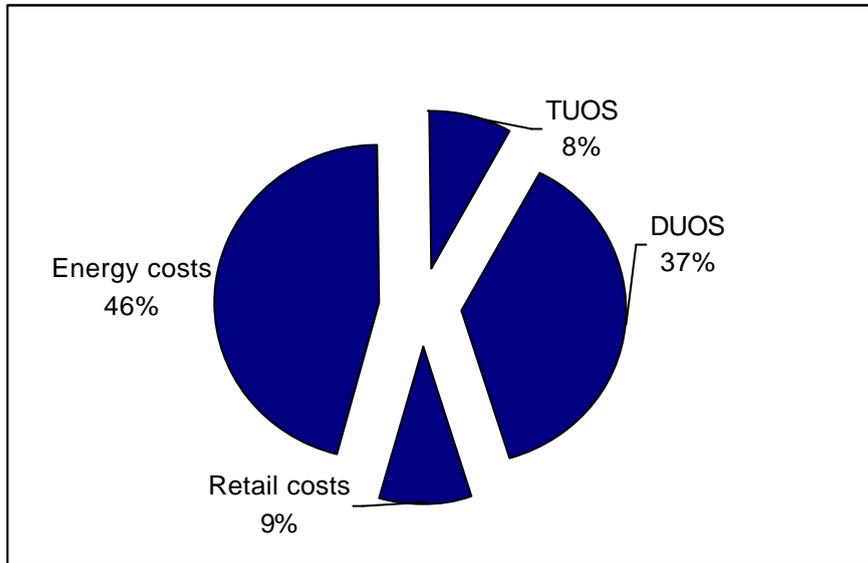
Other fees include a range of miscellaneous service and monopoly fees, such as meter testing and design certification.

As Figure 3.2 shows, the DUOS charges paid to DNSPs account for approximately 37 per cent of the typical bill of a residential customer. Transmission revenues are regulated by the Australian Competition and Consumer Commission. Energy costs—which comprise payments made to generators for the cost of producing the electricity—are determined in the competitive electricity market and are not directly regulated.⁴ The retail margin is

⁴ The NSW Government's Electricity Tariff Equalisation Fund (EETF) does, however, affect the cost of electricity that consumers on regulated tariffs pay. Further information on the EETF may be found at www.treasury.nsw.gov.au

determined in a competitive market, although the Tribunal sets regulated default tariffs. These default tariffs, which consumers who do not wish to participate in the competitive market can choose, are intended to act as a safety net, to protect consumers during the transition to full retail competition.

Figure 3.2 A breakdown of a typical bill for a domestic customer



4 TRIBUNAL'S APPROACH TO DEVELOPING THE NEW REGULATORY ARRANGEMENTS

Through its notice on the new economic regulatory arrangements⁵ the Tribunal has already established, at a high-level, how it will regulate the network tariffs and other fees the DNSPs can charge retailers and others over the next regulatory period, starting 1 July 2004. In determining these arrangements in detail, it must seek to achieve regulatory outcomes that meet the objectives and principles set out in the National Electricity Code (the Code).

The Tribunal's approach to determining the regulatory arrangements in detail, the objectives and principles it must aim to achieve, and the scope of the services to be regulated are discussed below.

4.1 New regulatory arrangements

The Tribunal has established that it will regulate network tariffs and other fees by using:

- a weighted average price cap to set DUOS charges
- a pass through of transmission charges
- a price cap to set all miscellaneous service and monopoly service fees.

To set the weighted average price cap for DUOS charges, the Tribunal will:

- undertake a building block analysis to determine a notional revenue requirement for each year of the regulatory period for each DNSP
- test these notional revenue requirements using financial analysis to ensure they will allow the businesses to remain financially viable
- take the notional revenue requirements and, using growth forecasts, convert them into price movements
- consider whether other factors should be included in the weighted average price cap, such as a service quality incentive mechanism, a correction factor, demand management payments, other specified costs and a mechanism to deal with forecasting inaccuracies.

This process will establish the amount by which average DUOS charges will move (either up or down) over the regulatory period. The Tribunal will express this price movement through the 'X' factor in the price cap formula—that is, it will specify that prices can move by the CPI (or inflation) minus X⁶, where X is set to allow the movement needed for the DNSPs to recover their required revenue. Chapter 6 explains methods for calculating the X factors.

DUOS charges will then be added to the TUOS charge component to deliver a total network price. The Tribunal will allow a pass through of actual TUOS charges (and may allow passing through payments to embedded generators and inter-distributor transfers through the same mechanism).

⁵ IPART, *Notice under clause 6.10.3 of the National Electricity Code - Economic Regulatory Arrangements*, NCR-10, June 2002.

⁶ The X factor could be negative or positive.

The Tribunal has stated that it will limit the movement in individual network prices for individual customers (the sum of the DUOS and TUOS tariffs). It has also stated that it will consider separately limiting the movement in the DUOS tariffs for individual customers.

Figure 4.1 illustrates the components of the building block approach that the Tribunal will use to determine each DNSP's notional revenue requirement. This approach is also explained in more detail in Chapter 5. Figure 4.2 illustrates how the revenue requirements will be used to calculate the X factor in the price control formula for DUOS tariffs, as well as the other components of the regulatory arrangements. These figures also illustrate how the total cost review will feed into the building block analysis and X factor calculation.

Figure 4.1 The 'building block' approach to assessing required revenue

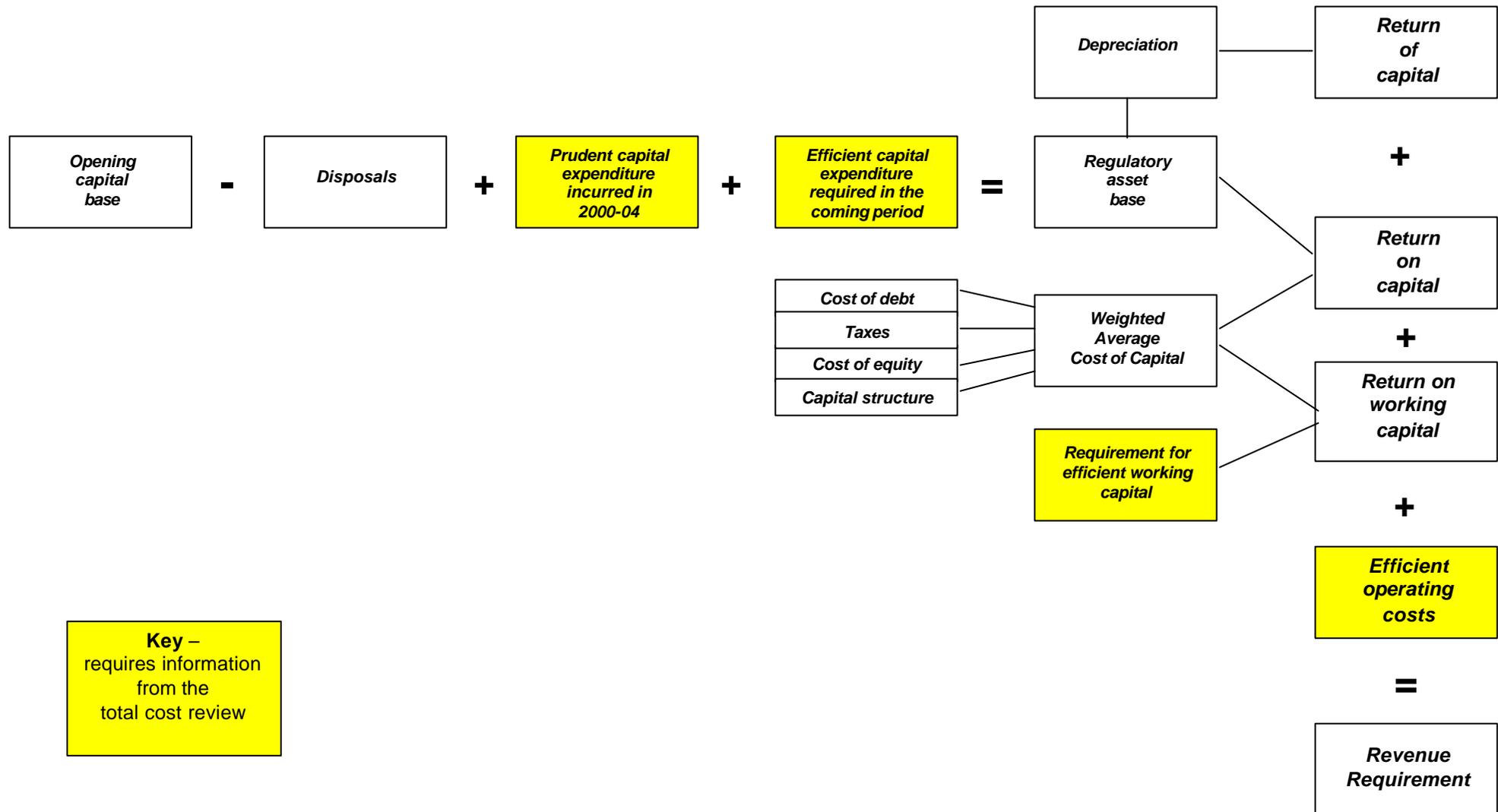
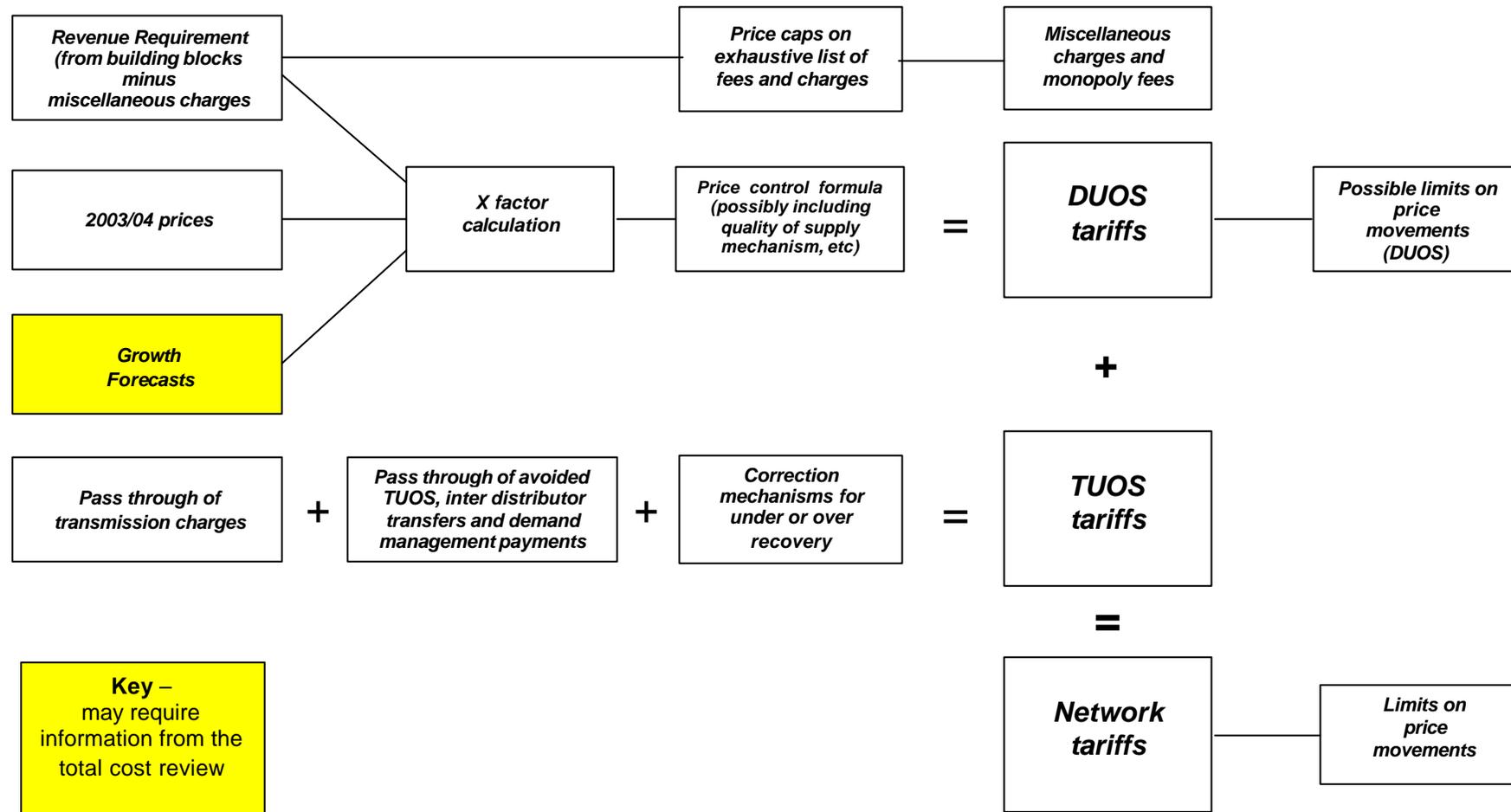


Figure 4.2 Regulatory arrangements from 1 July 2004



4.2 Objectives and principles

In regulating DNSPs under Chapter 6 of the Code, the Tribunal must seek to achieve the objectives of the Code (cl 6.10.2) and administer in accordance with the principles of the Code (cl 6.10.3). The Tribunal will use these objectives and principles to guide this review.

The objectives and principles are set out in full in Appendix 1. However, in summary, they establish that regulation is to be:

- cost effective, transparent and accountable
- applied consistently
- balanced between the interests of the stakeholders.

In addition, regulated prices should aim to achieve:

- economic efficiency
- revenue sufficiency
- equity.

The Tribunal requests that when making submissions, stakeholders explain how their proposed approaches comply with the Code.

4.3 Relationship to demand management inquiry

In October 2002, the Tribunal released its report on the *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services*. The Tribunal identified a range of demand management responses, some of which relate to distribution networks. Stakeholder's submissions should consider these recommendations, where appropriate.

4.4 Scope of services to be regulated

The Code requires that the Tribunal determine which distribution services are prescribed services (and therefore subject to economic regulation in accordance with 6.10.3 and 6.10.5 of the Code). Those distribution services that are not prescribed are deemed to be excluded, and are subject to a more light-handed approach than that set out in 6.10.5 of the Code.

The determination covering the 2000-2004 period defines prescribed distribution services as:

...those services performed by each DNSP that are associated with or ancillary to access to that DNSP's network for the supply of electricity within that DNSP's service area.⁷

The Tribunal is considering whether this definition should be modified. On 3 June 2002 it released *Review of Prescribed Distribution Services* (DP54), and is currently considering the submissions it received from interested stakeholders. Submissions called for the Tribunal to indicate how it would regulate excluded services. Therefore the Tribunal will release a discussion paper on the regulation of excluded services in late 2002.

⁷ IPART, *Regulation of NSW Electricity Distribution Networks: Determination and Rules under the National Electricity Code*, NCDet99-1, December 1999, p 7.

5 ESTABLISHING EFFICIENT COST BUILDING BLOCKS

As discussed in Chapter 4, one of the key components the Tribunal will use in calculating the X factor for the weighted average price cap for DUOS tariffs is the DNSPs' revenue requirements. The Tribunal will use a cost building block approach to determine these requirements for each DNSP.

The cost building blocks comprise an allowance for each of the following costs:

- efficient capital, operating and maintenance expenditures
- a rate of return on its regulatory asset base (RAB), including an adjustment for tax liability
- the cost of working capital
- depreciation of the RAB.

The Tribunal may also include allowances for other factors that affect the amount of revenue the DNSPs can recover through DUOS charges. In particular, the final balance on their 'unders and overs' accounts could be added to (or deducted from) the cost building blocks. Each of these building blocks, together with options for treating the closing balance of the unders and overs account, are discussed below.

5.1 Efficient capital, operating and maintenance expenditures

In the review leading up to the current determination, the Tribunal, to a large extent, examined each DNSP's capital and operating expenditure separately.⁸ At the time, it recognised that there is the potential for businesses to trade-off capital expenditure for operating expenditure and vice versa, and that this could affect service quality. Given this potential, the Tribunal believes that a joint review of these two cost streams is preferable. For this review, it has decided to assess operating and capital expenditure together, by undertaking a 'total cost' review. This approach will ensure that any trade-offs between capital and operating expenditures are fully accounted for in the analysis of costs.

The aim of the total cost review is to provide the Tribunal with an overall strategic view of:

- whether the DNSPs' proposed levels of capital, operating and maintenance expenditures are reasonable and efficient for the same security of supply and service standards
- the prudence of the DNSPs' past capital expenditure and operating and maintenance expenditure.

The Tribunal has already given stakeholders an opportunity to comment on the nature of the total cost review, when it circulated its draft Invitation to Tender for conducting this review. It has since revised the Invitation to Tender after considering stakeholders' comments. The Tribunal expects to appoint a consultant before the end of 2002. A draft report of the consultant's findings is due at the end of May 2003. The consultant will then present these findings to stakeholders, who will have the opportunity to comment on the draft report.

⁸ Although, the Tribunal did draw upon the results of a Data Envelopment Analysis study, which jointly assessed operating and capital costs.

5.1.1 Total costs in the current regulatory period

Data supplied by the DNSPs suggest that by the end of the current regulatory period, they will have spent far in excess of the capital expenditure projections used to support the cost building block analysis for the current regulatory period (see Table 5.1). Across all DNSPs, in 2003/04, actual capital expenditure could be close to \$200 million (or 50% per cent) higher than the Worley International⁹ projections used for the current determination.

Distribution network businesses are asset intensive operations. Asset management is a critical part of a DNSP's business. The Tribunal expresses serious concern over the size of the unexpected capital expenditures relative to the DNSPs forecasts and that DNSPs' asset management systems did not adequately account for these at the commencement of the current regulatory period.

Table 5.1 Capital Expenditure – Projections and Actuals¹

| DNSP | | | 1999/00 | 2000/01 | 2001/02 | 2002/03 | 2003/04 |
|--------------------------------|--|-----|---------|---------|---------|---------|---------|
| EnergyAustralia | DNSP projections | \$m | 160.7 | 164.0 | 166.3 | 186.9 | 198.0 |
| | Worley projections | \$m | 160.7 | 164.0 | 166.3 | 186.9 | 198.0 |
| | Actual/forecast | \$m | 323.0 | 288.1 | 274.3 | 284.2 | 274.3 |
| | <i>Difference Actual/ Worley projected</i> | % | 101% | 76% | 65% | 52% | 39% |
| Integral Energy | DNSP projections | \$m | 124.8 | 98.8 | 81.3 | 82.5 | 78.6 |
| | Worley projections | \$m | 113.5 | 87.5 | 70.0 | 71.2 | 67.3 |
| | Actual/forecast | \$m | 118.7 | 100.7 | 137.7 | 153.9 | 169.3 |
| | <i>Difference Actual/ Worley projected</i> | % | 5% | 15% | 97% | 116% | 152% |
| Country Energy ^{2 3} | DNSP projections | \$m | 133.9 | 133.9 | 131.0 | 125.2 | 114.5 |
| | Worley projections | \$m | 149.1 | 149.1 | 146.2 | 140.4 | 129.9 |
| | Actual/forecast | \$m | 138.8 | 141.5 | 154.8 | 147.9 | 148.4 |
| | <i>Difference Actual/ Worley projected</i> | % | -7% | -5% | 6% | 5% | 14% |
| Australian Inland ³ | DNSP projections | \$m | 6.3 | 5.0 | 3.7 | 6.2 | 3.3 |
| | Worley projections | \$m | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| | Actual/forecast | \$m | 2.9 | 3.0 | 9.0 | 14.7 | 4.7 |
| | <i>Difference Actual/ Worley projected</i> | % | -17% | -14% | 158% | 320% | 35% |
| All DNSPs | DNSP projections | \$m | 425.7 | 401.7 | 382.4 | 400.8 | 394.3 |
| | Worley projections | \$m | 426.8 | 404.2 | 386.0 | 402.0 | 398.6 |
| | Actual/forecast | \$m | 583.4 | 533.4 | 575.9 | 600.7 | 596.8 |
| | <i>Difference Actual/ Worley projected</i> | % | 37% | 32% | 49% | 49% | 50% |

Sources:

DNSP projections: Projections made by the DNSPs for the 1999 Determination, *Report to IPART on Capital Expenditure Review in NSW Electricity Distribution, Final Report, Worley International*, October 1998 (includes Other Capital Expenditure Items except capital contribution works, recoverable works and retail related expenditure).

Worley's projections: Projections made by Worley for the 1999 Determination, *Pricing for Electricity Networks and Retail Supply Report Vol 1, Rev99-5.1*, June 1999, Table 7.1 (excludes capital contribution works, recoverable works and retail related expenditure).

Actual/forecast: 1999/00 and 2000/01 *Regulatory Accounts*, excluding capital contributions. Data for 2001/02, 2002/03 and 2003/04 are DNSPs forecasts from the *2000/01 Regulatory Accounts*, adjusted for capital contributions.

Note 1: 2001/02 dollars (all sources have been adjusted for inflation).

Note 2: Country Energy was formed on 1 July 2001. Data collected prior to this is the addition of capital expenditure for Great Southern Energy, Advance Energy and NorthPower.

Note 3: DNSP and Worley projections for Australian Inland and Great Southern Energy (part of Country Energy) were revised in *Regulation of NSW Electricity Distribution Networks Determination, NCDet99-1*, December 1999.

⁹ Worley International undertook an independent capital expenditure review for the 1999 Determination.

At this stage, the Tribunal does not have a good understanding why this capital expenditure is much higher than projected at the start of the 1999 regulatory period. However, it will be a significant issue for the total cost review since it impacts on the RAB and has implications for the revenue requirements in the next regulatory period and beyond. For the total cost review, the Tribunal has decided that it will implement a backward-looking prudence test¹⁰ for past capital expenditure and will roll the RAB forward on the basis of identified prudent capital expenditure. Going forward from the beginning of the 2004 regulatory period, DNSPs would then receive an allowance for depreciation and return on capital in their notional revenue requirement.

However, if prudent capital expenditure for the DNSPs is significantly higher than projected for the current determination period, then DNSPs will have borne the costs associated with a return on and return of capital on the difference between actual and projected capital expenditure during the current regulatory period. An issue for the Tribunal is whether DNSPs should be compensated for these interest and depreciation costs. Such compensation could be delivered by inflating the building block costs in the 2004 regulatory period in line with the under-recovered interest and depreciation costs, or a portion thereof.

To make this decision, the Tribunal will need to understand the reasons why, in a relatively short time frame, actual and forecast capital expenditure during the current regulatory period has been substantially higher than that predicted by both the DNSPs themselves and the Tribunal's consultant at the time that the current determination was made. The Tribunal expects that the total cost review will address this issue. It will be important that the supporting arguments for the greater-than-expected expenditure are well documented and quantified.

The Tribunal will also need to take account of the implications of its decision for incentives for generating efficiency improvements, for incentives for investing efficiently, and for the implications for the distribution of risk between businesses and customers. If the Tribunal were to allow the DNSPs to recoup some or all of the costs associated with the increased capital expenditure, what effect would this have on incentives during the next regulatory period? Would it create an expectation that the Tribunal would compensate for higher than expected costs at the end of the 2004 regulatory period? Are there any special circumstances that make the higher than expected capital expenditure a one-off situation?

In terms of investment, if the DNSPs were required to bear the cost of unexpected but prudent capital expenditure during the regulatory period, would they be less inclined to invest in their networks to meet this demand and maintain service standards? If service quality standards fall through insufficient investment, would DNSPs be penalised in other ways? That is, would other regulatory instruments such as a service quality incentive mechanism or minimum service quality standards be sufficient to offset any adverse impact on investment incentives? (The issue of incentives for efficient network investment is discussed further in Chapter 7.)

Allowing DNSPs to recover fully the cost of unexpected capital expenditure in the 2004 regulatory period would shift DNSPs' business risks onto its customers. That is, the cost of a DNSP incorrectly forecasting demand for its services and setting prices at an inappropriate

¹⁰ In using a prudence test, the Tribunal notes that in the ordinary sense of the word 'prudent' means 'discrete or cautious in managing one's activities; practical and careful in providing for the future and exercising good judgement' (Concise Collins Dictionary, 2nd Australian Edition 1990).

level, would be fully borne by customers and DNSPs would face no cost to their bottom line profits. It is not clear to the Tribunal that this is necessarily the most appropriate outcome. An issue for the review is how this risk should be shared between DNSPs and customers. Further, the allocation of risk has implications for the rate of return that the Tribunal allows on the regulatory asset base. For example, if business risk is fully transferred to customers, then it would not be appropriate to allow a rate of return that includes a premium for bearing risk. In this situation, the rate of return should be a risk free rate such as the government bond rate.

A further issue for the Tribunal is that if it allows the DNSPs to recoup some or all of the return on the unexpected capital expenditure, how should it treat any unexpected operating expenditure. Should such expenditure be recouped during the next regulatory period as well? In addition, there is the problem of the trade-off between operating and capital expenditure. If a DNSP has unexpectedly spent more on capital equipment, it might have reduced its maintenance costs below the levels built into the building blocks. Should the DNSP be compensated for higher than projected capital expenditure in this situation?

There are three broad options for incorporating unexpected prudent capital expenditure from the current regulatory period into the building blocks for the next period. These are to allow DNSPs to:

1. recover both the foregone interest and depreciation
2. recover only foregone depreciation
3. recover neither foregone interest nor depreciation.

Option 3 offers the greatest incentives for the DNSPs to minimise their costs, since it does not permit them to recoup any of the costs of higher than expected capital expenditure. Option 1, because it allows full recovery of unexpected costs, gives no incentive for the DNSPs to avoid overspending. Further, if applied symmetrically option 1 would provide no incentive to pursue efficiency gains. This option has the weakest incentive properties of the three, but guarantees the DNSPs a return on their investment. Option 2 falls in between these two extremes.

In principle, good regulation would treat overspending and underspending in the same way. In the case of underspending, DNSPs would have received an allowance on capital expenditure, which they did not actually incur. Options 1 and 2 would require that DNSPs hand back the allowed rate of return and depreciation on the expenditure allowed for in the building blocks but not actually spent. This highlights the adverse incentive effects of these approaches, as the businesses would see few benefits from reducing the costs. Further, this disincentive could also work against any cheaper demand management or embedded generation options for network augmentation as DNSPs would see few benefits from adopting these options, in the form of reduced costs and higher profits.

Option 1 also effectively transfers a significant amount of business risk to customers. If the Tribunal were to adopt this first option, it would need to consider what implications this would have for the rate of return it allows on the regulatory asset base. It is likely that with significantly reduced business risk under this option, the rate of return would need to be closer to the risk free, government bond rate than it is in the current regulatory period.

The Tribunal invites submissions from DNSPs and other stakeholders explaining the reasons why actual and forecast were so much higher than the projected levels used to support the current determination.

Stakeholders might consider the following questions in developing their submissions:

- ***Should DNSPs be permitted to recoup any under-recovered return on and return of capital on any prudent capital spending in excess of that projected for the current regulatory period? Are there any special circumstances that could justify the Tribunal allowing DNSPs to these costs?***
- ***If so, what implications would this have for incentives for DNSPs to improve the efficiency of their operations and also for the sharing of risk between DNSPs and their customers?***
- ***If not, is it likely that incentives for DNSPs to invest in maintaining network service quality weakened? Are there any other mechanisms that would prevent this?***
- ***Should overspending on operating expenditure be treated symmetrically?***
- ***Should the allowed rate of return on assets be reduced, if DNSPs are allowed to recover costs associated with unexpected capital expenditure? If so, by how much?***
- ***If some DNSPs overspend and some underspend on capital and/or operating expenditure, how should underspending be treated? Should DNSPs be obliged to repay the allowance for the underspent amount? Should DNSPs be allowed to recoup overspending on capital expenditure if they have underspent on operating expenditure?***

5.1.2 Forward capital expenditure programs

One of the key issues for the Tribunal in making the 2004 determination will be the likely significant forward capital expenditure program planned by the DNSPs. For example, EnergyAustralia is proposing to spend approximately \$1.8 billion over the next five years on capital equipment.¹¹ This level of capital expenditure is equivalent to around 42 per cent of the EnergyAustralia's 1998 regulatory asset base, in 2002 dollar terms.

Capital expenditure, by adding to the DNSP's regulatory asset base, increases costs and increases prices. The magnitude of this increase can be substantial. For example, taking EnergyAustralia's proposed capital expenditure program of \$1.8 billion and assuming a cost of capital of 7.5 per cent and an average asset life of 50 years, then this capital expenditure could increase capital-related costs by up to \$171 million a year.¹² Assuming total energy supply of 26 000 GWh per year, this cost increase is equivalent to around 0.7 cents per kWh. EnergyAustralia's average network price over the current regulatory period was around 3c/kWh.

In testing the efficiency of the DNSPs' proposed capital expenditure plans, the Tribunal will need to understand the key drivers of the capital expenditure and be convinced that the proposed capital expenditure represents an efficient means of meeting the demand for network services. In particular, the Tribunal is concerned that demand management and distributed generation solutions are adequately considered as alternatives to network augmentation. In its demand management report, the Tribunal confirmed its existing

¹¹ Presentation by EnergyAustralia to EnergyAustralia Network Information Forum, 18 September 2002.

¹² Comprising a return on capital of \$135 million (7.5 per cent x \$1.8 billion) and a return of capital of \$36 million (\$1.8 billion/50 years). This calculation is an approximation for illustrative purposes only.

commitment to the recovery of prudent expenditures on network capital expenditures, loss reduction and demand management payments.¹³

One of the reasons for the high capital costs of distribution is that networks have traditionally been built to provide sufficient capacity to meet spikes in system demand at peak times. A lack of familiarity with demand management solutions and concerns by network planners over perceived unreliability of demand management solutions have led to biases against demand management solutions to network capacity constraints. This has led to situations whereby 10 per cent of capacity is utilised less than 1 per cent of the time.¹⁴ The Tribunal's recent inquiry into the role of demand management found that network-driven demand management options can provide a cost-effective means of enhancing network capacity, improving the efficiency of capital and providing lower net costs to customers.¹⁵

For example, SEDA estimates that the average cost of network augmentation to be around \$200/kVA per year. The Tribunal has found that in many instances demand management technologies such as standby generation (at around \$56/kVA) or interruptible supply options (at around \$53/kVA) would be viable alternatives to network augmentation.¹⁶ The Tribunal requires evidence that demand side options such as these have been considered as potential solutions to network constraints.¹⁷

Open planning processes, better pricing signals, standard offers are means of ensuring efficient non-network options can compete in a more equal footing with network options. The Tribunal has indicated that it will work with DNSPs to develop and demonstrate network processes that provide regulatory certainty of the prudence of demand management projects, including any necessary investment in 'learning by doing' programs. The Tribunal encourages DNSPs to initiate such a process.

The Tribunal is interested in exploring whether changes in pricing can encourage a better utilisation of network assets and encourages DNSPs and others to make submissions on this issue.

5.2 Rate of return on the DNSPs' Regulatory Asset Bases

The return on capital invested by the DNSPs' owner (the New South Wales Government) represents a significant component of the cost of providing network services. This rate of return represents compensation to the DNSPs' owner for committing capital to them and bearing the risks associated with their business.

¹³ IPART, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, Final Report*, Review Report Number Rev02-2, October 2002, p 66.

¹⁴ EnergyAustralia presentation to Tribunal at Public Forum for Demand Management Inquiry, September 2001.

¹⁵ IPART, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services, Final Report*, Review Report Number Rev02-2, October 2002.

¹⁶ *Ibid*, p 57.

¹⁷ This is consistent with Code and licence requirements for DNSPs to consider demand management solutions to network design.

Current regulatory practice is for the return on capital to be calculated by applying a cost of capital to an asset base. To calculate the rate of return component of the cost building blocks approach, the Tribunal will need to determine:

- an appropriate initial value for the Regulatory Asset Base (RAB) at the start of the regulatory period for each DNSP
- an appropriate cost of capital to be applied to this asset base.

5.2.1 Calculating the initial value of the RAB

The value of the RAB has strong implications for the prices that consumers pay for network services. Around three quarters of the DUOS tariff is made up of a return on the business owner's investment in the DNSP's assets (the return *on* capital) and an allowance for the depreciation of these assets (the return *of* capital).

Not surprisingly, during the review leading up to the 1999 determination, there was strong debate about the appropriate value of the initial RAB. In that determination, the Tribunal indicated that, for the purposes of calculating the building block costs for that regulatory period, it would roll forward the RAB on the basis of forecast capital expenditure. It also indicated that after 1 July 2003, it will then test actual capital expenditure for prudence, and adjust the RAB to take account of (prudent) actual capital expenditure. This adjusted RAB will form the initial RAB for 2004 regulatory period. The total cost review (discussed above) will test the prudence of capital expenditure during the current regulatory period.

Specifically, the calculation of the rolled-forward (initial) RAB would involve:

- indexing the opening asset base at 1 July 1999 by the CPI to account for inflation
- adding prudent actual capital expenditure (as determined by the Tribunal following the total cost review) and an allowance for indexation of that expenditure
- deducting depreciation and the value of disposed assets.

Easements in existence at 1 July 1999 were valued at historical cost. The Tribunal noted that if additional easements were acquired then these would be considered on the same basis as other elements of capital expenditure. In rolling forward the RAB, the value of easements would be indexed for inflation.

For the regulatory period starting July 2004, the Tribunal's preference is to roll forward the initial (1998) RAB from the current regulatory period, making allowances for:

- ***inflation***
- ***prudent capital expenditure***
- ***depreciation***
- ***asset disposals.***

The Tribunal invites comments on its preferred approach.

5.2.2 Calculating the cost of capital to be applied to the RAB

There are a number of approaches for calculating an appropriate rate of return on the RAB. The Tribunal's preferred approach is to use the Weighted Average Cost of Capital (WACC) approach to determine an appropriate range for the rate of return. The Tribunal also recognises that there is a need to exercise judgement in determining the WACC having regard to the objectives and principles in the Code, including the legitimate interests of utilities and other stakeholders.

The Tribunal sought comment on the methodology for estimating the WACC in its recent discussion paper.¹⁸ The issues raised in that paper have implications for this review, as well as for other industries that the Tribunal regulates (for example, gas, water and transportation). The issues raised in the paper included whether the WACC should be presented as a real or nominal rate, as a pre-tax or post-tax return and whether the WACC should be based upon a statutory or effective tax rate.

The Tribunal has considered stakeholder submissions in response to the discussion paper and is inclined toward adopting a WACC that is:

- ***presented in real, pre-tax terms***
- ***utilises a statutory tax rate rather than an effective tax rate***

The Tribunal is also inclined to adopt a forward transformation,¹⁹ consistent with market practice, in the calculation of the WACC.

The Tribunal will need to determine values for the various parameters that inform the calculation of the WACC. These parameters relate to the cost of debt and the cost of equity (as determined by the CAPM). Stakeholders wishing to comment on the appropriate settings for these various parameters for the 2004 network price determination should do so in their public submission to this review.

5.3 Cost of working capital

The current determination includes an allowance for the cost of maintaining an investment in working capital. For this determination, the Tribunal estimated a reasonable level of working capital for each DNSP, based on a simplified payment cycle approach—that is, on the amount of time that payments and receipts are outstanding. Since the notional revenue requirement is expressed in nominal terms, the return on net working capital is calculated as a nominal return equivalent to the WACC applied to the RAB.

The Tribunal's preference is to calculate the cost of working capital for the 2004 review in a similar manner to the current determination.

The Tribunal invites comments on its preferred treatment of working capital.

¹⁸ IPART, *Weighted Average Cost of Capital - Discussion Paper*, Discussion Paper DP56, August 2002.

¹⁹ The forward transformation converts a post tax nominal WACC to a pre tax real WACC by first applying a tax adjustment and then applying an inflation adjustment.

5.4 Depreciation of the RAB

The National Electricity Code provides no specific guidance on the methodology for calculating depreciation of the RAB. For its current determination, the Tribunal calculated an allowance for depreciation assuming straight line depreciation. This allowance was based on a categorisation of assets and separate asset life assumptions for these categories. The Tribunal raised the possibility of alternative depreciation profiles in the future, where these can assist in managing market risks and managing variations in the prices of new investment. The key proviso is that alternative depreciation profiles yield an aggregate allowance that is the same in net present value terms as the straight line approach—that is, the alternative depreciation profile is ‘net present value neutral’.²⁰

The Tribunal will need to consider the interaction of alternative depreciation profiles and the methodology for setting the X factor (see below for further discussion). Where a net present value (NPV) approach²¹ (outlined in Chapter 6) is used to determine the X factor, then an NPV neutral depreciation profile will have the same impact on revenue over the life of the asset as a straight line approach. However, an approach to setting the X factor such as the straight line revenue smoothing approach would be sensitive to the building block costs at the end of the regulatory period. Front-loading or back-loading depreciation would likely lead to a different level of revenue recovery than straight line depreciation.

The Tribunal recognises that there is no one ‘best’ approach to calculating depreciation and that under particular circumstances one depreciation profile might be preferred to another. However, the presumption of the continuation of the straight line approach is on the basis of simplicity, consistency and transparency. For the Tribunal to consider alternatives to straight line depreciation, stakeholders will need to detail the specific depreciation they are proposing and explain how this will lead to a superior outcome—in terms of market risk and price variations and in relation to the principles and objectives of the Code—than the straight line approach.

The Tribunal’s preferred approach is to adopt straight line depreciation to calculate the depreciation allowance, with flexibility to consider alternative profiles, providing net present value neutrality is retained and significant benefits can be demonstrated.

The Tribunal invites comment on its preferred approach. Stakeholders might also propose alternative depreciation profiles for the Tribunal to consider and explain why these should be preferred to the straight line depreciation approach.

²⁰ IPART, *Regulation of New South Wales Distribution Networks, Determination and Rules under the National Electricity Code*, NCDet99-1, December 1999, p 61.

²¹ That is, where the net present value of revenue recovered from tariffs is equal to the net present value of building block costs.

5.5 Treatment of the ‘unders and overs’ account balance

In accordance with the Tribunal’s Rule 2001/3 made under Clause 6.10.1(f) of the Code, each DNSP is required to maintain an ‘unders and overs’ account that must cumulatively record during the regulatory control period, the difference between the DNSP’s Aggregate Annual Revenue Requirement (AARR) and actual network revenue collected. At 30 June 2004 some DNSPs will have a positive closing balance in their account while others will have a negative closing balance.²²

The implementation of a weighted average price cap in the next regulatory period means the existing unders and overs accounts arrangements will not be required. Therefore the Tribunal needs to decide how it will treat the closing balance of the account on 30 June 2004.

There are a number of options for closing off the unders and overs accounts, and the Tribunal has yet to make a decision on the most appropriate approach. Two possible options are to:

1. Treat the balance as a customer capital contribution and deduct (add) it from (to) the DNSP’s opening 2004/05 regulatory asset base. A positive balance will reduce the RAB and hence prices via the WACC and depreciation charges. The effect will continue until the implied assets are fully depreciated (assuming that is excluded from the asset base in subsequent regulatory periods).
2. Treat the balance as prepaid revenue and progressively incorporate it within allowable revenues over the next regulatory period. A positive balance will reduce allowable revenues and hence reduce prices and vice versa for negative balances. The balance would be tapered to zero within the regulatory period. Active balances would continue to attract interest.

In relation to option 1, the Tribunal notes that there is no in-principle argument for treating the balance like a capital contribution. There is no corresponding physical asset that is created. Further, the interpretation of a negative balance —that is, under-recovery — in this context is unclear. In addition, one of the implications of this option is that the balance would be incorporated into base revenue requirements over a much longer time period than in option 2, and would have a much smaller impact on prices in the medium term. The length of time will depend upon the average remaining life of the assets in the RAB.

The Tribunal will need to consider what implications this has for intergenerational equity—that is, the interests of current customers versus future customers of the business. A non-zero balance on the unders and overs account has been generated by network charges for current customers that have been either too high or too low. Under option 1, this balance would be incorporated over a long period of time meaning that future customer either benefit from lower prices or bear the cost of higher prices. The Tribunal doubts whether this is equitable in an intergenerational sense.

²² A positive balance in the account means that network prices have been higher than they should have been given actual sales, and a negative balance means prices have been lower than they should have been.

Under option 2, the balance would be incorporated either straight away or over a short period of time. This means that it will be largely current customers who benefit from or bear the cost of under or over recovery. This approach would be consistent with the current workings of the unders and overs account which requires businesses to incorporate the balance into prices straightaway if certain thresholds are reached. In the case of substantial over-recovery, as seems likely, this treatment can smooth the effect on prices of the capital expenditures, which are larger than previously expected.

If the balance is incorporated into the revenue requirements of subsequent years, an issue is over what period should the balance be incorporated. In part, resolving this issue will depend upon the size of the account balance. It will also depend on the methodology for determining the X factor. For example, if the X factor is set so that the revenues generated over the regulatory control period exactly recovers (in NPV terms) the revenue requirement, then the timeframe over which it is incorporated does not matter.²³ If this is the case, then a simple approach would be for it to be incorporated in the first year of the regulatory control period. However, under a revenue smoothing approach (discussed below), the price path depends on the revenue requirement in the final year of the regulatory control period. Therefore, the rate at which the balance is incorporated could influence the price path and the level of revenue earned by the DNSP.

The Tribunal invites comments from stakeholders on the appropriate means of dealing with any residual balance in the unders and overs account:

- ***Is it appropriate that residual balance be treated as a capital contribution and added/deducted to the opening RAB for the 2004 regulatory period?***
- ***Or should the residual balance form part of the revenue requirements for the 2004 regulatory control period?***

Stakeholders are also welcome to propose alternative approaches.

²³ This assumes that any active balance attracts an interest rate equal to the WACC for the DNSP. If a different interest rate were applied, then the rate at which the balance is incorporated would affect the amount recovered (in net present value terms).

6 IMPLEMENTING A WEIGHTED AVERAGE PRICE CAP FOR DUOS TARIFFS

In its *Notice under clause 6.10.3 of the National Electricity Code - Economic Regulatory Arrangements*, the Tribunal stated that it would adopt a weighted average price cap as the form of regulation for the distribution component of network tariffs (DUOS tariffs).

The weighted average price cap specifies how DUOS tariffs will move (on average) over the regulatory period. (For an explanation of how a weighted average price cap works and what it may include, see Section 6.1 below.) To implement this approach, the Tribunal will need to address a range of issues. These include:

- specifying the price control formula
- considering the additional factors that may be included in the price control formula, including a service quality incentive mechanism
- considering how the X factor will be calculated, including the methodology for forecasting energy volumes and customer numbers
- considering arrangements for introducing new tariffs.

Each of these issues is discussed below.

The Tribunal will also need to address the mechanics of operation — for example, data requirements, compliance monitoring. These issues are partly addressed in the information request and also will be addressed during the review process.

6.1 The price control formula

The weighted average price cap limits how average DUOS tariffs can move from one year to the next. To weight the movement in average prices, tariff components are multiplied by a quantity. The same volume data is used to weight both the future year (numerator) and current year (denominator) prices.

The weighted average price cap can be represented by a control formula. One side of this formula represents the ratio of prices weighted by quantity. The other side of the formula specifies the amount by which prices can move. This movement is expressed by the term '1+CPI-X', which means that prices can move by inflation (CPI) minus an 'X' factor, which will be specified by the Tribunal. For example, if inflation is 3 per cent and the X factor is 2 per cent, then prices can increase by 1 per cent, on average.

The price control will be represented by the following formula:²⁴

$$\frac{\sum_{i=1}^n \sum_{j=1}^m p_{ij}^{t+1} * q_{ij}^{t-1}}{\sum_{i=1}^n \sum_{j=1}^m p_{ij}^t * q_{ij}^{t-1}} \leq (1 + CPI_t - X_{t+1}) \quad i=1, \dots, n \text{ and } j=1, \dots, m.$$

where the DNSP has n tariffs, which each have up to m components, and:

²⁴ This formula may be augmented to include other factors, as discussed below.

- p_{ij}^t is the price currently being charged for component j of tariff i
 p_{ij}^{t+1} is the proposed price for component j of tariff i in the coming year
 q_{ij}^{t-1} is the quantity of component j of tariff i that was sold in the previous year
 X_t is the real change in average prices from year t to year $t+1$ of the regulatory period.

The DNSPs would set prices to satisfy the above basic equation. They can change some prices by more than others, and even move some prices up and others down, as long as they satisfy the above equation (and comply with any limits on individual price movements, discussed in Chapter 7). The actual revenue earned by the DNSP in that year would be determined by actual quantities sold and be:

$$\sum_{i=1}^n \sum_{j=1}^m p_{ij}^{t+1} * q_{ij}^{t+1}$$

A weighted average price cap differs from the current revenue cap form of regulation in that DNSPs are not restricted in the amount of revenue they can earn. As long as the DNSP's prices comply with the price control formula and any other limits on prices the Tribunal may impose, additional sales will earn DNSPs additional revenue. Unlike the unders and overs account mechanism under the current system, the Tribunal will not require DNSPs to return any revenue in excess of the notional revenue requirement to customers through lower prices in subsequent years.

6.1.1 Inflation indexation

Inflation indexation is incorporated into the price control formula through the use of the consumer price index (CPI) in the CPI-X term. The Code defines the CPI as the change in the All Groups Consumer Price Index between the March quarter of the previous year and the March quarter of the current year—that is, the change in the March quarter Index of the current year compared with the value of the Index in the March quarter of the previous year. The Code gives the Tribunal (as the Jurisdictional Regulator) the discretion to use either the weighted average 8 capital cities CPI or the CPI for the appropriate capital city.

In NSW, network tariffs are determined and applied by the DNSPs according to the principles and procedures set out in the *Pricing Principles and Methodologies for Prescribed Electricity Distribution Services* (PPM). The PPM currently specifies that network tariffs are adjusted annually on 1 July. The DNSPs are required to provide 60 days notification of the tariffs they propose to apply. Tariff submissions must therefore be lodged by 2 May each year. Given this timing and the need to provide the DNSPs with an adequate opportunity to prepare their submissions, the December quarter is the most recent period for which inflation data is available.

If an inflation indexation term that uses a March quarter CPI base were to be applied, the price notification period and the time available for the preparation of price submissions would need to be compressed.²⁵ Therefore, the Tribunal proposes to continue to use CPI data based on the December quarter for practical purposes.

²⁵ The PPM will be revised during the 2004 review and the Tribunal will need to consider the revised arrangements in deciding on the appropriate CPI.

The Tribunal currently calculates the change in the CPI as a year on year change, rather than a quarter on quarter change in the index, as suggested by the Code. That is, the change in CPI is calculated as the change in the average of the All Groups CPI, Average 8 Capital Cities for the four quarters to the December quarter over the average of the four quarters for the same period of the previous year. This approach is applied across all the sectors regulated by the Tribunal. The Tribunal believes this year on year approach is superior to quarter on quarter approach included in the Code because:

- a year on year measure is a more stable measure
- a year on year measure better reflects the flow of income that DNSPs receive throughout the year.

The Tribunal proposes to apply inflation indexation measured as the change in the average of the All Groups CPI, Average 8 Capital Cities, for the four quarters to the December quarter over the average of the four quarters for the same period of the previous year.

6.1.2 Quantity weights

The recentness of quantity data used to weight the prices can affect the amount of revenue these prices generate. The older the quantity data, the greater the potential revenue impact, as older data is less likely to reflect current consumption patterns. Ideally, quantity data would be for the year in which the price changes would take effect—that is, year $t+1$ quantities for price changes in year $t+1$ —as this would ensure revenue neutrality. However, this would require a forecast of quantities and introduce a forecasting risk, as prices will need to be proposed and approved before the end of the year prior.

The Tribunal's proposed approach is to use the most recent audited data available. If year $t+1$ prices are being proposed in year t , audited data are likely to be available for year $t-1$ —that is, 2 years lagged.²⁶

The Tribunal seeks comments on use of the most recent audited quantity data available to weight prices in the weighted average price cap control equation.

6.2 Additional factors that may be added to the price control formula

In addition to the basic formula set out above, the Tribunal indicated that it would consider adding:

- a service quality incentive mechanism
- a correction factor (as provided for under section 6.10.5(8) of the Code), which would allow factors arising in the current regulatory period to be carried forward into next
- a mechanism allowing for the net impact of inter-distributor transfers to be passed
- a mechanism to provide incentives to undertake demand management
- a mechanism for passing through other specified costs
- a risk hedging factor to account for significant differences between forecast and actual throughput.

²⁶ For example, in early 2005 the DNSPs will set prices to apply from 1 July 2005. The quantity data that they use would be that consumed in 2003/04 (and audited).

Appendix 2 discussed each of these factors in more detail, describing the context in which the Tribunal might apply them.

The Tribunal invites comment on whether it should incorporate the various factors into the price control formula. Stakeholders should discuss the circumstances in which they believe it would be appropriate to apply any factors they propose be included.

6.3 Calculating X factors

Under a weighted average price cap, the X factor represents the real change in average prices from one year to the next. To determine this X factor, the Tribunal will:

- establish a notional revenue requirement for each business for each year of the regulatory control period
- establish forecasts for each year of the regulatory control period
- calculate the amount by which prices need to move on average from their initial values, given forecast quantities, to deliver the notional revenue requirement.

The Tribunal's approach for establishing the notional revenue requirement for each business is discussed in Chapter 5. Possible approaches for forecasting electricity volumes and calculating the amount by which prices need to move to deliver the notional revenue requirement are discussed below.

6.3.1 Forecasting energy volumes

To calculate the X factor, the Tribunal needs to establish, for each DNSP, forecasts for the volume of sales for each tariff component for each year of the regulatory period. If actual sales in the regulatory period are higher than these forecasts, the DNSP will earn more than its required revenue. However, if actual sales are lower than forecast, the DNSP will not earn sufficient revenue to fully recover its costs. This creates a strong incentive for the DNSPs to forecast low growth in sales.

Through the Tribunal's information request, the DNSPs will be required to submit volume forecasts under low, medium and high growth scenarios, and their corresponding costs for each scenario. The Tribunal could use any growth rate within this range in the final analysis (or outside the range if the Tribunal considers the forecasts unreasonable). However, the volume forecasts used to determine the revenue requirements²⁷ under the cost building process must be the same as the volume forecasts used to derive the X factor.

A range of factors can influence the growth of energy sales and customer numbers, such as the development of residential estates or high-rise apartments, general economic conditions impacting on business and industrial activity, weather patterns and the uptake of energy-intensive appliances such as air conditioners. Some of these may be reasonably predictable over a five-year period as they require advance planning; others are less predictable.

²⁷ Including those used in the total cost review.

In its notice on the form of regulation, the Tribunal proposed two possible approaches that it would use to forecast volumes:

1. Developing forecasts based on those put forward by the DNSPs, subjecting these to review by an independent consultant, and then considering public comment on the DNSP forecasts and the review.
2. Using a mechanistic approach whereby volumes are presumed to continue growing at an average of recent historical growth rates. This could be based on audited data from the three to five years preceding the next regulatory period.

Under either approach, the Tribunal could exercise its judgement in assessing the DNSPs' forecasts, independent analysis and public comment; or in accepting that special circumstances warrant modifying historical growth rates. Both approaches also have potential advantages and disadvantages.

The advantages of approach 1 are that the DNSPs have detailed knowledge of their distribution area, and are best placed to gather information on likely future developments that may impact customer numbers and energy consumption. In addition, if the DNSPs make available the data and analysis on which they have based their forecasts, the Tribunal and/or its independent consultants can assess the validity of this analysis. The disadvantages of this approach are that:

- DNSP estimates have historically been of limited accuracy
- there is an information asymmetry—the Tribunal and independent consultants may not be well-placed to assess DNSPs' forecasts, and may not have access to all the information they have used in making the forecasts
- to the extent that growth in energy consumption is driven by general economic conditions, the DNSPs may not be better placed than others to forecast growth.

The advantages of approach 2 are that a mechanistic approach removes the potential for incentive effects to bias the forecasts. In addition, recent historical growth may provide the best unbiased estimate of short-term future growth and is an unbiased forecast over successive regulatory periods if consistently applied. The disadvantage of this approach is that it does not take into account that future growth may differ from recent past growth for significant reasons, such as the loss of a large industrial customer, or the development of a new residential or industrial estate — factors which, in-principle, could improve the forecast if taken into account. A further barrier to applying a mechanistic approach might be the limited availability of a historical data series of sufficient length to forecast sales volumes with any degree of statistical accuracy. As well as being of sufficient length, the data would also need to be sufficiently disaggregated to allow projections of demand for each tariff class and component.

Some of the issues may be addressed if the DNSPs were required to explain any variation between their forecast growth rates and recent historical growth rates, including describing each factor contributing to the variation, and the assumptions underlying the assessment of each factor's impact on growth forecasts.

The Tribunal does not have a preferred approach to forecasting electricity sales volumes, and seeks comments on the relative merits of the two approaches discussed above.

6.3.2 Calculating the amount by which prices must move

The draft versions of the financial model that the Tribunal will use to support its analysis for the 2004 determination (see section 2.2) contain three illustrative approaches to calculating the amount by which prices need to move to deliver the notional revenue requirement to DNSPs over the regulatory period. These are:

1. **NPV approach with single X factor.** A single X factor is set for the regulatory period. It is set such that the expected NPV, given 2003/04 tariffs and projected demand increases, is equal to the NPV of the notional revenue requirement over the regulatory period. The equating of expected revenue and notional revenue requirements in NPV terms takes account of any timing differences in receipts and costs. For example, if a DNSP is expected to earn more revenue than the notional revenue requirement in the early years of the determination, then under this approach, the potential interest it can earn on the difference is effectively deducted from the notional revenue requirement in later years. Similarly, if the DNSP is expected to earn less revenue than the notional requirement in early years, then the foregone interest is effectively added to the notional revenue requirement and recovered in the later years of the regulatory period.
2. **NPV approach with P-nought adjustment.** Two X factors are set. The initial X factor is for the first year of the regulatory period, and is set to recover the notional revenue requirement in the first year (the 'P-nought' adjustment). The second X factor is specified for the remainder of the regulatory period and is set to ensure that the notional revenue requirement is recovered over the regulatory period (in NPV terms).²⁸
3. **Straight line revenue smoothing.** A single X factor is set for the regulatory period. It is set such that prices adjust to ensure that expected revenue in the final year of the regulatory period is equal to the notional revenue requirement for that year. This approach is similar to that applied by the Tribunal in the current determination, except that approach smoothed revenue (that is, revenue grew at a constant rate over the regulatory period) rather than prices. This approach may over or under recover the notional revenue requirements over the regulatory period.

Approaches 1 and 3 would deliver a smooth real price path over the regulatory period. For example, if the X factor were set at 2 per cent, then this would mean that on average prices would need to fall by 2 per cent in real terms in every year of the regulatory period. Approach 2 would deliver a smooth price path following a possible initial price rise or fall. For example, if the notional revenue requirements for the 2004 regulatory period are significantly greater than those of the current regulatory period, then approach 2 could see a large real price increase in the first year (to increase revenues to the level of the notional revenue requirement) followed by more moderate real increases over the remainder of the period.

Approaches 1 and 2 guarantee that the expected revenue collected by the DNSPs will be equal, in NPV terms, to the established revenue requirements over the regulatory period. This means that unless an explicit building block is included for an efficiency carryover from the previous regulatory period, any efficiency gains would be transferred to customers and the DNSPs would receive no benefit from any improvements in efficiency they made during the current regulatory period. Approach 3, if it over-recovers the notional revenue

²⁸ A variation of this approach would be for the Tribunal to determine the second X factor outside of the model, and set the initial X factor at a level that recovers the notional revenue requirement over the regulatory period (in net present value terms).

requirements, could allow the DNSPs to retain some of the benefits of efficiency improvements over the next regulatory period.

Approach 3 would strengthen efficiency incentives without requiring a separation of controllable and uncontrollable factors. The 1999 determination was based on an approach similar to the third approach. If adopted this time, then given current operating and capital expenditure, it may result in a loss in net present value terms compared to approaches 1 and 2.

The three approaches are likely to deliver different revenues for DNSPs at the end of the 2004 regulatory period. With approach 3, the expected revenue will be equal to the notional revenue requirement for the final year of the regulatory period.²⁹ With approaches 1 and 2, expected revenue in the final year could be higher or lower than the notional revenue requirements, depending on the relative size of the cost building blocks over the 2004 regulatory period. In selecting a methodology for setting the X factors, the Tribunal will need to consider the impact of such differences in terms of the transition of prices into the regulatory period following the one commencing in 2004.

The methodologies described above are not exhaustive and the Tribunal will consider other methodologies put forward by stakeholders in their submissions. It does not have a preferred approach for calculating the amount by which prices need to move to deliver the notional revenue requirement. It will consider the price path once the revenue requirements are established and the likely magnitude and direction of price changes is known.

The Tribunal invites comment on the three methodologies discussed above, as well as any alternate methodologies stakeholders may wish to put forward. Submissions on alternate methodologies should include a discussion on:

- ***the financial (revenue) implications of the methodology***
- ***implications for price volatility***
- ***impacts on incentives.***

6.4 Restructuring tariffs

Tariff reform is a significant issue in NSW. Firstly, there are hundreds of network tariffs in use in the state. Secondly, the Tribunal has commented during previous reviews on the important role that tariffs have in signalling the economic costs of network use and the influence that this has on the level of network investment. Tariffs that diverge from costs can lead to distortions in network use and investment, resulting in the misallocation of network resources and long-term losses of efficiency.

In calculating the X factor, the Tribunal will assume that a constant structure of tariffs applies over the 2004 regulatory period. This structure will be the same as the tariff structure in the 2003/04 financial year.

²⁹ Under all three approaches, actual revenue is likely to differ from expected revenues due to errors in forecasting likely energy volumes and customer numbers.

It is important to stress *that this does not prohibit DNSPs from restructuring their tariffs or introducing new tariffs over the 2004 regulatory period*. Indeed, the Tribunal supports DNSP efforts to restructure tariffs in line with the objectives outlined in the Pricing Principles and Methodologies:

- economic efficiency
- revenue sufficiency
- equity.

The potential for pricing to improving the efficiency of network use was highlighted in the Tribunal's inquiry into the role of demand management. As highlighted in this review, some 10 per cent of network capacity is required for less than 1 per cent of the year. This will worsen if demand continues to get peakier and networks invest in new network capacity to meet demand. In particular, the Tribunal believes that price signalling can play an important role in signalling congestion costs and reducing the need for costly network augmentation. Improved price signals could shift peak demands on the network and result in better utilisation of existing network capacity.

DNSPs will have to take account of the effect that any restructuring has on the overall weighted average price cap and also any additional limits on price movements that the Tribunal may impose (discussed below). The interaction of the weighted average price cap, other limits on price movements and DNSPs' proposals for price restructuring is likely to have implications for the revenue earned by DNSPs. A particular plan to restructure prices could have either have positive or negative revenue consequences. The Tribunal would be concerned if the regulatory framework for the 2004 regulatory period created a significant barrier to tariff restructuring.

Are any of the regulatory issues that the Tribunal is considering likely to create significant barriers to tariff restructuring? If so, stakeholders should outline in detail how they believe proposed tariff restructuring would be affected by the potential decisions that the Tribunal might make on these regulatory issues.

6.5 Arrangements for introducing new tariffs

The ability to introduce new tariffs is an important aspect of network development. Currently, the tariffs applied by the DNSPs combine distribution and transmission costs into a total network charge. Separate DUOS and TUOS tariffs will be developed and then aggregated to give the total network tariff that customers will pay. Any change in DUOS tariffs, including the introduction of new tariffs, will be subject to the constraint applied by the weighted average price cap.

The Tribunal's recent inquiry into demand management³⁰ also highlighted the importance of efficient tariffs. The inquiry drew particular attention to the role that demand-based charges can play in managing network congestion and avoiding (or at least deferring) augmentation costs, and recommended that greater consideration should be given to the use of tariffs that signal congestion costs.

³⁰ IPART, *Inquiry into the Role of Demand Management and Other Options in the Provision of Energy Services -Final Report*, Review Report Number Rev02-2, October 2002.

The Tribunal is concerned to ensure that the weighted average price cap does not impede the process of tariff reform. Where an existing tariff continues to be offered, the rate at which customers switch to the new or modified tariff is often uncertain and can lead to difficulties in estimating the revenue impacts for the DNSP.³¹ There may be a concern that, when combined with the lagged quantity weights used in the weighted average price cap, this could result in a level of revenue risk that would create a disincentive for the DNSPs to pursue tariff reform.

Price controls similar to the weighted average price cap are in use in other jurisdictions, and procedures have been developed for introducing new or restructured tariffs. The approach taken by Victoria's Essential Services Commission (ESC) in its 2001 Electricity Distribution Price Review is one example. The key features of ESC's approach are summarised in Box 6.1 below.

At issue are the revenue risks and compliance costs that the DNSPs face. The Tribunal considers that these would be most effectively worked through in conjunction with the DNSPs.

The Tribunal invites comments on approaches to facilitate the introduction of new or restructured tariffs under the weighted average price cap.

³¹ The tariffs that DNSPs apply to customers are total network tariffs. The possible revenue effects being discussed are transmitted through the distribution component of network tariffs.

Box 6.1 Victorian Essential Services Commission's treatment of new tariffs

The ESC's tariff basket formula for existing tariffs utilises *known* information on past quantities sold, current tariffs, and proposed tariffs at the time the formula is applied. However, where new tariffs or tariff parameters are introduced, there is no data relating to previous quantities sold. In these cases:

- The ESC allows the DNSPs to submit estimates of quantities for new tariffs and the tariffs they replace, which are then reviewed for 'reasonableness' by ESC.
- DNSPs nominate a parent tariff category associated with the new tariff being introduced, which applies to those customers who are expected to migrate to the new tariff category.
- The value for the current price of the new tariff is set equal to the current parent tariff. A 'reasonable estimate' of the relevant quantities that would have been sold under the new tariff in the previous year is submitted as if the proposed new tariffs had been offered in that year. A 'reasonable estimate' is also to be submitted for the quantities that would have been sold under the existing parent tariff in the previous year if the proposed new tariffs had also been offered in that year. The later estimate is used in applying the tariff basket to the parent tariff.
- If the ESC cannot verify the estimates provided by the DNSP as being reasonable, notification will be given, and revisions will be required, or additional evidence must be submitted to address the ESC's concerns.
- Each new tariff is also required to comply with a rebalancing constraint of the form $CPI+Y$, in addition to the overall $CPI-X$ tariff basket constraint.
- When a new charging component (rather than category) is introduced, data on previous quantities sold and existing prices is also not available for the new parameter. These tariffs are incorporated into the tariff basket control in the same way as for other new tariffs. Hence DNSPs need to submit a 'reasonable estimate' of the relevant quantities that would have been sold under the tariff with the new charging parameter in previous year had it been offered, and an estimate of the quantity of the parent tariff that would have been sold in the previous year if the new tariff had also been available (if the parent tariff continues to be offered). Evidence to support estimates must be provided for the ESC to verify. Notification of any deficiencies will be provided.
- By requiring the use of estimates of the quantities they expect would have been sold (under both the new and the existing tariffs) if the proposed tariff had been offered in the previous year, previous year weights are used, rather than current year weights. This is done to reduce any incentives for strategic behaviour on behalf of the DNSPs, such as raising prices fastest on those tariff components where quantities are growing at the fastest rate.
- Estimates are required for two years following the introduction of a new tariff or a new charging parameter, after which time actual data relating to past quantities will be available and the new tariff can be incorporated into the tariff basket as per old tariffs.

7 ADDITIONAL ISSUES

This chapter raises additional issues associated with the new regulatory arrangements that the Tribunal will consider in this review. These include:

- treatment of service quality in the regulatory framework
- the length of the 2004 regulatory period
- the process for reviewing the alternate pricing methodology under Part E of Chapter 6 of the Code
- the methodology for separating network tariffs into TUOS and DUOS charges
- the structure and application of limits on price movements
- mechanisms for creating incentives for improving efficiency.

7.1 Service quality

The Tribunal considers that it would be desirable for service standards to be explicitly incorporated into the regulation of network prices during the 2004 regulatory period. The quality of service provided by a DNSP affects its costs of providing that service.

There are a number of dimensions to the quality of service including:

- quality of supply — relating to how well a flow of electricity serves customers, factors include voltage fluctuations, harmonic oscillations, supply frequency etc
- customer service — relating to the quality of dealings between the DNSP and customers
- reliability — relating to the maintenance of a flow of electricity to premises, commonly measured in terms of the number and duration of interruptions.

While the Tribunal recognises that, to varying degrees, all three of these dimensions are likely to matter to customers, difficulties in measuring quality of supply and the quality of customer service are likely to pose a practical barrier to their incorporation in the regulatory regime for the 2004 review. For example, the Tribunal understands that none of the four DNSPs currently has monitoring facilities to assess voltage fluctuations and power quality across the entirety of their networks.

The fact that quality of supply and customer service are currently difficult to measure does not preclude their inclusion in future regulatory frameworks. An issue for the Tribunal during this review is whether it would be desirable to set in train a process that encourages DNSPs to upgrade their systems in terms of measuring the quality of supply and customer service. Resolving this issue will require the Tribunal to gain an understanding of how much these elements of service provision matter to customers, the costs of developing reliable measurement and information systems, and whether customers might be willing to bear the costs of developing measurement and information systems, with a view to incorporating these dimensions of quality in regulation at a later date.

The Tribunal's view is that measures of reliability offer the best prospect of being incorporated into the regulatory regime in 2004. The Tribunal commissioned PB Associates to assess the ability of DNSPs' systems for measuring and reporting network reliability data. PB Associates advice to the Tribunal is that, while it would be currently possible to set system-wide reliability measures, it would not be possible to establish reliability measures at a more disaggregated level such as the Standing Committee on National Regulatory Reporting Requirements (SCNRRR) feeder categories of CBD, Urban, short rural and long rural.³² However, PB Associates reports that DNSPs have a number of projects in place to improve the performance of their information systems but that the definitions and structure of the reporting framework needs to be developed in sufficient detail to guide the development of these systems.

The Tribunal has therefore established a Services Standards Consultative Group to address detailed issues such as defining reliability measures. The Group comprises representatives of DNSPs and other interested stakeholders.

The development of the cost building blocks will require the Tribunal to assume that DNSPs achieve a certain level of reliability. For a range of reasons, the reliability achieved by a DNSP may not meet this level of reliability. A DNSP might, for example, reduce the frequency of maintenance, delay capital expenditure or undertake less tree trimming. With no linkage between price and service quality, these actions would reduce a DNSP's costs without impacting on its revenue. The DNSP could therefore increase its profit by reducing service quality.

Alternatively, a DNSP might outperform its targets due to greater operating, maintenance and capital expenditure, and more efficient responses to supply interruptions. However, with prices fixed, the DNSP would have no means of recovering additional expenditure or being rewarded for efficiency improvements, and its profits would fall. It would have little incentive to improve reliability.

As discussed in the previous chapter and in Appendix 3, one means of addressing these possible outcomes is to include a service standards incentive mechanism in the price control equation—an 'S factor'. Such a mechanism would establish a linkage between the price level and a DNSP's performance relative to reliability targets. If the DNSP out-performed the level of reliability assumed in the building blocks, it could be rewarded through a higher average price in following years. Failure to achieve the level of reliability could result in a penalty through a lower average price in following years. An issue for the Tribunal is whether to include provision for both a penalty and a reward, a penalty only or a reward only.

The development of an S factor incentive regime will require the Tribunal to work through a number of issues with DNSPs and other stakeholders, via the Services Standards Consultative Group. These include:

- the form of the S-factor and the availability of data to support it
- what measures of reliability matter to consumers
- whether the incentive should be allow for penalty and a reward, a penalty only or a reward only

³² A copy of the SCNRRR report can be found on the Tribunal's website.

- what level of revenue should be at risk
- how long DNSPs should retain the incentive
- how to ensure equity in terms of geography and income — how best to target incentives to those among the community that are willing to pay for it.

The availability of appropriate and reliable data is an essential foundation for an incentive regime. Without this, there is a danger that an incentive regime could lead to perverse outcomes. PB Associates has advised the Tribunal that at this stage, DNSPs systems for monitoring and reporting on reliability would not be adequate for the introduction of an incentive regime. However, PB Associates reports that the DNSPs have a number of projects underway and that it is important that the definitions and structure of the reported framework are developed in sufficient detail to allow the DNSPs to incorporate these requirements into the new information systems. Through the Services Standards Consultative Group, the Tribunal will work with DNSPs and other stakeholders to develop and understand the strengths and limitations of DNSP data systems with a view to developing potential service incentive model regimes that could be applied in the 2004 Determination.

The Tribunal will not be able to make a decision on the whether it is appropriate to include a financial incentive in the regulatory regime until it has considered all the issues discussed above and reviewed the model regimes developed by the Services Standards Consultative Group.

7.2 Length of regulatory period

The Tribunal must determine the length of the regulatory period that commences on 1 July 2004. The Code specifies that the regulatory period must not be less than 3 years (clause 6.10.5(c)). However it can be longer.

The length of the regulatory period has implications for the incentives for efficiency improvements, the predicability and stability of the regulatory environment and the effectiveness of the regulation. The benefits of a longer regulatory period include:

- greater incentives for achieving increased efficiency, by allowing the DNSPs to retain more of any gains (in the form of higher profits) arising from cost reductions
- more stable and predictable regulatory environment for businesses, which may lower business risk and lead to better investment decisions
- fewer regulatory reviews and lower costs for the regulator and the stakeholders.

However, a longer regulatory period has undesirable impacts, including:

- delaying consumers from benefiting from efficiency gains
- increased risk of changes in the industry and in technology creating significant disparity between costs and revenues.

The current regulatory period in NSW began on 1 February 2000 and ends on 30 June 2004. Victoria and South Australia have adopted five-year regulatory periods for distribution businesses in their jurisdictions, while the Queensland Competition Authority's determination on distribution prices is for four years. The Australian Competition and Consumer Commission determined a five-year regulatory period for Transmission Network Service Providers (TNSPs).

The Tribunal believes that a regulatory control period of five years would strike a balance between providing incentives for improving efficiency, reducing regulatory uncertainty and minimising the risk that changes in the industry affect the appropriateness of the regulation.

The Tribunal proposes a regulatory control period of five years commencing 1 July 2004, and invites public comment on its preferred position.

7.3 Alternate pricing principles methodology

The Tribunal has developed an alternate pricing methodology to the approach set out in Part E of Chapter 6 of the Code in its *Pricing Principles and Methodologies for Prescribed Electricity Distribution Services - Developed pursuant to clause 6.11(e) of Part E, Chapter 6 of the Code* (PPM). The PPM relates to the current regulatory framework and will need to be revised before 1 July 2004.

The Tribunal intends to establish a consultation group to consider issues associated with revising the PPM. The purpose of the consultation group will be to provide input on a number of detailed matters. The Tribunal will then consider this input, together with other analysis put to it, in revising the PPM.

The Tribunal will convene this consultation group in December 2002, and anticipates that the draft revised PPM will be released with the draft determination in November 2003.

7.4 Separation of network tariffs into TUOS and DUOS

Network tariffs levied by the DNSPs comprise two elements—DUOS charges and TUOS charges (see Chapter 3 for an explanation). DUOS tariffs will be regulated through the weighted average price cap, while the DNSPs will be allowed to recover the actual transmission charges they pay to the transmission network service providers (net of transmission settlements residue payments) through TUOS tariffs. This means they need to separate network tariffs into DUOS and TUOS tariffs.

In August 2002, the DNSPs submitted a joint draft TUOS Allocation Methodology outlining their proposed principles for separating TUOS and DUOS charges. These include that:

- total TUOS allocated to network tariffs should align with total estimated TUOS for a DNSP
- TUOS charges should be allocated to network tariffs in a way which reflects the cost drivers present in transmission pricing
- DNSP site-specific CRNP customers should have TUOS charges allocated in a way that preserves the location and time signals of transmission pricing as per clause 6.10.2(b)(4) of the Code
- DNSP network tariffs for smaller customer classes should have TUOS charges allocated on an average basis, as locational signals cannot be preserved.

The DNSPs also outlined a range of key challenges in relation to the allocation of TUOS charges. These include:³³

- The difficulty in equitably allocating the general and common service fixed charge as a fixed network access charge. This charge accounts for approximately 70 per cent of TUOS (on average) and is apportioned based on total energy.
- The significant variation in the proportion of usage and fixed charges between locations.
- The availability of appropriate metering data. Residential and small business customers do not have time-of-use and demand metering, so assumptions will need to be made based on standard or sample profiles.
- Factoring in diversity of demand.
- Passing through locational price signals when the end price is applied to many customers within the network. Locational signals can be preserved for large site-specific or CRNP customers and inter-distributor transfers. However, locational signals are not preserved for network prices applying to smaller customer classes. This is because there are large numbers of customers within the same class spread across the network and being fed from all bulk supply points. As such, the DNSPs propose that TUOS charges for these customer classes be allocated on an averaged basis.

The Tribunal seeks comments on how DNSPs should separate current network tariffs into distribution and transmission charges.

7.5 Limits on price movements

The weighted average price cap proposed by the Tribunal places limits on the aggregate change in DUOS tariffs (and tariff components) for each year of the regulatory period. However, the price cap by itself does not limit the extent to which individual tariffs or tariff components can increase each year, provided weighted average price change complies with the control formula.

In previous determinations, the Tribunal addressed the potential for customers to experience rapid price increases by imposing a limit on the maximum annual increase allowed for individual network tariffs. In the next determination, network tariffs will be separated into DUOS tariffs and TUOS tariffs. The Tribunal has stated³⁴ that it will impose limits on price movements for total network tariffs, and will also consider separate limits for DUOS tariffs.

7.5.1 Limits on price movements for network tariffs

The Tribunal has to decide the level at which limits on price movements for network charges should be set. Before making this decision, the Tribunal needs to analyse the information that it will receive from the DNSPs. However, it acknowledges that tight limits on price movements may limit the amount of price restructuring the DNSPs can undertake, and that this could limit the overall average price increase to below that allowed under the price control formula. This could leave the DNSPs with actual revenue that is lower than their

³³ Joint Submission by Integral Energy, EnergyAustralia, Country Energy and Australian Inland on TUOS Allocation Methodology, 29 August 2002, pp 2-3.

³⁴ IPART, *Notice under clause 6.10.3 of the National Electricity Code - Economic Regulatory Arrangements*, NCR-10, June 2002.

notional revenue requirement. In addition, the DNSPs have commented previously that limits on price movements reduce the scope for tariff reform, by limiting the extent of tariff rebalancing directed at unwinding cross-subsidies and introducing more cost-reflective prices and price structures.

In its 1999 determination, the Tribunal applied an overall limit on average price movements and individual bills for residential customers only. There were no individual limits for business customers. In this review, the Tribunal will consider whether to limit price movements for total network tariffs for business customers as well as for residential customers. Are business customers as exposed to affordability concerns and increases in prices as residential customers?

The Tribunal seeks comment on:

- ***Whether limits on price movements for network tariffs should be for residential customers only, or also for business customers?***
- ***The level at which limits on price movements for network tariffs should be set for residential customers and for business customers?***

7.5.2 Limits on price movements for DUOS tariffs

As discussed above, the weighted average price cap only limits the average change in DUOS tariffs in each year of the regulatory period. It does not limit the extent to which any individual tariff can increase or decrease each year, provided the average price changes comply with the formula.

The Tribunal seeks comment on whether this is sufficient, or whether additional limits on price movements for individual DUOS tariffs are required.

7.6 Creating incentives for improving efficiency

Creating incentives for efficiency improvements is a key objective for the 2004 determination. The CPI-X form of regulation that underlies the weighted average price cap allows the DNSPs to retain the benefits of efficiency 'out performance' during the regulatory control period (or the costs of under performance). However, if any efficiency gains are converted into immediate price reductions at the next regulatory reset, then the incentives for achieving efficiency improvements tend to be weaker toward the end of the regulatory period. For example, the DNSPs may have an incentive to create the impression that potential productivity gains are more difficult to achieve, in a bid to influence the process of setting the notional revenue requirements and the X factor for the following regulatory period.

An issue for the Tribunal is whether the incentive properties of the proposed price cap regulation require strengthening and, if so, what practical options might be available. This strengthening of incentives might take the form of an 'efficiency carryover' mechanism, such as that introduced by the Essential Service Commission (ESC) in Victoria (see Appendix 3). This kind of mechanism would strengthen incentives by extending the period over which the DNSPs are able to retain the benefits of efficiency gains beyond the next regulatory reset.

The Tribunal is aware of the general arguments that are used to support the inclusion of additional efficiency incentives, beyond those already present in CPI-X regulation. However, there are a range of issues that would need to be resolved before an efficiency carryover could be implemented, including:

- how to measure and allocate efficiency gains
- whether the incentive should apply to losses as well as gains
- how to handle unexpected growth and other sources of divergence from the initial assumptions underlying the efficiency benchmarks
- any implications for service standards
- the transparency and simplicity of the approach, consistency with the Code and whether a carryover unduly fetters the actions of future regulators.

At this stage, the Tribunal is not inclined to implement a forward looking efficiency carry-over mechanism during the 2004 regulatory period. It is not clear to the Tribunal that the benefits to be gained from such a measure outweigh the practical difficulties associated with their implementation and justify their inclusion in the 2004 price control.

Nevertheless, the Tribunal recognises the importance of efficiency incentives in the context of this review and invites submissions on the following questions, and any other relevant matters:

- ***Is the introduction of a forward-looking efficiency incentive, in addition to the incentives already present in the CPI-X form of regulation, justified, and if so on what grounds?***
- ***Would the introduction of an efficiency incentive have any implications for the regulation of service levels?***
- ***If a forward-looking efficiency incentive mechanism is to be considered, what are the principles on which it should be based?***
- ***What are the carryover options that would best meet criteria of effectiveness and practicality?***

As well as the issue of a *forward* looking efficiency carryover mechanism, the Tribunal may consider the carryover of any efficiency gains from the current regulatory period into the period commencing 2004. Applying a carryover to the DNSPs from the 2000-2004 regulatory period would require:

- retrospectively setting the expected or target performance—that is, the benchmark cost efficiencies applicable to 2000-2004
- measuring their actual cost efficiencies achieved over the period—their actual performance
- assessing the causes of any variation between these levels—determining whether there is an attributable benefit or cost that should be applied to DNSPs.

This 'backward-looking' analysis could be undertaken as part of the proposed 2004 total cost review, using the 1999 Determination as a starting point. However, it would carry a risk of considerable analytical complexity and practical difficulty.

The Tribunal does not see merit in pursuing backward looking efficiency carryover mechanism.

APPENDIX 1 OBJECTIVES AND PRINCIPLES OF PART D OF CHAPTER 6 OF THE NATIONAL ELECTRICITY CODE

6.10.2 Objectives of the distribution service pricing regulatory regime to be administered by the Jurisdictional Regulators

The distribution service pricing regulatory regime to be administered under Part D of the Code must seek to achieve the following outcomes:

- (a) an efficient and cost-effective regulatory environment;
- (b) an incentive-based regulatory regime which:
 - (1) provides an equitable allocation between Distribution Network Users and Distribution Network Owners of efficiency gains reasonably expected by the Jurisdictional Regulators to be achievable by the Distribution Network Owners;
 - (2) provides for, on a prospective basis, a sustainable commercial revenue stream which includes a fair and reasonable rate of return to Distribution Network Owners on efficient investment, given efficient operating and maintenance practices of the Distribution Network Owners;
 - (3) ensures consistency in the application of regulations applicable to:
 - (i) connection to distribution networks;
 - (ii) distribution service pricing; and
 - (4) provides for the recovery by *Distribution Network Service Providers* of *Customer TUOS usage charges* from those *Distribution Customers* that have a *metering installation* capable of capturing relevant *transmission system* and *distribution system* usage data, in a way that preserves the location and time signals of the *Customer TUOS usage prices*;
- (c) prevention of monopoly rent extraction by Network Owners;
- (d) an environment which fosters an efficient level of investment within the distribution sector, and upstream and downstream of the distribution sector;
- (e) an environment which fosters efficient operating and maintenance practices within the distribution sector;
- (f) an environment which fosters efficient use of existing infrastructure;
- (g) reasonable recognition of pre-existing policies of governments which are *Distribution Network Owners* regarding *distribution* asset values, revenue paths and prices;
- (h) promotion of competition in upstream and downstream markets and promotion of competition in the provision of network services where economically feasible;
- (i) reasonable regulatory accountability through transparency and public disclosure of regulatory processes and the basis of regulatory decisions;
- (j) reasonable certainty and consistency over time of the outcomes of regulatory processes, recognising the adaptive capacities of Code Participants in the provision and use of distribution network assets;
- (k) reasonable and well defined regulatory discretion which permits an acceptable balancing of the interests of Distribution Network Owners, Distribution Network Users and the public interest.

6.10.3 Principles for regulation of distribution service pricing

The regime under which the revenues of Distribution Network Owners and Distribution Network Service Providers (as appropriate) are to be regulated is to be administered by the Jurisdictional Regulators in accordance with the following principles:

- (a) Concerns over monopoly pricing in respect of the distribution network will, wherever economically efficient and practicable, be addressed through the introduction of competition in the provision of distribution services.
- (b) Where pro-competitive and structural reforms alone are not a practicable or adequate means of addressing the problems of monopoly pricing in respect of distribution services or protecting the interests of Distribution Network Users, the form of economic regulation to be applied is described in clause 6.10.5.
- (c) The form of economic regulation applied by the Jurisdictional Regulators must not be changed during a regulatory control period.
- (d) Subject to clause 6.10.3(c), if a Jurisdictional Regulator proposes to amend the form of economic regulation specified in clause 6.10.5 applied to a Distribution Network Owner, the Jurisdictional Regulator must:
 - (1) give two years prior notice to the Distribution Network Owner of the new economic regulation arrangements to apply from the commencement of the next regulatory control period; and
 - (2) publish a description of the process and timetable for re-setting the form of economic regulation at a time which provides all affected parties with adequate notice to prepare for, participate in, and respond to that process, prior to the commencement of the regulatory control period to which that form of economic regulation is to apply.
- (e) The regulatory regime to be administered by the Jurisdictional Regulator must be consistent with the objectives outlined in clause 6.10.2 and must also have regard to the need to:
 - (1) provide Distribution Network Owners with incentives and reasonable opportunities to increase efficiency;
 - (2) create an environment in which generation, energy storage, demand side options and network augmentation options are given due and reasonable consideration;
 - (3) take account of and be consistent with the allocation of risk between Network Owners and Network Users;
 - (4) take account of and be consistent with any obligations of Code Participants in relation to distribution networks under Chapter 5;
 - (5) provide a fair and reasonable risk-adjusted cash flow rate of return to Distribution Network Owners on efficient investment given efficient operating and maintenance practices on the part of the Distribution Network Owners where:
 - (i) assets created at any time under a take or pay contract are valued in a manner consistent with the provisions of that contract;
 - (ii) subject to clause 6.10.3(e)(5)(i), assets (also known as "sunk assets") in existence and generally in service on 1 July 1999 are valued at a value

- determined by the Jurisdictional Regulator or consistent with the regulatory asset base established in the participating jurisdiction;
- (iii) subject to clause 6.10.3(e)(5)(i), valuation of assets brought into service after 1 July 1999 ("new assets"), any subsequent revaluation of any new assets and any subsequent revaluation of assets existing and generally in service on 1 July 1999 is to be undertaken on a basis to be determined by the Jurisdictional Regulator. In determining the basis of asset valuation to be used, the Jurisdictional Regulator must have regard to:
 - A the agreement of the Council of Australian Governments of 19 August 1994, that deprival value should be the preferred approach to valuing network assets;
 - B any subsequent relevant decisions of the Council of Australian Governments; and
 - C such other matters reasonably required to ensure consistency with the objectives specified in clause 6.10.2; and
 - (iv) benchmark returns to be established by the Jurisdictional Regulator are to be consistent with the method of valuation of new assets and revaluation, if any, of existing assets and consistent with achievement of a commercial economic return on efficient investment;
- (6) provide reasonable certainty and consistency over time of the outcomes of regulatory processes having regard for:
- (i) the need to balance the interests of Network Users and Network Owners;
 - (ii) the capital intensive nature of the distribution sector, the relatively long lives of distribution assets, and the variable and frequent augmentation of the distribution network;
 - (iii) the need to minimise the economic cost of regulatory actions and uncertainty;
 - (iv) relevant previous regulatory decisions made by authorised persons including:
 - A the initial revenue setting and asset valuation decisions made by a government at a time at which that government was a Distribution Network Owner in the context of industry reform pursuant to the Competition Principles Agreement;
 - B decisions made by Jurisdictional Regulators and any regulatory intentions previously expressed; and
 - C decisions made by ministers under jurisdictional legislation.

APPENDIX 2 ADDITIONAL FACTORS THAT MAY BE ADDED TO PRICE CONTROL FORMULA

A2.1 Service standards incentive

As indicated in Chapter 7 the Tribunal considers that it would be desirable for service standards to be explicitly incorporated into the regulation of network prices during the 2004 regulatory period. The quality of service provided by a DNSP affects its costs of providing that service. Thus in determining each DNSP's cost building blocks and total revenue requirement, the Tribunal must assume it delivers a particular service quality level.

For a range of reasons, the reliability achieved by a DNSP may not meet the reliability assumed in the building block analysis. A DNSP might, for example, reduce the frequency of maintenance, delay capital expenditure or undertake less tree trimming. With no linkage between price and service quality, these actions would reduce a DNSP's costs without impacting on its revenue. The DNSP could therefore increase its profit by reducing service quality.

Alternatively, a DNSP might outperform its targets due to greater operating, maintenance and capital expenditure, and more efficient responses to supply interruptions. However, with prices fixed, the DNSP would have no means of recovering additional expenditure or being rewarded for efficiency improvements, and its profits would fall.

One means of addressing these possible outcomes is to include a service standards incentive mechanism in the price control equation—an 'S factor'. Such a mechanism would establish a linkage between the price level and a DNSP's performance relative to reliability targets.

If the mechanism was symmetrical, there would be a marginal price increase if the DNSP improved its standards over the previous year, and a marginal price decrease if standards fell. If the mechanism was asymmetrical, there would be penalties for under-performance and no reward for out-performance, or alternatively, incentives for out-performance and no penalties for under-performance.

The price control equation with inflation, X and reliability incentive factors included would take the form:

$$\frac{\sum_{i=1}^n \sum_{j=1}^m p_{ij}^{t+1} * q_{ij}^{t-1}}{\sum_{i=1}^n \sum_{j=1}^m p_{ij}^t * q_{ij}^{t-1}} \leq \frac{(1 + CPI_t - X_{t+1})(1 + S^t)}{(1 + S^{t-a})}$$

The S factor would be calculated for each distributor on the basis of:

- the performance gap—the difference between actual reliability and target reliability, based upon the selected measures
- an incentive rate—that is, the level of reward/penalty for reliability outcomes.

The development of an S factor incentive regime will require the Tribunal to work through a number of issues with DNSPs and other stakeholders. These include:

- form of the S factor and the availability of data to support it
- what measures of reliability matter to consumers
- whether the incentive is symmetrical or asymmetrical
- what level of revenue should be at risk
- how long DNSPs should retain the incentive
- equity in terms of geography and income — how best to target incentives to those among the community that are willing to pay for it.

The availability of appropriate and reliable data is an essential foundation for an incentive regime. Without this, there is a danger that an incentive regime could lead to perverse outcomes. PB Associates has advised the Tribunal that at this stage, DNSPs systems for monitoring and reporting on reliability would not be adequate for the introduction of an incentive regime. However, PB Associates reports that the DNSPs have a number of projects underway and that it is important that the definitions and structure of the reported framework are developed in sufficient detail to allow the DNSPs to incorporate these requirements into the new information systems. As set out in Chapter 7, the Tribunal will be establishing a Services Standards Consultative Group to work with DNSPs and other stakeholders to develop and understand the strengths and limitations of DNSP data systems with a view to developing potential service incentive model regimes that could be applied in the 2004 Determination.

A2.2 Correction factor

The Tribunal has indicated that it would consider including a correction factor in the price control formula, to allow factors arising in the current regulatory period to be carried forward into the regulatory period commencing 1 July 2004. There are two ways in which it may consider using a correction factor:

1. Treatment of unders and overs account balance at 30 June 2004. The current regulatory regime includes a revenue cap with an unders and overs account to correct for differences in forecast and actual revenue. Therefore, at the end of this regulatory period there will be a balance in each DNSP's unders and overs account. The Tribunal needs to consider how to treat this balance. It could use this correction factor to carry forward these balances. Alternatively, it could adjust the revenue requirement to account for the unders and overs account balances. (This issue is discussed further in Chapter 5.)
2. Treatment of capital and operating expenditure in excess of that included in the 2000-2004 regulatory period. The DNSPs are likely to have spent more capital and operating expenditure than provided for in the 2000-2004 regulatory period. The Tribunal is considering how that additional expenditure should be treated—whether it is revenue foregone, or should be provided for in the next regulatory period. If it decides to provide for it in the next regulatory period, it may use this correction factor to adjust the revenue requirements.

A2.3 Inter-distributor transfers

Inter-distributor transfers (IDTs) are payments made by one DNSP to another, for conveying electricity through its distribution network. This cost forms part of each business' revenue requirement, as determined by the cost building blocks approach. It could be passed through to retailers by adding a mechanism to the weighted average price cap. Alternatively, it could be deducted from the revenue requirements and passed through with transmission charges.

A2.4 Demand management

Demand management involves a number of ways that a supplier can meet its customers' energy needs by either shifting or reducing their demand. It involves actions that alter the level or pattern of energy consumption, the energy source, or the use of the distribution network. Demand management is used to alter the use of the network focus on solving network capacity constraints in ways that are more cost-effective than network augmentation. They include technologies that can drive load shape changes, such as distributed generation projects, power factor correction and fuel switching.

Demand management also offers value in terms of avoided generation costs and possible customer service benefits. Hence the total cost of demand management options need not be greater than network costs. If demand management costs are less than capital expenditure on more traditional network solutions, a question raised in the Tribunal's inquiry into demand management was how should these efficiency gains be treated? Should they all be passed onto customers, or perhaps retained by the DNSP for a period of time? This will be an issue for this review.

The Tribunal could allow for payments for demand management projects, including payments to embedded generators, in the regulatory arrangements by adding them to the revenue requirement on which the X factor is calculated, or by passing them through with transmission payments.

The Tribunal's preference is to pass IDT and demand management costs through with transmission payments, as including them in the weighted average price cap exposes them to forecast risk and the DNSPs may make a windfall gain or loss. This approach is consistent with that adopted by the Essential Services Commission of Victoria.

A2.5 Other specified costs

At this stage of the review, the Tribunal does not envisage that there will be a need for a mechanism to allow additional specified costs that are not incorporated into the building blocks to be passed through. However, it may consider such a mechanism if a need arises. For example, during the current regulatory period, the costs of implementing full retail contestability could have been passed through using such a mechanism. These costs were not known at the time the 1999 Determination was made.

A2.6 Forecast risk and risk hedging

The revenue cap through which the DNSPs are currently regulated contains an ‘unders and overs’ account to correct for differences between their expected revenue and their actual revenue. The weighted average price cap to be used in the next regulatory period does not include an unders and overs account. However, in its notice of the new economic regulatory arrangements,³⁵ the Tribunal indicated that it would consider including a mechanism to adjust prices in the event that actual volumes differ significantly from forecast volumes. This would allow customers to share the benefits of high growth through lower prices, and provide for customers to partially compensate the DNSPs through higher prices if their revenue fell short of their costs as a result of lower than forecast demand.

It is common practice for businesses faced with large and identifiable risks to ‘hedge’ these risks. This is done, for example, to reduce exposure to unpredictable movements in interest rates, exchange rates, or commodity prices. The issue for the Tribunal is whether the forecasting risks are reasonable for DNSPs and customers to bear, or whether they are potentially large enough to warrant the inclusion of a hedging mechanism. Another issue is whether the risk borne by the DNSPs and their customers is symmetrical, or does the process for forecasting growth create an opportunity for the DNSPs to transfer the risk to their customers.

A hedging mechanism would adjust the average price change if the previous years’ growth in energy sales exceeded (or fell short of) the forecast growth rate by a specified margin. For example, if the previous years’ growth in energy sales were within 100 basis points of the forecast rate, the mechanism would have no effect. However, if energy growth was much higher than expected, the next year’s prices would be lower than they otherwise would have been, to partially offset DNSPs’ excess revenue; and if growth was much lower than expected, prices would be increased to partially compensate DNSPs for their revenue shortfall.

If the hedging mechanism is denoted as H, the price control equation for the weighted average price cap with the X and H factors included would be:

$$\frac{\sum_{i=1}^n \sum_{j=1}^m p_{ij}^{t+1} * q_{ij}^{t-1}}{\sum_{i=1}^n \sum_{j=1}^m p_{ij}^t * q_{ij}^{t-1}} \leq (1 + CPI_t - X_{t+1})(1 + H)$$

If a hedging mechanism were included, the Tribunal’s determination would specify the threshold at which H would come into effect (for example, H is zero if actual energy growth is within 100 basis points of forecast growth). It would also determine H to return a specified percentage of excess revenue to customers (or recover a percentage of DNSPs’ revenue shortfall) through a price adjustment for the following year (for example, shared 50/50 between DNSPs and customers).

³⁵ IPART, *Notice under clause 6.10.3 of the National Electricity Code - Economic Regulatory Arrangements*, NCR-10, June 2002.

A key issue for the Tribunal, if it were to include a hedging mechanism, is to determine the threshold at which H should take effect. A further issue will be to determine the basis for sharing excess revenue or revenue shortfalls between DNSPs and customers.

APPENDIX 3 THE VICTORIAN ESC EFFICIENCY CARRYOVER MECHANISM³⁶

As part of its pricing determination for the period 2000-05, the Essential Services Commission of Victoria included an efficiency carryover mechanism that allowed DNSPs to retain the benefits of any cost savings (capital and operating) for a period of 5 years. The broad details of the mechanism are as follows.

- The carryover mechanism is based on the difference between benchmark forecasts and outturn expenditure in relation to operating and maintenance and capital costs only.
- An efficiency gain (loss) in operating and maintenance activities in any year is calculated as a reduction (increase) in the level of *recurrent* operating and maintenance expenditure, compared to the benchmark forecast expenditure for that year.
- An efficiency gain (loss) in capital expenditure is calculated as the regulatory WACC, multiplied by the difference in that year's capital expenditure against the original benchmark forecast. No adjustment is included for differences in depreciation.
- Any efficiency gains (or losses) are retained by the distributor for five years *after* the year in which the gains (losses) are achieved. This implies a sharing of benefits between the distributor and customers of around 30:70 in net present value terms and provides an equal treatment of savings in each year.
- There will be no reopening of the original benchmark operating and maintenance and capital expenditure forecasts (except where appropriate under clause 6.3 of the Tariff Order or where there have been changes to legislative obligations placed on distributors).
- In line with the above principle, there will be no adjustment of the original benchmark operating and maintenance and capital expenditure forecasts to reflect any difference between actual demand and forecast demand.
- Efficiency gains and losses are treated symmetrically. In determining the overall gain or loss in any one year, ESC looks at the combined gains or losses calculated for capital expenditure plus operating and maintenance expenditure.
- A floor of zero is set on the carryover amount in any one year, (ie, there is no *negative* carryover in any year of a future regulatory period). Where the combined carryover from operating and maintenance expenditure plus capital expenditure would be negative, the efficiency carryover will be set to zero for that year, and the implied negative value will be used to offset any positive gain in the following year.
- Implied negative values are carried over and accrued in each year, until the end of the regulatory period.
- Any accrued negative carryover amount at the end of the regulatory period will be taken into account in setting benchmarks for the following regulatory period.

³⁶ Office of the Regulator General, *Electricity Distribution Price Determination, Volume 1*, pp 83-84, Victoria.