Commerce Commission

Review of Asset Valuation Methodologies: Electricity Lines Businesses' System Fixed Assets

DISCUSSION PAPER

1 OCTOBER 2002

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EXECUTIVE SUMMARY

The Commerce Commission (Commission) is required under Part 4A of the Commerce Act 1986 (Part 4A) to undertake a review of asset valuation methodologies for electricity lines business system fixed assets. This discussion paper is part of that review. The Commission invites written submissions on the paper by 4 November 2002. A conference will be held from 25-29 November 2002.

The Commission is also required under Part 4A to set thresholds for the declaration of control in respect of electricity distribution and transmission services supplied by electricity lines businesses. This paper includes coverage of the links between the regulatory regime required under Part 4A and possible valuation methodologies for system fixed assets.

A number of questions, to help interested parties focus their submissions, are included in this paper. Submitters should, however, feel free to raise any other relevant matters not specifically addressed in the questions or otherwise canvassed in this paper.

Evaluation Criteria

The Commission has proposed criteria for evaluating the asset valuation methodologies. These are to a large extent based on the Purpose Statement contained in subpart 1 of Part 4A. Submissions made on the Issues Paper on asset valuation methodologies previously released by the Commission (March 2002) were also considered. The proposed criteria are:

1. Efficiency – the methodology should support outcomes that are allocatively, productively and dynamically efficient;

2. Identification of any excessive profits – the methodology should facilitate the identification of excessive profits; and

3. Cost effectiveness – the methodology should achieve valuation objectives for regulatory purposes at lowest cost, all else being equal.

Valuation and Regulatory Control

In a regulated environment, constraints may be placed on a firm's allowed capital costs. Capital costs comprise the return *on* capital (the allowed rate of return) and the return *of* capital (depreciation). Both the return on and of capital depend on the regulated asset base, and therefore on the asset valuation methodology.

Investments in assets involve risks arising primarily from inflation, premature asset failure, and economic stranding (due either to unanticipated shifts in demand or to technological obsolescence). Such risks are exacerbated when assets are long-lived and capital costs are recovered over long time periods, as is the case with most electricity lines businesses' assets.

The choice of valuation methodology and other regulatory parameters can affect the extent of investment risks, and the allocation of risks between investors and consumers. Some risks, such as from unanticipated inflation, cannot be avoided by investor action. For these risks, investors should be compensated. If investors were not compensated for such risks, future investments would not occur.

In other circumstances, imposing the risks of economic stranding on investors (by using a valuation method that includes the optimisation of assets) should be beneficial in providing incentives for the firm to ensure that it invests in appropriate technology, and prevents "gold plating" its assets. It may also reduce the risk of inefficient by-pass of the existing assets. On the other hand, optimisation may create investment risk and can involve a social cost if the risk is not compensated. Thus, the inclusion of optimisation in an asset valuation process involves trading off the creation of investment risk (and the need to compensate investors for such risk) against the reduction in investor "moral hazard"[1] and/or inefficient by-pass.

Asset Valuation Methodologies

Two broad approaches to valuation are commonly used, namely revenue-based approaches (e.g. opportunity cost, discounted cash flow, and market transaction value) and cost-based approaches (e.g. historic cost and replacement cost). The Commission does not favour discounted cash flow and market transaction valuations of system fixed assets because such valuations can build in expectations of earning monopoly profits.

The Commission supports opportunity cost as an over-riding valuation principle. However, the system fixed assets of electricity lines businesses are specialised, and hence their costs are sunk, meaning that their opportunity cost is low, or close to zero. A valuation at scrap value would not allow investors to recover the costs of their investments, and hence would jeopardise future investment and therefore dynamic efficiency. Hence, specialised assets such as line business system fixed assets have to be valued according to either their historic or replacement cost.

The focus of this discussion paper is therefore on the historic cost and replacement cost valuation methods.

In discussing alternative valuation methods, the Commission has distinguished between methods that could be used for establishing opening system fixed asset valuations (for the opening asset base), and for the ongoing valuation of system fixed assets in the future.

The historic cost (HC) of an asset is the original cost of acquiring the asset, as recognised under generally accepted accounting principles. Historic costs are usually depreciated to reflect "wear and tear" and obsolescence over the economic lives of assets. Historic costs may also be indexed for inflation.

[1] The term "moral hazard" refers to a person's weakened incentives to act prudently when they don't bear all of the costs of their actions.

Replacement cost (RC) is defined as the current cost of acquiring a present day asset (a "modern equivalent asset") that could provide a similar level of service to the asset in question. Replacement cost is based on the technology of the day and, therefore, current market values. Optimised depreciated replacement cost (ODRC) is an estimate of the depreciated cost of the most efficient, lowest-cost combination of assets that could replace existing assets and offer the same utility or level of service, or the level of service customers prefer.

Optimised deprival value (ODV) is defined as being equal to the loss to the owners if they were deprived of the assets and then took action to minimise their loss. ODV is equivalent to ODRC, except where it would not be rational from an economic perspective to replace an asset. In the latter case, ODV is equal to the economic value (EV) of the asset, where EV is defined as the greater of scrap value or value to users.

Opening Asset Base

The opening asset value chosen could, in particular, have implications for embedding any existing excessive profits into the future (via excessive valuations), and/or for perceptions of regulatory risk by investors, which may affect their incentives to undertake future investment. Possible approaches to valuing the opening system fixed asset base are presented in the table below.

Opening Valuation Options
1. Book valuation at date of vesting, or at separation, of electricity lines businesses, rolled forward to account for depreciation, disposals and additions (valued at historic costs)
2. Most recent audited historic cost valuation rolled forward to account for depreciation, disposals and additions (valued at historic costs)
3. ODV valuation audited by Commission in 2002
4. ODV or ODRC (or other) based on existing or new ODV Handbook (or other rules to be developed)

Future Asset Base

Over time, the historic cost of the asset base would be measured by the opening valuation (however that was determined) plus/minus the historic cost of additions/deletions and minus depreciation since the opening valuation.

For determining the value of the asset base over time, the approaches technically differ largely in terms of their treatment of optimisation and inflation. The table below illustrates how each of the asset valuation methodologies discussed in this paper can be categorised in relation to these two factors. The table presents three levels of optimisation and three distinct ways of accounting for inflation.

Comparison of Cost-Based Approaches

	No Optimisation	Some Optimisation	High Optimisation
No inflation adjustment	DHC	DHC with a "used and useful" test	N/A
Adjustment for replacement cost movements	DRC	ODRC/ODV	ODRC/ODV
CPI adjustment	Indexed DHC	Indexed DHC with a "used and useful" test	N/A

DHC – depreciated historic cost
DRC – depreciated replacement cost
ODRC – optimised depreciated replacement cost
ODV – optimised deprival value

Use of the ODV Methodology by Electricity Lines Businesses

ODV was first used in New Zealand in 1991 for the valuation of the transmission assets owned by the Electricity Corporation of New Zealand (ECNZ), and then to establish the book value of Transpower prior to it becoming a State-Owned Enterprise on 1 July 1994. In addition, since 1994, ODV has been an integral component of the information disclosure regime for all electricity lines businesses. The aim of information disclosure is to improve performance by electricity lines businesses by improving the transparency, comparability and monitoring of relevant information. As part of this process, all electricity lines businesses are required to undertake and disclose periodic ODV valuations of their system fixed assets.

The prescribed ODV method is set out in the Ministry for Economic Development's ODV Handbook (ODV Handbook), now in its fourth edition. Revisions to the prescribed ODV method over time have focused on improving the consistency of valuations. Parsons Brinckerhoff Associates Ltd, appointed by the Commission to assist with the audit of system fixed asset valuations pursuant to Part 4A, have proposed, in their Closing Report to the Commission, a number of possible improvements to the prescribed ODV method. This paper does not critically assess those recommended improvements, or the appropriateness of the prescribed ODV method generally. If the Commission ultimately decided on ODV, the recommended changes to the ODV Handbook would need to be considered. If another method were ultimately decided on, its means of implementation and application would also need to be considered.

Industry-specific Issues

In preparing this paper, the Commission has been aware of asset valuation issues in the telecommunications and airports industries. Although, as a general principle, the Commission considers consistency in asset valuation methodology to be desirable, there may be legitimate reasons for using different approaches in different industries or in different circumstances.

The choice of valuation methodology could, among other things, depend on industry-specific issues. Industry-specific issues that could affect the choice of valuation approach for the electricity industry include the following:

- the system fixed assets owned by electricity lines businesses are, for the most part, specialised (and hence comprise a sunk cost);
- technological change may be a more significant source of investment risk in the future than it has been in the past. For example, distributed generation may significantly affect the future value of transmission and distribution services; and
- the use of the ODV method since 1994 for the purposes of the electricity information disclosure regime may have validated that approach for pricing purposes in the minds of some parties.

International Practice

The Commission has considered the approaches taken to asset valuation for regulatory purposes in electricity and gas markets in the United States, Australia and the United Kingdom. International regulatory practice appears to depend on the context of its introduction. For example, utility regulators in the United States have tended to rely on historic cost accounting conventions ever since a landmark court judgement in 1945. In Australia and the United Kingdom, regulatory practice has depended to some extent on the processes associated with vesting and/or privatisation of the assets. Historic cost conventions are the norm in the United Kingdom, while in Australia both historic cost and ODRC are used by various regulators for the valuation of gas and electricity network assets.

Assessment Against the Criteria

The evaluation criteria noted above are used to assess the relative merits of various asset valuation methodologies for setting the opening asset valuations of system fixed assets and for valuing system fixed assets into the future. The focus in this paper is on historic cost-based and replacement cost-based approaches. The aim in this paper is to highlight, in terms of the evaluation criteria, the pros and cons of adopting particular asset valuation methods.

For the discussion of opening valuations of system fixed assets, historic costs are generally taken to mean the book values at the time of vesting plus additions and deletions at actual costs incurred since the time of vesting (vesting historic cost). ODV refers to the electricity lines businesses' audited ODV valuations (i.e. as at 31 March 2001) using the prescribed ODV method for information disclosure purposes (as per the ODV Handbook). In terms of the valuation approaches going forward, references to ODV do not necessarily mean the methodology as described in the current ODV Handbook. For example, opening valuations based on ODV could subsequently be modified according to a revised ODV Handbook. Similarly, references to DHC do not necessarily mean the precise methodology described in existing financial reporting standards.

Efficiency Criterion

In respect of electricity lines business system fixed assets, the Commission considers that for both opening and future valuations, allocative and productive efficiency considerations are less important than dynamic efficiency in assessing the methods under the efficiency criterion.

There may be dynamic efficiency implications for the valuation of opening asset bases. If investors were to consider that the Commission's opening asset values signalled an increased regulatory risk through values being set "too low", this could reduce incentives for investors to undertake efficient investments in the future. Balanced against this view, is the concern that if opening valuations were set "too high", inefficient investment (e.g. by-pass) might be encouraged. A further consideration is that valuations significantly below book values might give rise to financial difficulties for some electricity line businesses.

The Commission considers that, in principle, opening asset values could range from scrap values to the current ODV values. Opening values based on ODV could be lower than current book values for a number of electricity lines businesses (because of recent acquisitions at some multiple of ODV), while opening values based on vesting values (historic cost) are likely to be lower than ODV.

The dynamic efficiency implications of the different methodologies for valuing system fixed assets into the future are uncertain. This uncertainty arises because of the trade-off inherent in optimisation under ODRC. Optimisation may increase an investor's incentive to make efficient investment decisions and also reduce the likelihood of inefficient by-pass. However, optimisation may also create risk by exposing investors to unexpected technological and demand changes. If this risk were not accompanied by an increment to the allowed rate of return (i.e. by using a risk-adjusted WACC), then the present value of investors' cash flows would not cover their investment.

If demand uncertainty and technological change were not significant, and either the risk of inefficient investment or by-pass were significant, then ODRC or ODV would be preferred. In contrast, if the risks of inefficient investment were modest and could be dealt with through prudency reviews or a "used and useful" test, and if the risks of

inefficient by-pass were moderate, then an historic cost approach, for future valuation, would likely be preferred.

Excessive Profits Criterion

Some commentators have claimed that electricity lines businesses earn excessive profits and that reducing the opening asset base (e.g. by adopting vesting historic cost) is necessary to avoid embedding those excessive returns into the future. In this regard, regulatory decisions concerning opening valuations are tightly linked to decisions about whether profits are excessive. The Commission has not to date specifically assessed these factors in respect of individual electricity lines businesses.

Aside from the issue of opening valuation, in respect of constraining excessive profits going forward, the Commission considers that both historic cost and ODRC/ODV valuation methods could be suitable if used appropriately and consistently in valuing the future asset base. A significant issue in achieving consistency is dealing appropriately with inflation. Both historic and replacement cost approaches could deal with this issue if combined with an appropriate rate of return and/or if revaluation gains and losses are otherwise appropriately accounted for.

Cost Effectiveness Criterion

With regard to opening system fixed asset values, the costs associated with the current round of ODV valuations have already been incurred by electricity lines businesses. It would, therefore, be cost-effective to use these values, assuming they achieve the valuation objectives for regulatory purposes. A revised opening ODV valuation or an historic cost valuation would involve additional one-off costs. In the case of an historic cost valuation, these costs could be high if historic records were unavailable or difficult to obtain or estimate.

Historic cost approaches are likely to be less costly than replacement cost approaches going forward, as the need to determine and verify replacement costs is avoided. However, this position is qualified to the extent that a capital efficiency review (to discipline over-investment) could be a necessary part of an historic cost approach, although such a review is likely to be less costly than optimisation undertaken as part of ODRC or ODV.

Tables 7 and 8 at the back of this paper further summarise the assessment of asset valuation methodologies the Commission has undertaken.

Closing Comment

The Commission has not reached a judgement on which method is most appropriate for valuing opening and future asset bases of electricity lines businesses. Interested parties are invited to make submissions to inform the Commission's deliberations.

CHAPTER 1 – BACKGROUND AND PROCESS

INTRODUCTION

1.1 Under s 57ZD of subpart 4 of Part 4A of the Commerce Act 1986 ("Part 4A"), the Commerce Commission ("Commission") must "carry out a review of valuation methodologies for line business system fixed assets as soon as practicable" ("review").[2] This chapter:

- provides a brief background on the relevant legislation;
- describes the statutory framework for the review;
- outlines the Commission's process for the review; and
- provides an overview of the structure of this paper.

BACKGROUND

1.2 Part 4A, which commenced on 8 August 2001, requires the Commission to carry out certain functions for the regulation of electricity lines businesses, including a review of asset valuation methodologies that could be used to value the system fixed assets of such businesses.

1.3 Following the introduction of Part 4A, the Commission proposed to prepare two papers: one to discuss control of electricity lines businesses, and the other a review of asset valuation methodologies. The first paper, the Regulation of Electricity Lines Businesses Discussion Paper ("Regulation Discussion Paper"), was published on 21 March 2002. This is the second paper and it discusses the review of asset valuation methodologies.

STATUTORY FRAMEWORK

1.4 This paper refers to various sections of the Act. It does not, however, seek to set out in detail every statutory provision that may relate to the review. Readers should be aware that the relevant statutory provisions prevail over any inconsistencies contained in, or any omissions from, this paper.

1.5 In conducting the review, the Commission is required to:

- publish its intention to carry out the review and invite interested persons to give their views on the matter (s 57ZE(1)(a)), specifically;

[2] Reference to sections or parts are to sections or parts of the Commerce Act 1986 unless otherwise stated.

- publish a notice in the Gazette and in any other manner (if any) that the Commission considers appropriate (s 57ZE(2)(a));

- specify that the matter "relates to the carrying out of a review of valuation methodologies" (s 57ZE(2)(b)); and

- invite interested persons to give their views on the matter to the Commission and specify the time and manner in which they may do so (s 57ZE(2)(c));

- give interested persons a reasonable opportunity to give their views (s 57ZE(1)(b)); and

- have regard to those views (s 57ZE(1)(c)).

1.6 The Commission published its intension to carry out the review in the *Gazette* on 14 March 2002 (s 57ZE(1)(a)). Contemporaneously, the Commission released an issues paper ("Issues Paper"), which set out a number of questions for interested parties to comment on. Parties were invited to raise any additional issues they felt were not covered by the questions. The Commission has considered submissions on the Issues Paper in preparing this paper.

1.7 In releasing the Issues Paper and considering submissions received, the Commission has partially fulfilled its obligations under sub-sections 57ZE(1)(b) and (c). The Commission will fulfil these obligations further by considering submissions received on this paper. The Commission's consultation process on this paper is further discussed below.

System Fixed Assets

1.8 The review relates to valuation of "system fixed assets". The Electricity (Information Disclosure) Regulations 1999 ("the regulations") define "system fixed assets" as:

> "all fixed assets of a line owner that are used or intended to be used for the conveyance or supply of electricity; but does not include—
>
> (a) Stores and spares over and above any levels prescribed in the ODV Handbook; or
>
> (b) Works that are under construction."

1.9 The regulations contain the following definitions of "fixed assets":

> "Fixed assets, in relation to the business of a line owner,—
>
> (a) Means—
>
> (i) Those line business assets of the business that are tangible in nature and have a relatively long useful life; and
>
> (ii) The capitalised value of any line business assets of the business that are subject to a finance lease; and

(iii) Any works that are under construction and will be used for the purposes of any line business activity of that line owner; but

(b) Does not include—

(i) Any intangible assets; or

(ii) Any security:"

1.10 The definition of system fixed assets is further explored in Chapter 7, including whether there is any need to refine the definition.

Ambit of Review

1.11 The Commission interprets the specific requirement for the review (s 57ZD) as requiring the Commission to review all valuation methodologies that could potentially be used for valuing line system fixed assets.

1.12 The Commission also notes there is no explicit purpose statement in the Act for the review. While there is a purpose of subpart 4 of Part 4A – the subpart that requires the review – this relates specifically to the recalibration (audit) of asset values of large electricity line business owners, which the Commission has recently completed. The purpose of the review is further discussed in Chapter 2.

PROCESS FOR THE REVIEW

1.13 The Commission has adopted the following process:

- an Issues Paper for interested parties to comment on (published on 14 March 2002);
- a discussion paper (this paper) discussing the different valuation methods and relevant issues for interested parties to comment on;
- a conference for interested parties to make submissions to the Commission and for the Commission to ask questions; and
- a final paper ("Final Paper") setting out the Commission's final views as to the valuation methodology that will be required to be used in the future, and for what purpose.

1.14 The process for fulfilling these steps is presented in Table 1.

Table 1: Process for the Review

Steps	Date
Gazette Notice commencing review	14 March 2002
Release of Issues Paper (submissions invited)	14 March 2002
Release of Discussion Paper	1 October 2002
Written submissions close	4 November 2002
Public conference (oral submissions)	25-29 November 2002
Final Report	End of 2002

1.15 The Commission has placed public notices in metropolitan newspapers inviting submissions on this paper. This paper is available from the Commission's website, or by contacting the Commission.

Public Availability of Submissions

1.16 To promote an open and transparent process, the Commission intends to publish all submissions (subject to any restrictions on publishing certain information) on its website. Accordingly, the Commission requests that all submissions be provided in electronic form. Parties are also requested to provide 20 hard copies of submissions.

Address for Submissions

1.17 Submissions should be sent to:

electricity@comcom.govt.nz

Submissions on the Review of Asset Valuation Methodologies
Commerce Commission
PO Box 2351
Wellington

Status of Information Supplied to the Commission

1.18 Parties making submissions on this paper may wish to provide confidential or commercially sensitive information to the Commission. Parties can request that the Commission make orders under s 100 in respect of information that should not be made public. Any request for a s 100 order must generally be made before the information is supplied to us. Any application for a s 100 order must identify the reasons why the information should not be published and why the order is required. The Commission will provide further information on s 100 orders if requested by parties, including the principles we apply when considering requests for such orders.

1.19 Any s 100 order expires the day after the publication of the Commission's Final Paper. The Official Information Act 1982 ("OIA") will then apply. If we receive a request for disclosure of information formerly privileged to the s 100 order after the expiry of the order, we will consult with the party that provided the information as to whether the information should remain confidential (and if so, why). The Commission can decline requests for information in appropriate circumstances on the grounds set out in the OIA. Any decision to withhold information under the OIA can be reviewed by an Ombudsman.

1.20 The Commission discourages requests for non-disclosure of submissions, as it is desirable to test all information as fully as possible in a public way. Also, we are unlikely to agree to any requests that submissions in their entirety not be disclosed. The Commission recognises there will be cases where information should not be published. If it is necessary to include such material in written submissions, the material should be clearly marked, and preferably included in an appendix to the submission. Please provide a copy of such submissions with the material deleted or amended appropriately so it is suitable for public release in both electronic and hard copy form. The responsibility for ensuring that the s 100-order material is not included in a public version of a submission rests entirely with the party providing the submission.

Conference

1.21 The Commission will hold a conference to allow interested parties to appear before it to present their submissions and be questioned. As indicated in Table 1, the conference will be held from 25-29 November 2002. The Commission will issue further information setting out the details for the conference in due course, and these details will also be published on the Commission's website. All parties who have made submissions on this paper will be advised in writing of the conference details, and invited to attend.

STRUCTURE OF THE PAPER

1.22 The remainder of this paper is structured as follows:

- Chapter 2 discusses the purpose of the review;
- Chapter 3 sets out the criteria adopted by the Commission for assessing valuation methodologies;
- Chapter 4 discusses the effect of asset valuation for regulatory purposes on investment risk and the allocation of risk between consumers and investors;
- Chapter 5 introduces the asset valuation methodologies considered in the paper;

- Chapter 6 discusses the application of ODV under the current ODV Handbook;
- Chapter 7 highlights specific electricity issues and the Commission's approach to valuation in other industries;
- Chapter 8 highlights lessons for asset valuation methodologies from other countries;
- Chapter 9 identifies the implementation and operational issues, including the costs of the various valuation methodologies; and
- Chapter 10 assesses the different asset valuation methodologies.

1.23 In the process of preparing this paper, the Commission had a draft reviewed by Dr Brent Layton and Professor Stephen King (economic consultants), Dr Martin Lally (finance consultant), and Parson Brinckerhoff Associates (management consultants).

Questions for Interested Parties

1.24 Throughout this paper, the Commission has set out a number of questions to guide submissions. Interested parties are encouraged to respond to these questions in their submissions. Any other matters raised, or not raised, in this paper relevant to the review may also be addressed.

> The Commission's questions appear in boxes throughout the paper. A complete list of the questions is set out in Appendix 1.

CHAPTER 2 – PURPOSE OF THE REVIEW

INTRODUCTION

2.1 The only statutory requirements of the Commission in respect of the review are outlined in Chapter 1. Although there is no specific purpose provided for the review in Part 4A, the Commission has considered its purpose within the context of:

- the Commission's role in the regulation of electricity lines businesses under Part 4A; and
- the purpose of the Act more generally.

REGULATION OF ELECTRICITY LINES BUSINESSES

Thresholds and Control Regime

2.2 Under subpart 1 of Part 4A, the Commission is required to develop and implement a regulatory regime for assessing performance of large electricity lines businesses and controlling them if necessary. The purpose statement of subpart 1 is set out in s 57E and this sets out the overall purpose of the regulatory regime, viz:

> The purpose of this subpart is to promote the efficient operation of markets directly related to electricity distribution and transmission services through targeted control for the long-term benefit of consumers by ensuring that suppliers –
>
> (a) are limited in their ability to extract excessive profits; and
>
> (b) face strong incentives to improve efficiency and provide services at a quality that reflects consumer demands; and
>
> (c) share the benefits of efficiency gains with consumers, including through lower prices.

2.3 The Commission published the Regulation Discussion Paper on the proposed regulatory regime on 21 March 2002. That paper foreshadowed the importance of the review to the regulatory regime, for example, the Commission noted:

> *"[t]he Commission's review of asset valuation methodologies is also relevant to the thresholds and price control regime, given that asset values (and how they are determined) are important determinants of the performance of businesses." (page 13)*

2.4 Given the relationship of the review with the proposed thresholds and control regime, and vice versa, the Commission has referred also to the submissions on the Commission's Regulation Discussion Paper it received in the preparation of this paper.

2.5 The regulatory regime under Part 4A comprises two main parts:

- assessment against performance thresholds – the Commission is to assess periodically electricity lines businesses against a set of performance thresholds; and
- control – any business in breach of the thresholds, and subsequently found through investigation to warrant control, would be subject to control.

Relationship to Specific Thresholds

2.6 Of the four thresholds proposed by the Commission in its Regulation Discussion Paper, three require an asset valuation input, namely:

- the profit threshold – the valuation methodology could be used to measure whether excess profits were being earned;
- the efficiency threshold – the valuation methodology can affect the businesses' capital efficiency through the incentives it may create for developing and maintaining optimal network assets; and
- the sharing threshold – the valuation methodology could have implications for both the incentives to generate profit and for how investment risks are allocated between investors and consumers.

Relationship to Control

2.7 If the Commission determines to control any electricity lines businesses, their asset values will be important for determining the required revenue, or the starting price and X under a price cap approach, namely:

- the basis for determining the *return of capital* (depreciation charge); and
- the basis for determining the revenue a business must generate to earn a *return on capital*.

1. Should the same valuation methodology necessarily be used for thresholds assessments and for control?
2. What factors should be considered in deciding whether a consistent or different approach is desirable?

Information Disclosure

2.8 Under subpart 3 of Part 4A, the Commission must set information disclosure requirements. The Ministry of Economic Development (MED) currently administers an information disclosure regime.

2.9 The purpose of subpart 3 indicates that asset valuation could be part of information disclosure in the future (as is the case at present):

> *"[t]he purpose of this subpart is to promote the efficient operation of markets directly related to electricity distribution and transmission services by ensuring that large line owners and large electricity distributors make publicly available reliable and timely information about the operation and behaviour of those businesses, so that a wide range of people are informed about such factors as profits, costs,* ***asset values****, price (including terms and conditions of supply), quality, security, and reliability of supply of those businesses."* [Emphasis added]

2.10 Subpart 3 also makes it clear that the Commission can use the results of the review to set information disclosure requirements. Specifically, the Commission *"**may require**, for any disclosed information, the adoption, in the preparation or compilation of that information, of **any methodology** that is required by the Commerce Commission"* (s 57T(2)(b) (emphasis added)). Section 57T(3) goes on to state that information required to be disclosed *"may include (without limitation) .... (b) asset values and valuation reports .... [and] (h) policies and methodologies in these or other areas."*

2.11 While this paper primarily concerns the relevance of asset valuation to the design and operation of the thresholds and control regime, the linkage between asset valuation and information disclosure is also important.

3. What level of detail regarding asset values should be publicly disclosed? How should asset valuation requirements be prescribed in practice (e.g. a handbook)?

4. To what extent should there be any different approach to asset valuations (than for thresholds and control) used for disclosure purposes?

OTHER RELEVANT COMMISSION WORK

2.12 This paper refers to other work undertaken by the Commission on asset valuation in other sectors, specifically, airports and telecommunications. The Commission's audit of electricity lines business asset values (according to the ODV Handbook) is also an input into the review. The relevance of other Commission work is discussed in Chapters 6 and 7.

SUMMARY

2.13 In carrying out the review, the Commission considers it important to take into account:

- the regulatory context in which the review is being undertaken, specifically, the requirements under Part 4A that the Commission develop a thresholds and control regime for large electricity lines businesses;
- the lessons learnt from the Commission's audit of ODV valuation reports; and
- the Commission's work on asset valuations in other sectors, namely, airports and telecommunications.

CHAPTER 3 – EVALUATION CRITERIA

INTRODUCTION

3.1 The objective of the review is to choose the asset valuation methodology that best ensures the regulatory mechanisms (thresholds and control, and disclosure) achieve the statutory purposes of Part 4A. This chapter discusses the evaluation criteria that the Commission intends to use to assess the alternative valuation methodologies that are introduced in Chapter 5.

3.2 Underlying this review is an assumption that the effectiveness of the regulatory mechanisms operating under Part 4A depend in some way, on the choice of valuation methodology. An asset valuation methodology for the purposes of the regulatory functions under Part 4A is broadly required for:

- valuing the opening asset base (e.g. at the start of the threshold regime); and
- valuing assets in the future, accounting for depreciation, additions, and deletions, and possibly providing for revaluation of the entire asset base from time to time.

3.3 The methodologies used for these two processes need not be the same. It may be possible to apply a different methodology for additional investments to that used for existing assets. For both opening and future valuations, the over-riding criterion for assessing the asset valuation methodologies discussed in this paper is the degree to which they fulfil the purpose of Part 4A.

Potential Evaluation Criteria

3.4 Interested parties commenting on the Issues Paper suggested a number of evaluation criteria, as summarised in Table 2.

Table 2: Criteria Suggested by Parties

Suggested Criteria	Interpretation
Coherent with economic theory	The valuation must produce results that provide investors with incentives not to over or under-invest.
Transparent	Transparency is the ability to replicate the valuation methodology and reproduce the value generated in the original valuation. In general, more prescriptive methods are more transparent because there is less room for discretion and interpretation.
Tractable	The valuation methodology needs to be easily applied by valuation professionals, given the available information and the available resources, while minimising reference back to the regulator.

Consistent with what is observed in functioning markets	Even if the assets being valued are not traded, except as part of a business, the method must produce answers that are consistent with what can be inferred about the values of the assets.
Risk allocation	The valuation methodology should appropriately allocate risks (such as inflation, demand, technology and measurement) to parties best placed to manage each risk.
Stability	The valuation methodology should reduce perceptions of regulatory risk and encourage investment.
Consistency	The valuation methodology should ensure consistent transparency of information and facilitate cross company comparisons.
Limiting excess profits	The valuation methodology, in conjunction with other components of the information disclosure regime, should facilitate identification of whether businesses are earning excess profits.
Efficiency	The valuation methodology should achieve efficient outcomes (allocative, productive, and dynamic efficiency), by providing incentives to find least cost options.
Consumer demand	The valuation methodology should reflect the impact of changing consumer demand, and should provide incentives for investors to meet consumers' requirements for security and quality of supply.
Sharing of efficiency gains	Asset values should reflect changes in technology and asset management practices.

3.5 The Commission has considered the above criteria and the requirements of Part 4A in selecting its own evaluation criteria.

The Commission's Criteria

3.6 There are several ways to express criteria for the evaluation of valuation methodologies. The Commission proposes the following evaluation criteria:

- Efficiency – the methodology should support outcomes that are allocatively, productively and dynamically efficient;
- Identification of any excessive profits – the methodology should facilitate the identification of excessive profits; and
- Cost effectiveness – the methodology should achieve valuation objectives for regulatory purposes at lowest cost.

5. Are the proposed evaluation criteria of efficiency, excessive profits and cost effectiveness for assessing the valuation methodologies appropriate given the regulatory context in which asset valuations may be used?

6. What other evaluation criteria, if any, should the Commission consider?

EFFICIENCY

3.7 Promoting efficient markets for the long-term benefit of consumers is a principal objective of Part 4A. Efficiency can be considered under three headings:

- allocative efficiency – a market is allocatively efficient when the price buyers' pay for a product or service reflects the costs of producing it at the margin;
- productive efficiency – a market is productively efficient when businesses produce services of the desired quality at minimum cost, and production activities are distributed between businesses to minimise industry-wide production and transaction costs; and
- dynamic efficiency – a market is dynamically efficient when businesses have appropriate incentives to invest, innovate, improve the range and quality of services, allocate resources efficiently, and increase productivity and lower costs over time.

Allocative Efficiency

3.8 The level and structure of prices is the key to achieving allocative efficiency. Prices based on marginal costs would (theory suggests) maximise allocative efficiency. However, this may not allow a business to recover its total costs and may damage investment incentives (and therefore dynamic efficiency). Pricing based on average costs then represents a "second best" approach to pricing, but also a "necessary" approach to maximise total efficiency (including productive and dynamic efficiencies). The structure of prices between customers is not a direct issue for this review. The review is more relevant to determining appropriate average prices.

3.9 The valuation methodology can affect the profile of revenue over time, and this may have implications for efficient pricing structures. The Net Present Value (NPV) principle states that the discounted net cash flows over the life of the assets should equal the initial amount invested for investors to be adequately compensated, when an appropriate discount rate is used. By itself, the constraint that a monopoly business earns no economic profit (i.e. no excess profit) over the life of its assets does not define a unique profile of revenue over time. In theory, there are an infinite number of streams of

expected net cash flows that have a present value equal to the cost of an investment.[3] In principle, an owner of system fixed assets would be indifferent to different price profiles over time, provided they had the same present value and volatility of cash flows.

3.10 However, switching methodology part way through an asset's life will have implications for whether a business over- or under-recovers in terms of the NPV principle. In addition, customers might not be indifferent to different price profiles. Accordingly, the demand for line services over time could be affected by the choice of valuation methodology and the associated regulatory mechanism. This has implications for consumers' welfare and allocative efficiency, particularly if it leads to distorted energy use or inefficient by-pass of the existing network.

3.11 For a price to be allocatively efficient, the quality of service demanded must be of a quality that reflects that price, and meets consumers' preferences. Over time, service quality is a material consideration in terms of both allocative and dynamic efficiency. The quality of electricity lines services can also be affected by the asset valuation methodology. A methodology that does not provide some check on the prudence of investments and the resultant service quality might provide incentives to over-build and raise quality inefficiently high. A regime that places significant risk on lines businesses and does not adequately compensate those businesses for this risk might lead to under-investment and diminished quality.

7. In assessing asset valuation methodologies for system fixed assets, how important is allocative efficiency?

8. How are the level, structure and profile of prices over time affected by the choice of valuation methodology?

9. How does the choice of valuation methodology affect service quality and the ability for electricity lines businesses to provide services of a quality that reflects consumer demands?

Productive Efficiency

3.12 Productive efficiency means meeting demand at the lowest possible costs, including minimising the transaction costs of organising production and exchange. In the short-run this involves choosing and making best use of the appropriate level of variable inputs. Over time, it involves making investments that ensure variable and fixed costs for the expected level of output are minimised.

[3] M. Salinger, "Regulating Prices Equal to Forward-Looking Costs", *Journal of Regulatory Economics*, 14: 149-163, (1998), p 151.

3.13 Operating and capital expenditures are sometimes substitutable. Line owners can, to some extent, choose between maintaining an asset and replacing it with a new one. Operating and Capital expenditures are also partially interdependent. Capital investment choices may affect ongoing maintenance costs, and maintenance programmes may affect the timing and extent of future capital investments. The extent to which asset valuation methodologies might influence the mix of capital and operational investment is therefore relevant to this review.

10. In assessing asset valuation methodologies for system fixed assets, how important is productive efficiency? What factors should be considered?

Dynamic Efficiency

3.14 Dynamic efficiency means maintaining allocative and productive efficiency over time. In practice, this means making investments and innovating so that costs continue to be minimised and that prices over time generally reflect this.

3.15 For industries where new and improved products and production processes could be expected to be introduced relatively frequently, dynamic efficiency is largely about ensuring such improvements are introduced in a timely fashion.

3.16 For industries characterised by large long-term investments, and slow innovation in new and improved products and production processes, dynamic efficiency is largely about appropriate new investment management, particularly appropriate investment choices and the timing of those choices. Determining appropriate costs over time requires consideration of whether current, and prospective, investments are necessary. In principle, the choice of asset valuation methodology, and the choice of regulatory mechanism, could affect incentives to over- or under-invest in system fixed assets. Timely investment means that the asset valuation procedure should not create incentives to either accelerate or delay investment, particularly in periods of rapid technological change.

11. In assessing asset valuation methodologies for system fixed assets, how important is dynamic efficiency? What factors should be considered?

EXCESSIVE PROFITS

3.17 Part 4A is also concerned with ensuring electricity lines businesses are limited in their ability to extract excessive profits, and that, over time, the benefits from increased efficiency are shared with consumers.

3.18 Identifying excessive profits requires comparing revenues with reasonable or efficient costs. Capital costs, which include a return on capital and the return of capital (depreciation), are measured with reference to asset values. Asset valuation methodology is therefore directly relevant to the identification of excessive profits.

3.19 When considering the long-term benefit of consumers, there is a trade-off at times between short-term benefits of income transfers that would favour consumers and long-term benefits from efficiency gains that would also benefit consumers. The key consideration is whether changing an income distribution in favour of consumers in the short-term will harm incentives for businesses to make (where possible) efficiency improvements into the future. Depending on the regulatory mechanisms chosen, the choice of asset valuation methodology could have significant distributional effects, between asset owners and consumers, and between consumers over time.

12. How important is the identification of excess returns as a criterion for the assessment of valuation methodologies? What factors should be considered?

COST EFFECTIVENESS

3.20 The cost effectiveness criterion is that regulatory requirements for asset valuation should not impose unduly high compliance and administration costs. In other words, to the extent that any two valuation methodologies equally satisfy the criteria concerned with efficiency and excessive profit, the one that has lower administration and compliance costs would be preferred.

3.21 Compliance and administration costs are discussed in Chapter 9. It is important to note, however, that the cost effectiveness criterion does not simply mean that the cheapest method outright is preferred. Rather, it means, the cheapest option that achieves the regulatory objectives of Part 4A.

13. How important is cost effectiveness as a criterion for the choice of valuation methodology? What factors should be considered?

SUMMARY

3.22 In this chapter the Commission has described its proposed evaluation criteria for the review of asset valuation methodologies, which are:

- Efficiency – the methodology should support outcomes that are allocatively, productively and dynamically efficient;

- Identification of any excessive profits – the methodology should facilitate the identification of excessive profits; and

- Cost effectiveness – the methodology should achieve valuation objectives for regulatory purposes at lowest cost.

CHAPTER 4 – VALUATION AND REGULATORY CONTROL

INTRODUCTION

4.1 This chapter discusses the relationship between asset valuation and the recovery by investors of their capital costs. It also discusses how the choice of asset valuation methodologies, in combination with regulatory mechanisms, could affect both the level and the allocation of risks of investment, and the likely incentive effects of such allocation.

CAPITAL COSTS

4.2 Conceptually, capital costs comprise the return *on* capital and the return *of* capital (i.e. through depreciation).

4.3 In an unregulated environment, the amount of capital cost actually recovered by a business in a given period may be considered equivalent to its free cash flows during the period, i.e. revenues less cash expenses (excluding interest payments).

4.4 In a regulated environment, asset valuations could form the basis for determining both the return on and return of capital in any given period. Regulatory decisions therefore need to be made pertaining to both these components of capital costs. Of particular importance are the decisions the regulator makes regarding the allocation of investment risks between asset owners and consumers.

ALLOCATION OF INVESTMENT RISKS

4.5 The Commission considers that the allocation of investment risks between investors and consumers should include consideration of:

- who makes the investment decision?
- who is best able to bear the various types of investment risk?
- how can they manage the risk? and
- how are they compensated for risk?

4.6 In unregulated markets, asset owners are generally responsible for making investment decisions and bearing the consequences of poor investment decisions. However, some investment decisions may be made in the context of negotiated contracts in which risk is explicitly allocated by agreement between the contracting parties. The allocation of investment risk may depend on how investment decisions are made. For example, an investment to connect a specific customer (such as a new generator or factory) could be conditional upon a specific contract for the dedicated assets. The customer

might make a capital contribution or might have an equity stake in the relevant assets. However, for the majority of customers of electricity lines services, such bilateral contracts (and multilateral contracts) are unlikely due to high transactions costs.

4.7 How the regulatory regime treats depreciation (and/or asset revaluation) may affect whether investors are compensated for investment risks. An "accelerated depreciation" may be used, for example, when the accounting depreciation (return of capital) departs from economic depreciation. This would, in effect, impose the costs of economic asset stranding on current consumers rather than on future consumers or investors.

14. How great is the scope for bilateral or multilateral contracting regarding asset investment?

15. How should contractual management of asset-related risks be dealt with in the context of regulatory asset valuation?

4.8 The risk faced by investors depends on the form of regulation and the extent of contractual risk management available. To ensure efficient ongoing investment, regulators must consider how big the risks are and ensure that investors are adequately compensated for investment risk, and no more.

4.9 However, some investments may involve asymmetric risks and costs that for regulatory purposes may require a decision as to whether or not investors should be compensated for the risks. Generally speaking, investors are best placed to manage their investment risks, given the flexibility they have in deciding the location and timing of investments. Exposure to investment risks provides incentives for investors to make optimal investment decisions. If investors did not bear these risks, this could result in inefficient investment in new technology or gold plating of assets.

16. Who is best placed to manage the various forms of investment risk faced by electricity lines businesses?

4.10 Investors may be compensated for some investment risks via the regulated return on capital. This paper does not discuss the regulated return on capital in detail, other than to note that asset owners can, in principle, be compensated through a regulated rate of return (i.e. risk-adjusted weighted average cost of capital (WACC) plus an allowance for asymmetric risks that are not ordinarily provided for in the WACC). However, it is important to avoid double compensation for risk (through both the WACC and the chosen asset valuation methodology), as this would be synonymous with allowing a business to earn excessive profit. Also, while compensation for certain risks can, in principle, be made via a risk-adjusted WACC, deriving such a WACC is not straightforward.

17. In a regulated environment, how should investment risks be compensated? Is it preferable that some risks be compensated through WACC and others through the valuation methodology (e.g. through the choice of depreciation regime or treating revaluation gains/losses as income)?

TYPES OF INVESTMENT RISKS

4.11 Investment risks can include the following:

- general price inflation;
- risk of assets requiring premature replacement (due to early failure);
- risk of economic stranding (assets becoming surplus to requirements) due to unanticipated shifts in demand levels or patterns; and
- risk of economic stranding due to technological obsolescence (where the comparable service can be provided by cheaper alternative technologies).

4.12 The above risks are exacerbated if prices are set on the basis of recovering capital costs over long periods of time. Each is discussed below.

Inflation

4.13 It is common for investors to seek compensation for inflation in their costs of supply and is generally accepted that customers will bear this risk. The return of the real amount invested would not occur if there was no compensation for inflation. Accepting that investors should be compensated for inflation, this is possible through:

- the return of capital (i.e. through an adjustment to the asset base); or
- the return on capital (i.e. using a nominal WACC).

4.14 These issues are discussed below under the heading of the "Dealing With Inflation".

18. What are the relative merits of dealing with inflation through WACC or the valuation methodology?

Asset Failure

4.15 In competitive markets there is generally no cost "pass-through" for assets that fail. It is generally accepted that suppliers bear the risk of failure in their modes of production if they can manage these risks (e.g. insurance). The Commission considers investors, through the asset valuation methodology, should not be compensated for asset failures that could be managed.

19. Is it appropriate that investors bear the risk of asset failure? In what circumstances would it not be appropriate for investors to bear the risk of asset failure?

Stranded Assets

4.16 Both reductions in demand and rapid technological change can lead to assets becoming stranded. The term "economic depreciation" may be used to describe a depreciation profile that seeks to minimise, or has the effect of avoiding, the risk of economic stranding (or under-recovery of capital costs). Investors bear no risk of such stranding if they are permitted a return of capital in accordance with economic depreciation. Economic depreciation is discussed below.

4.17 If regulated depreciation were based on the technical lives of assets, but economic stranding occurred before the assets were fully depreciated, it is unlikely the investor would fully recover its costs (assuming a normal rate of return on capital is permitted). The prospect of not recovering capital cost could deter investment. Conversely, if assets were fully depreciated before the end of their economic lives, the owner might have little incentive to keep them in service.

20. How can accounting depreciation best be kept in line with economic depreciation?

21. How should assets be treated when they remain useful beyond their expected life?

4.18 Alternative treatments of economic stranding, under valuation methodologies such as depreciated replacement cost (DRC), optimised depreciated replacement cost (ODRC), and historic cost (HC), are discussed further below under the headings "Economic Depreciation" and "Capital Efficiency", and also in Chapter 5.

ECONOMIC DEPRECIATION

4.19 Depending on the rate of technological change and the extent of unanticipated demand changes, economic depreciation rates may be significantly higher than rates commensurate with assets' technical lives.[4] Regulated depreciation rates consistent with assets' technical lives in such circumstances would be too low, and investors might not fully recover their costs unless the regulated rate of return clearly compensated them for that risk.

4.20 In practice, it is not straightforward to establish the necessary WACC premium just necessary to compensate investors for the unquantifiable risks of future asset stranding. For this reason, it may be pragmatic for regulators to apply a normal rate of return together with technical depreciation rates, but to permit accelerated depreciation from time to time, when evidence of imminent or actual economic stranding becomes apparent. This is the approach proposed by the Australian Competition and Consumer Commission (ACCC) in Australia.[5] Transmission businesses regulated by the ACCC can signal anticipated economic stranding of an asset, and request an adjustment to future depreciation allowances in respect of that asset. This has the effect of considerably reducing the risk of stranding borne by the asset owners. The profile of prices would be affected by accelerated depreciation and would result in higher prices in the early years following the decision to accelerate the depreciation of the asset.

4.21 An alternative argument is that, given the monopolistic nature of electricity lines businesses, they should be better placed, compared to most businesses in competitive markets to minimise the risk of demand changes. Demand changes may be more readily anticipated when a supplier is not exposed to competition, as there is no uncertainty over losing demand to competitors.

4.22 It could also be argued that for consumers to share in the benefits of technological change, investors should be exposed to the risk of stranding as a result of technological progress and not be compensated for assets that become stranded. In addition, suppliers may have an incentive to over-invest if they are not exposed to the risk of stranding and the profile of prices may be distorted where accelerated depreciation filters through into prices. These issues are now discussed in terms of capital efficiency.

22. How should uncertainty as to the useful economic life of an asset be accounted for in terms of regulated depreciation?

23. What effect would economic depreciation have on price profiles over time?

[4] We refer here to economic depreciation of the service potential associated with an asset, rather than of the asset itself. For example, a transformer might have an in-built capacity of 50 MVA, of which only 20 MVA is now required due to an unanticipated reduction in demand. It is the 30 MVA of unnecessary capacity that is stranded, not the entire asset. Economic depreciation refers to the rate at which the cost of 30 MVA of transformation capacity has been eroded by demand-side effects.

[5] ACCC's Draft Statement of Principles for the Regulation of Transmission Revenues, 27 May 1999.

CAPITAL EFFICIENCY

4.23 Rate of return regulation (explicit or implicit) may provide incentives for over-investment in fixed assets, assuming regulated businesses are permitted a return not less than their true cost of capital. Over-investment in unregulated markets may also occur if there is limited constraint on imprudent investment decisions. These considerations have led some regulators to consider various mechanisms to constrain potential over-investment.

Capital Expenditure, Prudency Tests and Optimisation

4.24 In principle, a regulator could scrutinise all planned capital expenditure, and give approval for some portion of it, before investments were made. In other words, the regulator would allow assets to be added into the regulated asset base as a result of an ex ante prudency test. Investment "used and useful" reviews might also be conducted ex post, and applied either to recent capital investment or to the entire asset base. Assets would be allowed into the asset base only if they were "used and useful".

4.25 Typically, for ex ante capital efficiency assessments, regulators may be called upon to approve an investment and thereby, in effect, may enter into a form of regulatory compact with the regulated business. It may be possible, however, to minimise the regulator's involvement in ex ante capital efficiency assessments. As noted above, if suppliers and customers could agree on the prudency of the investment and the allocation of risks associated with possible stranding, the regulator's role might be eliminated or much reduced (e.g. resolving disputes only).

4.26 Ex post capital efficiency assessments can make use of:

- information available at, or close to, the time of the investment (if this were still available); or
- current information about demand and other relevant factors.

4.27 However, the conclusions drawn from these two types of information could be very different for assets built a long time ago. Optimisation and economic value assessments, as used with ODV, are examples of the second form of ex post reviews (where prudency is assessed with the benefit of hindsight).

4.28 As discussed above, the application of regulatory mechanisms to incentivise capital efficiency can change the allocation of risks between asset owners and consumers. The prospect of write-downs of the asset base, due to optimisation, "used and useful" tests, or some other form of capital efficiency assessment, is likely to constrain over-investment. If the optimisation process were also to involve replacing older assets (hypothetically) with modern equivalent assets, customers would share in these benefits (assuming investors are not allowed to recoup revaluation losses as income). Optimisation may also incentivise investors to delay investment in the face of rapid technological

change, to prevent being left with out-moded assets relatively soon after they are acquired.

4.29 The allocation of risk depends, in part, on the extent and frequency of capital efficiency assessments undertaken, as discussed below.

24. Is capital efficiency best determined ex ante or ex post, or by a mixture of both? Are some factors pertaining to capital efficiency best considered ex post and others best considered ex ante? How are capital efficiency assessments best conducted?

Extent of the Capital Efficiency Review

4.30 With regard to over-investment, if capacity were not sunk, and could be added and deleted incrementally from the asset base, there would be limited need for capital efficiency reviews. Surplus assets, in a theoretical ideal, could be removed relatively simply and the role of a capital efficiency review would reduce to identifying surplus assets.

4.31 However, as network investments are often lumpy and sunk, and networks are built with certain configurations, this incremental approach is often not possible. For example, an asset of a certain size might be considered optimal to deliver the required level of service, but such a size may not be available. This necessarily results in some excess capacity, at least in the short run, as a larger asset is used. Another example involves an asset that may be notionally removed under an optimal configuration, incurring ongoing maintenance costs (and perhaps even being replaced in the future, at further cost), because removing the asset would render other assets ineffective.

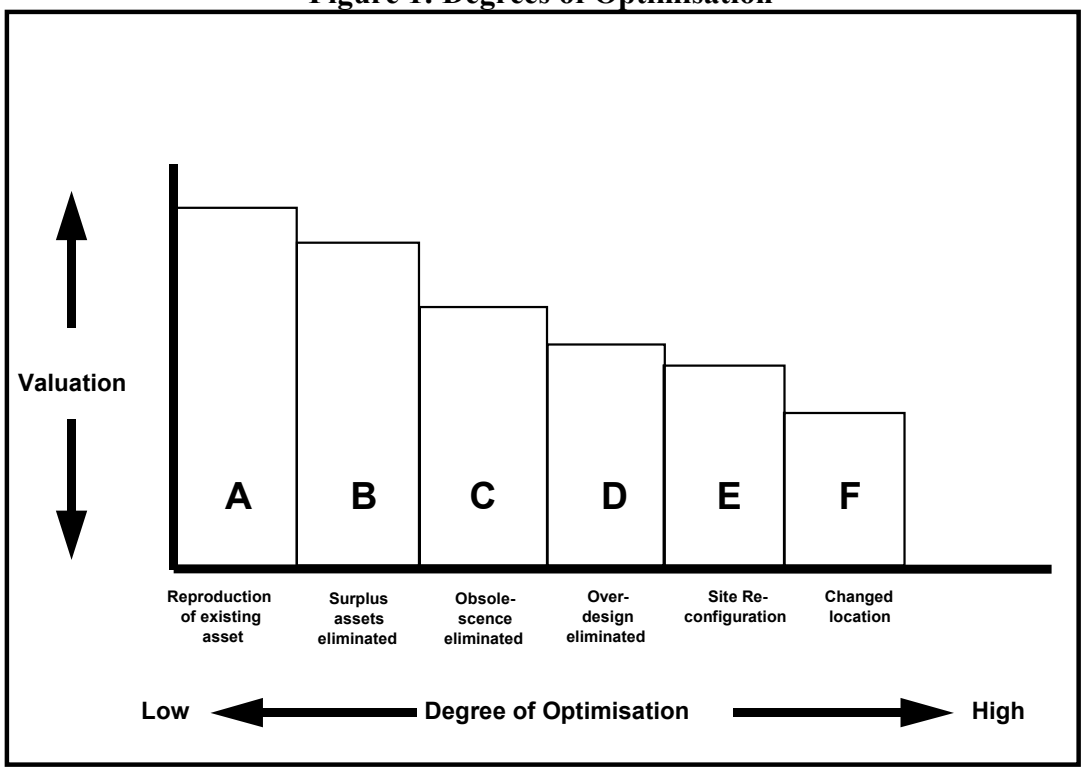
4.32 Optimisation of one form or another can reduce an investor's ability to undertake imprudent investment decisions (gold plate). Investors should not be compensated when imprudently acquired assets are removed from the regulatory asset base. However, optimisation may also create a risk by exposing investors to unexpected technological and demand changes.[6] If this risk were not accompanied by ex ante compensation through an increment to WACC (i.e. a risk-adjusted WACC were not used), then the present value of investors' cash flows would not meet the required return on their investment.

4.33 Optimisation can range from only the elimination of surplus assets at one end of the spectrum, to the complete redesign of the entire asset base at the other. The range of optimisation approaches, and their effect on asset values, is illustrated in Figure 1.[7]

[6] It is important to note that the technological and demand changes discussed here are those that are 'unexpected'. Investors could manage demand and technological changes that are expected.

[7] This is an adaptation taken from Local Government New Zealand, *The New Zealand Infrastructure Asset Valuation and Depreciation Guidelines,* 2001.

Figure 1: Degrees of Optimisation



4.34 "Greenfields" optimisation (F) involves the hypothetical designing and building of an entirely new, optimal collection of assets, regardless of historic constraints that may apply to the existing assets. In the electricity lines business context, this might involve a complete redesign of the network, including notional relocation of substations and lines. In contrast, lower levels of optimisation ("brownfields" optimisation) involve replacing under-utilised assets and removing redundant assets, but retaining the historic configuration of key assets (such as substations and connection points between transmission and distribution networks).

4.35 Optimisation under a theoretical ODV approach can involve the adjustment of asset valuations to reflect changes in the required configuration and scale of assets required to achieve the same level of service supplied by the existing assets, using modern replacement assets. Optimisation can span the wide spectrum of possible levels identified above. How optimisation is applied in practice, however, is a matter of judgement about where in the spectrum to use. Given ODRC's theoretical underpinning of replicating the costs of an efficient new entrant, point F in Figure 1 may be considered the most theoretically consistent optimisation approach under the ODRC method. The scope for optimisation under the accounting standard FRS-3 (discussed below) could go from point A up to point D (inclusive).[8]

[8] Wareham Cameron & Co Ltd, Rider Hunt Wellington Ltd, and CB Richard Ellis, *Valuation Guidance for Property, Plant and Equipment, including Specialised Items in the Health and Education Sectors*, prepared for The Treasury, May 2002, p.16.

4.36 Arguably, the scope for optimisation in the context of depreciated historic cost asset valuations would be more limited. However, assets that were redundant could still be "optimised out".[9] It may, however, be difficult to "optimise down" an asset to reflect a degree of over-design, because the historic cost of such notional assets may not be well defined.

4.37 In general, as the degree of optimisation increases, the degree of subjectiveness and the potential for conflict between the regulator and regulated entities increases.

25. What investment incentives do the various types of capital efficiency reviews create?

4.38 Re-optimisation involves including in whole, or part, assets that previously had been optimised down either in whole, or in part. For example, an asset that has too large a capacity, given current demand expectations, may be optimised, by having part of its costs removed from the asset base. This cost may be reinstated in the asset base in the future if there were an unexpected increase in demand. It is important to note in this case, however, that there is no expectation at the time of optimisation that the relevant asset cost will be returned to the asset base.

4.39 The above case can be distinguished from a changing profile of prices due to expected increases in demand. For example, if an asset is currently not being used at capacity, but is likely to face increased demand in the future, then the regulator may view it as sensible to require that the investor recover a smaller share from the asset today and more tomorrow when demand rises. This is equivalent to smoothing prices over the asset lifetime.

26. How frequently should capital efficiency reviews be conducted? What factors should be considered in deciding how frequently to conduct such reviews?

COMPENSATING FOR INFLATION

4.40 As noted above, inflation may be dealt with through the valuation methodology or through the regulated WACC. Investors can be compensated for inflation through the use of a nominal WACC, as this effectively includes a premium for inflation. However, this would leave investors exposed to industry-specific relative price changes.

[9] Transpower supports the idea that a "used and useful" test may be appropriate for the application of an optimised historic cost approach. Transpower, *Response to Issues Paper: Review of Asset Valuation Methodologies*, June 2002, P.9.

4.41 Inflation could also be dealt with through the valuation methodology. A replacement cost methodology implicitly provides compensation for inflation, as replacement assets are valued at current prices, but this also includes industry-specific changes in asset values (e.g. due to technological changes).

4.42 Under an historic cost approach, asset values could be indexed to the CPI (or another appropriate index). If the rate of inflation in the industry differed from the indexed amount, the indexed asset values would differ from their replacement costs, all other things being equal. Over time, the difference could get greater, if the general rate of inflation differed from the industry-specific rate in a consistent way, or the differences could be removed on average if no one-way bias existed.

4.43 In summary, there are four broad approaches for dealing with inflation when determining whether normal returns have been earned, viz:[10]

1. use historic cost and nominal WACC;

2. use replacement cost and a real WACC;

3. use replacement cost, nominal WACC and treat revaluation gains as part of income; and

4. use inflation-adjusted historic cost, real WACC and do not assign revaluation gains to income.

4.44 All four approaches accommodate the presence of inflation when measuring earnings. More generally, they all satisfy the NPV test (the present value of the cash flows matches the investment costs, other things being equal), when the rate of inflation is equivalent to the rate of change in asset prices (replacement costs).

4.45 Indexation based on general inflation may be seen as more of a way of preserving the purchasing power of investors' committed funds, but does not expose investors to industry-specific changes in asset values (e.g. due to technological changes).

4.46 The use of replacement costs and a real WACC would expose investors to industry-specific risk when the rate of change in replacement costs differs from the general level of inflation. If this does occur, the NPV test is not satisfied.

27. Does the level of inflation/deflation in the electricity industry suggest one valuation methodology would be better than others? Would compensation for inflation through indexation preserve the purchasing power of investors' committed funds? What are the pros and cons of indexation?

[10] Treasury, *Estimating the Cost of Capital for Crown Entities and State-Owned Enterprises*, Wellington, 1997.

VALUATION AND ACCOUNTING POLICIES

4.47 Disclosure of the valuation of a business's assets provides important information for its owners and potential investors. Accounting conventions and financial reporting standards ensure that asset valuations (and related information) are reliable and meaningful for the intended audiences. In New Zealand, accounting standards for specialised assets have recently been changed. The new standard is "FRS-3".

4.48 Asset valuations may be required for various regulatory purposes, including taxation by the Inland Revenue Department and rating by local territorial authorities. For example, Rating Valuation Rules are made under the Rating Valuations Act 1998 by the Valuer-General, and establish minimum levels of performance that local authorities must achieve in their rating valuations. With respect to the valuation of electricity and gas networks, the current Rules (effective from July 2000) require:

> "When valuing the infrastructural assets of electricity line businesses and gas distribution networks the "Optimised Deprival Value" (ODV) methodology should be adopted."

4.49 In this paper, however, the Commission uses the term "regulatory asset valuation" to mean valuation for the purposes of Part 4A. Here, asset valuation methodologies are required, for example, for the purposes of measuring rates of profit, or for determining price or revenue controls.

4.50 Regulatory asset valuation shares many of the objectives of valuation with other financial reporting purposes. But because the various purposes are not identical, the standards and methodologies used for one purpose may not necessarily be sufficient for another.

4.51 This section discusses the extent to which accounting standards and methodologies developed for various other purposes, can be usefully applied to asset valuation in the context of Part 4A.

Accounting Standards

4.52 The financial reporting standard "FRS-3: Accounting for Property, Plant and Equipment", was issued on 2 March 2001. FRS-3, which was prepared by the Institute of Chartered Accountants of New Zealand, applies to specialised assets such as the system fixed assets of electricity lines businesses, and essentially provides for two valuation methodologies: depreciated historic cost (DHC) and ODRC. The main features of FRS-3 are:

- initial recognition of assets at actual cost, including capitalisation of all costs directly attributable to the acquisition (e.g. borrowing costs);
- allocation of cost to individual components should be proportional to fair value at the time of acquisition;

- fair value for specialised assets is equal to market value if a market for the asset exists, and ODRC if a market value does not exist or if a market-based assessment cannot be made;

- donated or subsidised items should be recognised at fair value, with the amount of subsidy recognised as income for the period;

- any compensation for loss or impairment of an item must be recognised in the statement of financial performance;

- expenditure must be capitalised if it increases the economic benefits over the total life of the item (beyond those benefits reflected in its carrying value);

- items may be revalued, provided:

    - all items in the same class are revalued to fair value;
    - revaluations are consistent and sufficiently regularly (and at a minimum every five years);
    - revaluations are conducted or reviewed by an independent valuer (unless there is an active market for the item);

- the carrying value of a revalued item must recognise accumulated depreciation;

- revaluation increments and decrements must be recognised in the statement of movements in equity;

- net revaluation deficits for a class of assets must be recognised in the statement of financial performance;

- to the extent a revaluation reverses a previous revaluation deficit, such revaluation increments must be recognised in the statement of financial performance;

- the depreciable amount of an item must be charged over the item's useful life, and such charges recognised as an expense in the statement of financial performance;

- an asset's useful life is defined in economic rather than technical terms, and it must be reviewed every year (and future depreciation charges must be adjusted if necessary);

- an asset valued at ODRC must be reviewed annually to assess whether it might be potentially impaired, and if so, its value must be adjusted down to the recoverable amount where that is less than the current carrying value; and

- any write-down to recoverable cost (due to the impairment test) must be recognised in the statement of financial performance.

28. What relevance does FRS-3, or any other standards and policies, have for the Commission's criteria for evaluating valuation methodologies?

29. What other accounting policies or practices, if any, are relevant to the review ?

Capital and Operating Expenses

4.53 Capital and operating expenses are to some extent substitutable. Moreover, the distinction between capital and operating expenses is not always clear. Therefore, there is scope for different businesses to apply different accounting policies regarding capitalisation of some expenses. Similar issues may arise regarding depreciation policies. Different businesses could depreciate assets at different rates and/or different depreciation profiles.

4.54 Arguably, if the Commission were to seek to compare the operating and/or capital efficiencies of different businesses, common accounting and valuation policies would be necessary to ensure comparability. If no inter-business comparisons were made, a common policy between businesses might not be necessary. As the Commission is required to assess electricity lines businesses against thresholds, a common approach to accounting and valuation policies would likely be required to ensure consistent assessments.

30. What scope is there for substitution of capital and operating expenses for electricity lines businesses system fixed assets?

31. Should the regulatory asset valuation methodology include prescribed accounting policies, such as in relation to capitalisation and depreciation?

SUMMARY

4.55 This chapter has discussed:

- how regulatory constraints on the return on and of capital affects the allocation of risk between asset owners and customers;
- the role of regulatory mechanisms, such as optimisation, to provide incentives for capital efficiency;
- how inflation may be dealt with when using asset valuations for regulatory purposes; and
- how regulatory asset valuation may fit with accounting standards and valuation methodologies used for other statutory purposes.

CHAPTER 5 – ASSET VALUATION METHODOLOGIES

INTRODUCTION

5.1 This chapter provides an overview of valuation methodologies that could possibly be used to value electricity lines businesses' system fixed assets.

5.2 In brief, two broad approaches to valuation are commonly used, namely revenue-based and cost-based approaches. Revenue-based approaches include opportunity cost, discounted cash flow (DCF), economic value (EV), and market transaction value. Cost-based approaches include historic cost, indexed historic cost and depreciated replacement cost. Optimised deprival value (ODV) combines elements of both types of approach (ODRC and EV). Similarly, the accounting standard FRS-3 provides for a revenue-based approach to be overlaid on the historic cost approach where an asset's ability to generate net cash inflows is impaired.

5.3 In the absence of sunk costs, the Commission's preferred valuation methodology is opportunity cost. This chapter proceeds by explaining the opportunity cost approach, before examining other revenue-based valuation methodologies. More detailed discussion of the cost-based approaches suitable for valuing sunk assets is presented in later sections. A comparison of the advantages and disadvantages of these methodologies in the context of Part 4A is undertaken in Chapter 10.

VALUATION APPROACHES

Revenue-based Approaches

5.4 Revenue-based approaches value assets on the basis of forward-looking, future revenues. The methods considered below are opportunity cost, DCF, and market transaction value (also known as "fair value").

Opportunity Cost Valuation

5.5 Opportunity cost is the value of the next best alternative action that is forgone. Opportunity cost is the maximum of scrap value and present value in the next best use. If the next best use lies outside the business, then the latter will be market value in the next best alternative use.[11] Opportunity cost is the cost relevant to decision-making, and to ensuring resources are allocated to their best use. Valuing assets on the basis of their opportunity cost provides owners with incentives to ensure they are put to their best use. If the value of assets in an alternative use is higher than in their current use, then the owners have incentives to move them to the higher-valued use. The difference between the

[11] The range of market value in the next best alternative use excludes market value existing use. Market value next best alternative use, therefore, need not be the same as market transaction value, if transaction value is based on existing use.

highest-valued use and the next best alternative use is economic rent, which is the capitalised return in excess of what is necessary to keep the assets in their highest-valued use.

5.6 Valuing assets at opportunity cost can break the circularity issue (i.e. valuing a monopoly business on the basis of expected revenues may result in the inclusion of monopoly rents into the value), because it bases the valuation of the asset, not on its existing use, but on its value (i.e. what it could earn) in its next best alternative use. Opportunity cost valuation leaves investors indifferent as to whether they keep assets in the regulated activity or shift them to the next best alternative, even if, for example, adopting an opportunity cost valuation for regulatory purposes lowered returns to the business.[12]

5.7 A problem exists using opportunity cost to value assets that involve sunk costs. Some assets are sunk, in that they have no (or very limited) alternative uses. In such circumstances, valuing the assets at opportunity cost would imply a very low, or even zero value. If investors believed their sunk assets were to be valued substantially below cost and prices determined on that basis, they would not have invested in those sunk assets in the first instance, nor would they invest in similar assets in the future. As a result, an alternative to the opportunity cost principle has to be used for sunk assets.

5.8 There are degrees to which assets involve sunk costs, often called the "degree of asset specificity". At one end of the spectrum, an asset's opportunity cost value may be its "scrap" value, net of the cost of decommissioning and disposal. At the other end of the spectrum, an asset's opportunity cost value would be its present value in the next best alternative use, net of the cost of shifting it to that use.

32. Are there some system fixed assets that could be put to alternative uses outside of the electricity industry and, therefore, appropriately valued at opportunity cost? What assets have high specificity (i.e. only have value in their current use)?

5.9 In summary, the Commission considers the opportunity cost principle to be the overriding principle for asset valuation in general. However, for sunk assets the opportunity cost principle is not appropriate. Hence, the Commission has considered alternative approaches, which are discussed below.

Discounted Cash Flow

5.10 The DCF approach values a company on the basis of the present value of the net cash flows it generates into the future. This approach considers the value to the business likely to be created in the future using existing and future assets. Because of its forward-looking nature, this method does not need to

[12] How the opportunity cost principle is applied in practice may create incentives that alter investors' otherwise indifference towards investment.

consider the optimality of past investment or the cost values attributed to them. In a competitive market where revenues are constrained by competitive forces, such valuations do not give rise to monopoly rents. This type of forward-looking revenue approach is likely to best reflect the economic value of tradeable assets in competitive markets.

5.11 In principle, the DCF method could be used to value the assets of a monopoly business. However, if the monopolist were relatively unconstrained, the cash flows (and DCF value of the assets) of the monopoly could include monopoly rents. When profits are assessed against an asset base measured in this way, the business would appear to earn only a competitive return.

5.12 If the DCF asset value were used as a base to set allowed revenues, a circularity problem arises in that the revenues include monopoly rents hence, this method of asset valuation may not prevent the business exercising its market power.

5.13 Thus, DCF is not an appropriate methodology for valuing a business's assets, if the objective is either to determine whether the business is earning "excessive" profits, or to constrain revenues or prices to "competitive" levels.

Market Transaction Value or "Fair Value"

5.14 The accounting reporting standard (FRS-3) requires assets to be valued at "fair value", which is defined as:

> "the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arms-length transaction. Fair value is deemed synonymous with market value, open market value and current market value".

5.15 FRS-3 provides a hierarchy of approaches to the determination of fair value:

- by reference to price in an active market (if one exists);
- where no active market exists, by reference to some other market-based evidence, such as discounted cash flows derived from estimates of market-based revenues; or
- where no market-based evidence exists, depreciated replacement cost should be used.

5.16 Several transactions of electricity lines business assets have occurred in New Zealand in recent years. In many cases, sale prices have exceeded ODV, sometimes by multiples of two or more. There are various possible explanations for this. For example;

- systems fixed assets are only a component of the total assets of the company;
- it may reflect anticipated operating cost efficiencies;

- it may indicate future expectations regarding revenue streams, including the expectation of earning monopoly profits through the exercise of market power; and/or

- expectations about possible new services, or options to provide new services.

5.17 In a regulated environment, the market value of assets depends in part on investors' expectations of the price and revenue constraints imposed by regulation, as well as on potential synergies that could be gained from the transaction. In some cases, purchasers may be over-optimistic about the potential gains from a transaction, resulting in them paying prices that are "too high".

5.18 Establishing valuations on the basis of market value is problematic for a monopoly business where many of the assets are sunk. Given that the market value depends in part on expectations about regulatory constraints, a market transaction approach tends to be circular, as was noted for the DCF approach, i.e. the value includes the monopoly rents that might be earned. Further, if investors have misjudged the transaction and paid "too much" for the assets, requiring customers to pay higher prices based on the acquisition price could result in a net transfer of wealth from current and future customers to the previous asset owners. In contrast, in a competitive market, investors who overestimate the market value of assets bear the associated risks.

33. What could explain the evidence of transactions of electricity lines businesses' system fixed assets greater than their ODV? How important are current and intangible assets in explaining the evidence?

Cost-based Approaches

5.19 As an alternative to revenue-based approaches, cost-based approaches can be used to value specialised assets. However, the appropriate approach has to balance the incentives that may be created to either over-invest (if allowed returns are excessive), or under-invest (if returns are not adequate). The balancing of incentives is likely to be delicate and even a small imbalance could have a significant impact on how aggregate assets are managed and returns earned over time.

5.20 The main cost-based options are historic cost and replacement cost methodologies. The sections below describe the features of historic cost, replacement cost, and optimised deprival value (a variant of replacement cost) valuation approaches.

Historic Cost Approaches

5.21 The historic cost of an asset is the original cost of acquiring or building the asset, as recognised under generally accepted accounting principles. Historic costs are usually depreciated to reflect "wear and tear" and obsolescence over the economic lives of assets. Historic costs may also be indexed for inflation.

5.22 Under FRS-3, historic costs may also reflect associated cash flows where they are impaired due to market or other factors.

5.23 The use of historic cost in a regulatory control regime, can allow investors to earn a normal rate of return on their investment, avoiding the expropriation of value that would result from an opportunity-cost approach, as long as the methodology is applied consistently over the life of the assets. It can also be used as the basis for assessing whether businesses have earned excessive profits. The advantages and disadvantages of using a depreciated historic cost approach are discussed further in Chapter 10.

5.24 The major advantage of using a historic cost approach to value specialised assets is that it relies on reasonably objective data that can be audited by independent parties and is, therefore, relatively robust to manipulation. The information requirements for historic cost valuations are relatively low once a base valuation has been established, since the valuation at the close of any period is simply the opening valuation less depreciation plus asset additions less disposals during the period.

5.25 Where historic cost valuations reflect acquisition costs incurred in a market transaction, the problems identified above apply. An historic cost approach may also incentivise investors to keep redundant and over-designed assets in the asset base so as to continue to earn a return on them. Periodic review of the efficiency of the capital base, with a view to optimising such assets, could help address this problem.

5.26 Conceptually, assets could be optimised under an historic cost approach. In practice, however, the scope for optimising historic cost valuations may be limited, particularly in response to technological change. Some technology would almost certainly not have existed at the time an asset was purchased, and hence determining its optimised cost would not be possible. Thus, optimising the historic cost of system fixed assets might be limited to identifying and removing redundant assets. The possible tests that could be used include:

- a "used and useful" test for existing assets;
- a prudency test for proposed investments and those that exceed a reasonable expectation of demand over a certain number of years; [13] and/or

[13] The concepts of "used and useful" assets and "prudency" tests have been applied in US regulated industries where historic cost approaches are used.

- an EV, or impaired asset, test.[14]

5.27 Optimising historic valuations reduces some of the benefits of the historic cost methodology, specifically its objectivity and low information requirements.

34. What are the pros and cons of combining capital efficiency reviews with a historic cost approach? How great is the scope for capital efficiency reviews under a historic cost method?

5.28 A variant of the historic cost approach involves using the book value of assets at the time of a particular event in the company's life, such as establishment or vesting of the company, or break-up of a larger entity into smaller entities (e.g. a statutory requirement for ownership separation of electricity lines businesses); or floatation (if for example a company were privatised).[15] Additions and disposals to and from the asset base from that time would then be made at cost. Such a historic cost approach could be adopted where the values at that time reflect a reasonable investment by the current owner (i.e. acquisition costs do not reflect expectations of excessive profits). [16]

5.29 Once an opening asset base has been established, it is relatively straightforward to apply a historic cost approach into the future.

35. What events could be used as a base for valuing system fixed assets at historic cost? What are the relative merits of using the book values at each of these particular events as a base for a historic cost value? What would be the most appropriate date to use for assessing the historic costs of electricity lines businesses?

5.30 Historic costs can be indexed for inflation using either an asset-based price index or the consumer price index (CPI). If the index were based on inflation in the value of electricity lines business assets, historic cost values would differ little, if at all, from depreciated replacement cost values. CPI-indexed asset prices could exceed or fall short of replacement values depending on the relative rates of inflation. In a regulated environment, investors could be compensated for inflation by the use of an inflation-adjusted historic cost could combined with a real WACC to determine allowed revenue.

36. What are the pros and cons of indexing historic cost values for inflation?

[14] FRS-3 requires historic cost values to be written down to reflect any impairment (i.e. economic stranding).

[15] In the case where the current owners of the assets are also those who constructed the assets, this approach could also be used if the historic cost records of businesses construction costs are incomplete. However, valuations at these dates would be arbitrary.

[16] Floatation prices may, however, reflect the anticipation of monopoly profits at the time of floatation.

Replacement Cost Approaches

5.31 Replacement cost (RC) is defined as the present day cost of acquiring a substantially similar present day asset that could provide a similar level of service (to the asset in question). Replacement cost is based on current market values (and, therefore, technology of the day). Depreciated replacement cost (DRC) recognises the write-down of replacement costs for depreciation (to an age comparable to the asset in question).

5.32 Optimised depreciated replacement cost (ODRC) is an estimate of the depreciated cost of the most efficient, lowest-cost combination of assets that could replace existing assets and offer the same utility or level of service, or the level of service customers prefer (whichever is the lowest). Replacement cost valuations will incidentally incorporate the impact of general inflation forces in the economy plus any industry-specific deviations from the CPI (e.g. due to technological change). In addition, ODRC includes optimisation (e.g. due to changes in consumer demand for distribution and transmission services) and adjustment for the age of assets (depreciation).

5.33 The ODRC methodology is often claimed to have efficiency benefits when applied to monopoly industries because it replicates or mimics the behaviour observed in competitive markets. It is suggested that ODRC establishes, in principle, the investments a hypothetical efficient new competitor would make if it were to enter the market. It thereby sets the maximum revenue and prices that an incumbent business could charge while avoiding incentives for inefficient by-pass of existing assets.

5.34 It is also suggested that investors in competitive markets do not get returns on assets that are redundant, over-designed or technologically obsolete, and that the optimisation associated with ODRC removes such assets from the asset base (and the associated returns). ODRC attempts to constrain a monopolist's asset base, although arguably at the upper level of what would be observed in a competitive market. In competitive markets, asset owners may earn less than their full WACC on the ODRC value of their assets in the short-term. The EV test in the ODV approach attempts to replicate this possibility, but unless the EV test is conducted rigorously, even under an ODV regime, asset owners may earn above that possible in a truly competitive market.

5.35 However, others dispute the theoretical justification for ODRC by arguing that although ODRC may have economic merit when market entry is possible, it appears to have less merit where competition is unlikely.[17] They note that, in practice, ODRC does not set the upper bound on pricing. For example, economies of scale, and the need to secure a minimum market share, might deter a new entrant even if the incumbent set its tariffs above the ODRC level. New entrants may also fear the incumbent's ability to lower its prices if entry

[17] P.R. Carpenter, *Asset Valuation and the Pricing of Monopoly Infrastructure Services: A Discussion Paper*, submission to Commerce Commission's airports review, 2000.

occurs or is seriously contemplated. Moreover, market entrants would generally have to buy new assets (rather than the depreciated assets of the incumbent) to enter the market, so that incumbents could price up to ORC (rather than ODRC) without attracting entry.[18] Resource management considerations, including the limited availability and cost of rights of way (sometimes called easements), further reduce the likelihood of market entry.

37. How important is it that an asset valuation methodology replicates or mimics competitive market outcomes, given the regulatory objections of Part 4A and the Commission's evaluation criteria?

38. Does the ODRC approach have economic merit in terms of mimicking competition? Do any other asset valuation approaches have more merit in this regard?

5.36 ODRC could be used in a regulatory environment to ensure investors earned a normal risk-adjusted return over the life of the assets (e.g. using rate of return regulation), so that investor returns were not expropriated.

5.37 Investors earn a normal return if the capital returns in any period comprise depreciation plus the investors' cost of capital on the ODRC value of assets. Increases in asset value from periodic revaluations under ODRC may be matched by income forgone by the asset owner (reducing the revenue required from customers), and vice versa for decreases in asset value, as a result of optimisation if a nominal WACC is used. However, this will have an impact on whether the risks of unanticipated changes in asset values are borne by investors or consumers.

5.38 If revaluations caused by inflation are not matched by income forgone, then a real WACC should be used (with the revaluations providing compensation for inflation). If revaluations are not treated as income (income forgone) and a nominal WACC is used to determine the return on capital, investors would earn more than their cost of capital. This discussion assumes that the inflation premium contained in the nominal WACC matches inflation in asset values. If it does not, investors may earn more or less than a normal rate of return.

39. If electricity lines businesses have revalued their assets in the past but have not matched those revaluations with income forgone, should their current return on capital be calculated using a real WACC?

40. If revaluation gains have not been treated as income, should consumers now be compensated in some way? If so, how?

[18] See for example, D. Johnstone, *Asset Valuation and Regulation of Energy Infrastructure Tariffs in Australia: The Use and Deficiencies of DORC*, working paper, May 2001.

41. Are there likely to be significant differences between the inflation of asset prices and the inflation implicit in a nominal WACC calculation?

42. If businesses bear the cost of downward revaluations is this risk asymmetric (i.e. to the disadvantage of investors) and how could it be reflected in the WACC without compromising incentives for efficient investment?

5.39 The treatment of downward revaluations resulting from unanticipated technological change, changes in market demand, or over-investment, directly affects the risk borne by regulated asset owners, their incentive to invest carefully and whether they can expect to earn a normal rate of return. If all downward revaluations were matched by increased income in the relevant period, the risk (variability of returns) to asset owners would be lower (and the corresponding risk borne by customers would be higher) than if revaluations were not treated as period expenses.

43. If businesses bear the cost of downward revaluations is this risk asymmetric (i.e. to the disadvantage of investors) and how could it be reflected in the WACC without compromising incentives for efficient investment?

5.40 The importance of downward revaluations depends in part on the allowed depreciation profile. Depreciation profiles that reflect expected economic depreciation (i.e. take into account expected technological obsolescence) would generally reduce the significance of periodic revaluations compared with engineering-life based profiles.

Optimised Deprival Value (ODV)

5.41 The optimised deprival value is the value that would be lost by an asset owner if deprived of the asset. The concept was originally used to determine the maximum insurable loss associated with an asset.

5.42 In practice, ODV is treated as equivalent to ODRC, except where it would not be rational from an economic perspective to replace an asset. In the latter case, ODV is equal to the economic value (EV) of the asset, where EV is defined as the greater of the disposal or salvage value (i.e. net realisable value), or its value to users (i.e. the present value (PV) of expected income determined by the least cost substitute or by a regulated tariff based value). Thus, ODV combines cost and revenue approaches to valuation. The EV concept can also be used with historic cost valuation, and is referred to in FRS-3 as "impaired value".

5.43 The issues raised by ODV are the same as discussed above for ODRC, apart from the EV component of the valuation approach. The EV component allows a value to be assigned to assets, where the value in current use is equal to or greater than opportunity cost, yet replacement of the assets would not be

economic (i.e. not able to yield a normal return). For example, the replacement cost of a rural electricity line may be high, and therefore not economic. The disposal or scrap value of such lines may be relatively low. However, as long as the line does not require major maintenance, it may provide a value to users that exceed its scrap value, and EV would capture this value. As such, it appears to be a useful adjunct to ODRC (and DHC).

44. How important is an EV assessment to the theoretical underpinning of ODV?

5.44 In recent use, EV assessments have generally had a minimal effect on the total ODV value for electricity lines businesses. Arguably, the EV component may have a more material effect in the future if the cost of alternatives to lines services such as distributed generation falls. In part, the limited impact of EV assessments appears to be influenced by the methodology prescribed in the ODV Handbook. In particular:

- the flexibility allowed in allocating revenues and costs to network segments in determining present values;
- the "profit maximising tariff" of 30 cents/kWh (6 cents/kWh in the case of Transpower), which the electricity lines businesses typically use;[19] and
- the definition of network segments to be submitted to EV testing (the segments may not be narrow enough to capture uneconomic assets).

45. Why does the EV component have a limited impact on ODV values (as per the ODV Handbook)? Are the factors identified by the Commission significant?

5.45 The issues presented by the EV component of ODV include the following:

- although the EV approach appears to be conceptually sound, it has made little material difference to asset valuations to date. This raises the issue of whether the benefits of using EV outweigh the costs, including the likely need for specialist input from consultants; and
- section 62 of the Electricity Act 1992 obliges electricity lines businesses to continue supplying pre-existing customers, including those that are uneconomic, until April 2013. If the assets involved were valued at EV, the costs of uneconomic customers would be borne by electricity lines businesses. However, if the uneconomic assets are bundled with other assets so that the overall bundle is economic, the result is that other customers, cross-subsidise uneconomic customers. Thus, how EV is

[19] This is the maximum tariff under the ODV Handbook that an electricity lines business can charge for a group of assets, which, if exceeded, would cause a consumer to by-pass the lines network with an alternative form of supply (e.g. diesel-fuelled generator). If the tariff is set "too high", the impact of the EV test will be reduced.

applied can affect the allocation of risk between the business and its customers. However, for many of these customers, the marginal costs of supply may be relatively small as long as significant asset maintenance is not required, and they may, therefore, be economic to supply until 2013.

46. What are the additional costs of an EV assessment (over and above an ODRC assessment)? Do the costs outweigh the benefits?

47. Are there significant numbers of "uneconomic" customers for electricity lines businesses? How should the costs of any uneconomic customers be allocated?

SUMMARY

5.46 The chapter provided an overview of revenue-based and cost-based valuation methodologies. It noted the Commission's preference for an opportunity cost valuation approach for non-specialised assets. However, an opportunity cost approach would not be suitable for sunk assets because it would not allow investors to earn a normal return on their investment, so that in the long run, under-investment would result.

5.47 For sunk assets, cost-based valuation approaches are appropriate. The chapter reviewed four valuation methodologies, which could be used: historic cost; market transaction value; replacement cost; and optimised deprival value. The Commission does not favour market transaction value as it could build in expectations of earning monopoly profits.

5.48 The historic and replacement cost approaches differ largely in terms of their treatment of optimisation and indexing as shown in Table 3.

Table 3: Comparison of Cost-Based Approaches

	No Optimisation	**Some Optimisation**	**High Optimisation**
No inflation adjustment	DHC	DHC with a "used and useful" test	N/A
Adjustment for replacement cost movements	DRC	ODRC/ODV	ODRC/ODV
CPI adjustment	Indexed DHC	Indexed DHC with a "used and useful" test	N/A

DHC – depreciated historic cost
DRC – depreciated replacement cost
ODRC – optimised depreciated replacement cost
ODV – optimised deprival value

CHAPTER 6 – CURRENT USE OF THE ODV METHODOLOGY

INTRODUCTION

6.1 This chapter builds on Chapter 5 by discussing the ODV method as specifically used by electricity lines businesses (including Transpower) for information disclosure purposes (the prescribed ODV method). The chapter offers some insights into the application of the ODV method, which the Commission considers it important to:

- draw lessons from the application of a valuation methodology in practice, including from the Commission's recent audit of the valuations of electricity lines business system fixed assets (recalibration audit); and
- assess to what extent the prescribed ODV method reflects the ODV method as theoretically described elsewhere in this paper.

6.2 This chapter begins by giving an overview of the regulatory information disclosure regime for electricity lines businesses; why an asset valuation methodology is an integral component of that regime; and the reasons the ODV method was preferred for valuing line business system fixed assets for the purposes of that regime. The chapter then discusses the current key specifications of the prescribed ODV method. As part of this discussion, reference is made to the results of the recalibration audit recently conducted by the Commission. Finally, the chapter looks at changes to the prescribed ODV method since its inception.

6.3 The inclusion of this chapter in this paper does not imply the Commission endorses the prescribed ODV method, or that it has made up its mind that the ODV method is the best option for valuing system fixed assets (either at opening or into the future) for the purposes of the regulatory functions under Part 4A. Rather, this chapter is included to elicit feedback on the prescribed ODV method and its application.

INFORMATION DISCLOSURE AND USE OF ODV

6.4 The 1994 Disclosure Regulations came into force on 11 August 1994.[20] A principal part of the information disclosure regime was to require electricity lines businesses to separate out (in an accounting sense), each year, their natural monopoly transmission or distribution activities to make their performance in those activities transparent. The aim of information disclosure was therefore to encourage appropriate performance through transparency, comparability, and monitoring of relevant information. The valuation of

[20] The Government in 1990 approved the main features of the electricity information disclosure regime. The 1994 Regulations were amended in April 1996 and then replaced following the promulgation in April 1999 of the Electricity (Information Disclosure) Regulations 1999 (the 1999 Regulations). The 1999 Regulations were amended by the Electricity (Information Disclosure) Amendment Regulations 2000 and 2001.

system fixed assets is a key input to assessing performance. For this reason, a common and appropriate valuation method was considered necessary.

6.5 Under the information disclosure regime, electricity lines businesses are required to annually disclose certain financial performance measures.[21] These include return on funds, return on equity, and return on investment.[22] The calculation of each of these financial performance measures incorporates the valuation of electricity line business system fixed assets using the prescribed ODV method. There is no requirement under the information disclosure regime for electricity lines businesses to use the ODV method to value system fixed assets for any other purpose. For instance, guidelines for the prescribed ODV method make it clear that for regulatory purposes there is no requirement that electricity lines businesses incorporate system fixed assets valued at ODV in their tariff setting process.[23]

THE PRESCRIBED ODV METHOD

6.6 This section describes the main features of the prescribed ODV method as set out in the fourth edition of the ODV Handbook, including a description of changes to the ODV Handbook that have been made over time.[24] A key reason for specifying the ODV method by way of guidelines is to limit the degree of judgement necessary and discretion available in valuing system fixed assets. In so doing, it is expected that greater consistency of valuations between businesses can be achieved, thus enhancing the reliability and meaningfulness of performance measures.[25] In describing the prescribed ODV method, reference is made to practical insights about the application of the method as a result of the recently completed recalibration audit.[26]

6.7 The main processes and features of the prescribed ODV method as set out in the ODV Handbook are presented in Table 4.

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[21] In the case of Transpower, annual disclosure relates to the financial year ending 30 June. For local distribution businesses, it relates to the financial year ending 31 March. The first ever annual disclosure of information by Transpower under the disclosure regime was required for the year ended 30 June 1994, and by local distribution businesses for the year ended 31 March 1995.

[22] This is how the performance measures are currently known. Originally, in the 1994 Regulations, the measures were referred to, respectively, as accounting return on total assets, accounting return on equity, and accounting rate of profit. In addition, the prescribed formulae for calculating the measures have been refined over time under the empowering regulations, or amendments thereto.

[23] However, nearly all electricity lines businesses do value their system fixed assets for other purposes using the prescribed ODV method. This includes for the purposes of setting prices and preparing financial statements, including the audited financial statements disclosed under the information disclosure regime.

[24] Ministry of Economic Development, *Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Line Businesses*, Fourth Edition, October 2000 (the fourth edition of the ODV Handbook).

[25] In this respect, it is also noted that an independent auditor is required by the regulations governing electricity information disclosure to certify that an ODV valuation of system fixed assets has been made in accordance with the prescribed ODV method.

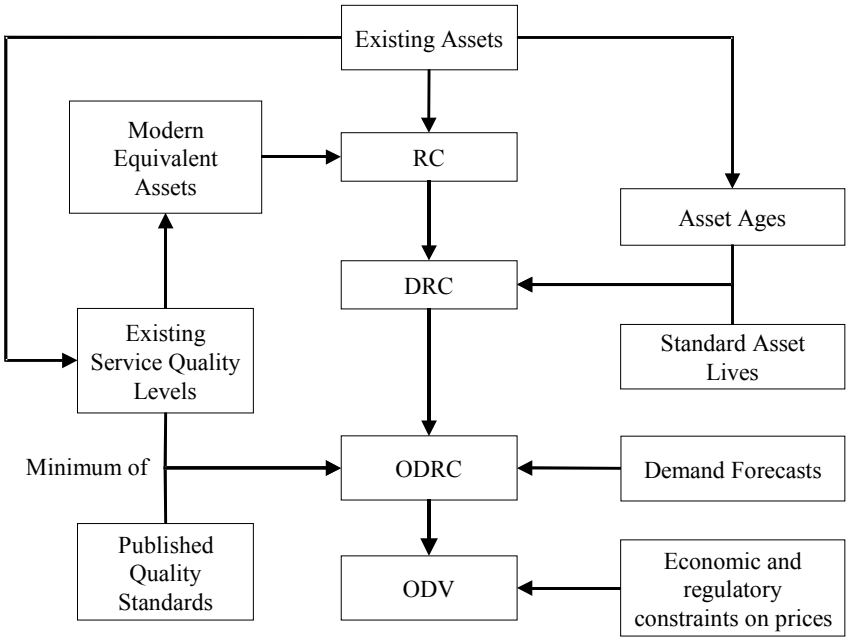
[26] An overview of the Commission's recalibration audit, as well as practical insights from the audit, is contained in *Recalibration of Asset Values of Large Electricity Line Owners – Closing Report*, 1 August 2002, a report prepared for the Commission by Parsons Brinckerhoff Associates Ltd (the Closing Report).

Table 4: Main Processes and Features of the Prescribed ODV Method

Process/Feature	Description
Objective	The aim of applying the prescribed ODV method "is to value the [system fixed] assets at the level at which they can be commercially sustained in the long term, and no more. The resulting value should be equal to the loss to the owner if they were deprived of the assets and then took action to minimise their loss."
Frequency of ODV valuations	At least every three years or whenever there has been a cumulative increase or decrease of at least 10% in either the system length or transformer capacity of the distribution network since the previous ODV valuation, whichever happens first. More frequent ODV valuations are allowed.
Preparing a detailed asset register	Requires comprehensive asset register of the system fixed assets and their configuration as the starting point for a valuation.
Calculating RC	System fixed assets are valued at their RC, which is determined by reference to Modern Equivalent Assets (MEAs) that are capable of providing the same level of service as existing assets. To ensure objectivity and consistency, maximum standard RCs for MEAs are prescribed for the majority of assets, which are not to be exceeded. In some instances, prescribed cost multipliers can be applied to maximum RCs to recognise special cost characteristics of certain assets.
Calculating depreciation to determine DRC	Existing asset ages (or remaining asset lives) are recognised by providing for depreciation. Once again, for the sake of objectivity and consistency, maximum standard asset lives are prescribed, and are not to be exceeded (except in some limited specified circumstances). RC is amortised using the straight-line method of depreciation. Fully depreciated assets still in service cannot be valued higher than their net realisable value (NRV), which will typically be zero.
Optimising the distribution network	With the objective of mimicking the outcomes in a competitive market, system fixed assets are optimised (notionally removed) from the distribution network to recognise surplus assets or excess network capacity, taking into account the required level of service (quality of supply, including security of supply) and network capacity. This involves redesigning the network, using MEAs, but changing the configuration and size of components to meet forecast demand (load growth) at the end of the relevant planning period (which is prescribed, varying between current demand, five years, and 10 years, depending on the type of asset) and to meet existing (or published minimum) quality standards, at least cost. In general, the number and location of network connections are assumed to be fixed. Optimisation can result only in the reduction of the value of system fixed assets. That is, the process cannot be used to notionally improve the system where this would cost more. The optimisation process involves considerable engineering expertise, and typically makes reference to traditional or conventional engineering practice, such as the "n–1" security (redundancy) planning standard.
Determining ODRC	Where an existing asset is optimised out and replaced by a notional asset, the notional asset is depreciated on the basis that its remaining life is equivalent to the life of the existing asset. The optimised asset is excluded from the valuation.
Determining EV (as the maximum of PV and NRV)	This process involves: (1) selecting network segments (by reference to feeders and spurs for local distribution businesses and to points of supply for Transpower, and based on those parts of the network that, applying certain general and specific criteria, are least likely to be economic); (2) determining the profit-maximising line tariffs (prescribed as maxima of 30 cents/kWh for local distribution businesses and 6 cents/kWh for Transpower) for consumers on the segments to be tested; (3) using the profit-maximising line tariffs to calculate the EV (maximum of PV and NRV) of each segment; and (4) valuing the assets in a segment at EV where this is less than ODRC. Cost allocations to segments for EV assessment are to be made using the avoidable cost allocation methodology (ACAM) and PV is to be determined according to a prescribed formula.
Determining ODV (as the minimum of ODRC and EV)	The overall ODV of system fixed assets is the sum of ODRCs (for those assets to which ODRC is applicable) and EV (for those assets to which EV is applicable).

6.8 Figure 2 illustrates the main processes and inputs related to the prescribed ODV method.

Figure 2: Prescribed ODV Method – Main Processes and Inputs



6.9 The Closing Report for the recent audit, prepared by Parsons Brinckerhoff Associates, identifies a number of areas where the prescribed ODV method and the ODV Handbook (or the way they are applied in practice by electricity lines businesses) could be improved (noting, these are the views of Parsons Brinckerhoff Associates, not necessarily the Commission), viz:

- the quality of the asset register, which is the basic starting point for an ODV valuation, could in some cases be improved;
- the standard replacement costs specified in the ODV Handbook should be regularly reviewed and, if required, updated to ensure their accuracy;
- a consistency review should be undertaken to ensure that the standard replacement costs and asset lives specified in the ODV Handbook for Transpower's system fixed assets are compatible with the standard replacement costs and asset lives specified for similar assets pertaining to local distribution businesses;
- standard replacement costs for transformers, switchgear, and control buildings related to zone substations should be specified in the ODV Handbook to improve the consistency of valuations of these assets between electricity lines businesses;

- a residual asset life of up to three years (and corresponding value) should be permitted on fully depreciated assets still in service to recognise contribution of economic value by such assets;

- a problem area for ODV valuation is in respect of transmission and distribution lines due to them being maintained perpetually through the incremental replacement of line components. While some electricity lines businesses based the ages of lines on the basis of commissioning dates, others calculated ages based on the average ages of supporting structures. Guidance in the ODV Handbook on the treatment of perpetually maintained assets is required, as the treatment of them can have a significant impact on their valuation;

- the ODV Handbook should clarify what constitutes refurbishment of system fixed assets and what constitutes maintenance, and specify the extent of evidential documentation necessary to support a refurbishment-based asset life extension;

- although the prescription for the optimisation process is generally adequate, the design of the pre-optimised network can have a strong bearing on the optimised value. Two networks offering a similar level of service, but with inherently different designs can, nevertheless, arrive at significantly different optimised valuations. In addition, most electricity lines businesses appear to base their quality of supply criteria on the performance of their existing networks, rather then on a rational economic analysis or customer expectations. By international standards, some quality of supply criteria are very high. Adopting lower quality of supply criteria may increase the level of optimisation by some electricity lines businesses;

- the prescribed EV assessment process is difficult to apply. As a result, it is difficult to predict outcomes from the EV assessment, as done by different electricity lines businesses. The EV assessment is based on allowed "profit-maximising tariffs" that are higher than what electricity lines businesses actually charge for those uneconomic segments. A lower profit maximising tariff could result in further EV write-downs. In addition, the cost effectiveness of the EV assessment should be reviewed; and

- there is an inconsistency in the ODV Handbook concerning the treatment of negative EVs. Clause 3.77 therein stipulates that the EV of the system fixed asset in a segment of a distribution network is worth the maximum of NRV and PV. Clause 3.81, on the other hand, states that the EV can only be NRV if consumers connected to those assets have agreed to disconnection (under the Electricity Act 1992, existing customers connections must be maintained until 31 March 2013, unless consumers agree to disconnection). This inconsistency has led to some electricity lines businesses including negative EVs in their valuation, while others have used NRV.

DEVELOPMENT OF THE PRESCRIBED ODV METHOD

6.10 Revisions over time to mandatory guidelines relating to the prescribed ODV method have focused on improving the consistency of valuations. This section considers the key changes made to the ODV Handbook over time and what affect this has had on the valuation process. A history of the development of mandatory guidelines (representing the prescribed ODV method) and key changes up to the fourth edition of the ODV Handbook are summarised in Table 5.

Table 5: Development of the ODV Handbook

ODV Handbook Edition	Notes
First	Separate (first edition) handbooks for Transpower and local distribution businesses. Handbook for local distributors entitled *Handbook for Optimised Deprival Valuation of Electricity Line Businesses*, 23 June 1994. Handbook for Transpower entitled *Handbook for Optimised Deprival Valuation of Trans Power*, 7 July 1994.
Second	First edition of the handbook for local distributors replaced by the second edition, dated 28 May 1998 (effective from 1 July 1998). The first application of the second edition was for the 1997/98-year information disclosures (year ended 31 March 1998). The significant changes included the updating of the standard asset lives used in valuing system fixed assets and the move to make the standard asset lives and values maxima, such that they cannot be exceeded. Customer meters and load control relays were removed from the schedule of line business system fixed assets.
Third	The third addition, dated April 1999, superseded both the first edition of the handbook for Transpower and the second addition of the handbook for local distributors (i.e. a single ODV Handbook was produced to cover both Transpower and local distributors). The third edition was entitled *Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Line Businesses*, and applied for the first time to the 1998/99 disclosure financial year (year ended 31 March 1999 for local distributors and 30 June 1999 for Transpower). However, this new handbook was not substantively different from the superseded handbooks applying to Transpower and local distributors.
Fourth	The fourth edition of the ODV Handbook (dated October 2000) superseded the third edition. It applied for the first time to the 2000/01-year information disclosures. The fourth edition makes more explicit and rigorous the rules in relation to the optimisation and economic value components of the ODV process. The fourth edition required all electricity lines businesses to undertake ODV valuations for the 2000/01 financial year, using the fourth edition of the ODV Handbook.

6.11 The second edition of the ODV Handbook (applying to local distribution businesses only) was more prescriptive, thus offering less scope for judgement. No changes were made to the standard replacement costs (in fact, these standard replacement costs have not changed since the first edition of the ODV Handbook, prepared in 1993).[27] Some changes were made to the standard lives of certain system fixed assets, and the list of assets included in the second edition of the ODV Handbook was extended to better reflect the different types of equipment in use. The provisions in the first edition for exceptions to the use of standard replacement costs and lives were removed so that the standards became maxima. Previously, assessed values were permitted in place of standard values if there were justifiable reasons, but were

[27] However, in the case of Transpower, detailed specifications and costs for all of its transmission building blocks were refined and updated during 1998. These building blocks formed the basis for the transmission building block costs in the third and fourth editions of the ODV Handbook.

considered to provide too much flexibility to electricity lines businesses in determining ODV valuations.

6.12 The third edition of the ODV Handbook was a major re-write in the sense that it combined ODV valuation guidelines for local distribution businesses and Transpower. This new edition clarified the prescribed ODV method and removed ambiguities. Although more explicit in some areas than previously, the third edition of the ODV Handbook did not include substantive changes to the valuation methodology.

6.13 The fourth edition of the ODV Handbook introduced much more explicit and rigorous rules relating to the optimisation and EV components of the prescribed ODV method. In respect of optimisation, allowable load growth periods were specified, and load forecast and quality of supply (including security) information used as the basis for optimisation, were required to be disclosed. The EV assessment guidelines were made more prescriptive. Network segmentation was defined, the profit-maximising tariffs (uniquely for Transpower and local distribution businesses) to be used were specified, and the cost allocation methodology for assigning costs to network segments was stipulated.

48. If the prescribed ODV method were to be used as an input into the regulatory functions under Part 4A, what, if any, changes would be required to the fourth edition of the ODV Handbook? What effect would any necessary changes have on the values of system fixed assets?

SUMMARY

6.14 This chapter discussed the prescribed ODV method, used specifically for the purposes of the electricity information disclosure regime introduced in 1994. The discussion provided some insights into how the ODV method is applied in practice, including changes made to the prescribed ODV method over the last several years. In addition, the discussion incorporated observations relating to the prescribed ODV method made during the Commission's recalibration audit. The purpose of this chapter is to draw out feedback on the prescribed ODV method and its practical application.

CHAPTER 7 – INDUSTRY SPECIFIC ISSUES

INTRODUCTION

7.1 There are principles relevant to valuation methodologies that are applicable across sectors, although there may be no single asset valuation methodology appropriate or preferred in all circumstances (including for statutory reasons). The Commission is open to the view that the choice of regulatory valuation methodology could, inter alia, depend on industry-specific characteristics.

7.2 This chapter discusses the particular characteristics of electricity lines businesses considering the various evaluative questions raised in Chapters 3 and 4. In particular, this chapter looks at the major sector specific issues that could affect the magnitude of the various investment risks identified in Chapter 4. Our conclusions on electricity-specific characteristics are applied in Chapter 10, where the alternative methodologies are evaluated.

INVESTMENT RISK CHARACTERISTICS

Technological Change

7.3 Changing technology directly affects the cost of new network assets and may also affect the cost of economic substitutes (such as distributed generation). Changing demand for services (eg. due to regional or national demographic changes) might affect the optimal size and configuration of network assets. Changing demand and changing technology may be interrelated to some extent. For example, a reduction in demand for electricity line services may be attributable to a change in the cost of an economic substitute (eg. distributed generation). The optimal size or built-in redundancy of network assets may also depend strongly on technological change, such as the use of automatic switching equipment, and/or real-time security assessment aids (such as "dynamic line rating").

7.4 Replacement costs are subject to general cost inflation, but technological change may cause costs to increase at a rate less than general inflation. This suggests that replacement costs for system fixed assets will, in the future, fall in real terms (relative to CPI inflation). The Commission has received anecdotal evidence that the standard costs listed in the ODV Handbook have not changed for several years and yet are widely considered to reflect current cost levels.

49. Are the standard costs currently listed in the ODV Handbook appropriate?

50. How significant is the rate of technological progress and the potential for shifts in demand for the valuation of electricity lines businesses system fixed assets?

51. Is there evidence that the replacement costs of system fixed assets will rise or fall (and how fast) relative to the rate of CPI inflation?

7.5 It is not straightforward to forecast the rate of technological change affecting replacement costs. Arguably, future rates of technological change could be estimated on the basis of historic trends. On that basis, the significance of future technological advances might compare with that of some historic advances such as, in relation to:

- information systems for monitoring and control of assets (and its effect on manning levels, utilisation factors, reliability);
- gas insulated switchgear;
- high voltage cables; and
- demand-side management.

7.6 Some of the technological advances in recent decades have permitted increased utilisation of network assets, but have not necessarily had a significant effect on real replacement costs. More importantly, these technological advances are characterised by incremental, rather than revolutionary, changes. On this basis, technological changes are only likely to be discernible over periods of five to ten years (or more). However, the Commission is not aware of any studies that have attempted to quantify the extent to which replacement costs may depart from historic costs in the future.

Transmission

7.7 For transmission assets, the materiality of ODV revaluations since 1994 is illustrated in Transpower's economic value reports, which appear in each year's annual report. In its 2001 report, Transpower reported an accumulated economic loss of $673 million, most of which is attributable to asset revaluation losses. The Commission understands those losses, in turn, are not generally attributable to reductions in the replacement costs of transmission equipment, but are largely attributable to optimisations associated with changing demand patterns for transmission services. The changing demand patterns, in turn, are driven by location decisions of new generators.

7.8 Based on Transpower's recent experience, the risks of owning transmission assets are high when they are subject to optimisation linked to changing demand patterns and levels. Accelerated depreciation allowances may be warranted in such circumstances, if investment is not to be deterred.

Distribution

7.9 The experience for distribution businesses is not so clear. For much of the period since 1994, changes in ODV values attributable to capital additions and depreciation are not readily distinguishable from changes attributable to replacement cost, optimisation and EV adjustments. Nevertheless, some

analysis by Simon Terry & Associates suggests ODV revaluations, in aggregate for distribution businesses, may have been positive in real terms, and significant in dollar terms, since 1994.

7.10 Orion New Zealand, in its submission on the Issues Paper, offered some reasons why real ODVs may have increased over that period, including:

- revisions of the ODV Handbook, such as those made to recognise the realistic longer lives of assets; and
- better quality information systems have revealed assets that were not previously included in the records.

7.11 There are a number of additional factors that may cause replacement costs to depart from historic costs at any given time, for example:

- the cost of steel and aluminium (affecting the replacement cost of conductors);
- foreign currency exchange rates (affecting imported components);
- conditions of over- or under-supply, or productivity changes, in the network construction market (affecting labour costs);
- resource management, occupational safety, and other regulatory compliance costs; and
- the value of land.

7.12 Since 1994, it appears that technological change and market demand risk has not been significant for distribution lines businesses. However, in the future, the risk of economic stranding due to changes in demand levels and patterns may be significant. In particular, continuing progress in distributed generation technologies and other demand-side technologies could result in significant reductions in the demand for distribution services.

Conclusions on Investment Risk

7.13 In conclusion, the Commission considers that:

- technological change affecting the replacement cost of system fixed assets may be a significant source of risk in terms of potential competitive entry, even though it has not been to date;
- unexpected changes in the level and pattern of demand due to progress in distributed generation (and other technologies associated with demand-side substitution) could have a significant effect on the future economic value of transmission and distribution services; and
- transmission services may be more vulnerable than distribution services to changes in the levels and patterns of demand.

52. Is there evidence that rates of technological change are sufficiently high to warrant full depreciation over a period significantly shorter than the relevant asset's technical life?

OTHER INDUSTRY-SPECIFIC ISSUES

7.14 In this section additional factors are discussed, which, while not necessarily unique to this industry, may nevertheless be relevant to the evaluation of alternative valuation methodologies.

Prudency of Investment Decisions

7.15 There are two industry-specific factors that may be relevant to the evaluation of the potential roles of optimisation and ex ante prudency tests.

7.16 The first factor is that the electricity lines businesses, perhaps due to their capital intensive and highly specialised nature, tend to be managed and staffed by people with a background in the engineering profession. Arguably, such people have a bias towards building assets, and tend not to look for alternative means to satisfy or manage demand. To the extent that such bias exists, if at all, rigorous ex ante prudency tests or ex post optimisations may be warranted to avoid over-investment.

7.17 The second factor is that the nature and level of services provided by electricity lines businesses is not readily measurable and, therefore, it is not straightforward to assess, ex ante, whether a particular investment is efficient. In general, it is easier and more effective to assess the prudency of investments with hindsight. The downside of this approach is that investors could require a higher risk adjusted return on capital to accept the risk of ex post optimisation.

53. What industry specific issues can affect the prudency of investment decisions? What relevance do these issues have for the choice of valuation methodology?

Capital Contributions

7.18 Some assets may be acquired by an electricity lines business at significantly less than their historic cost or their assessed replacement cost. In particular, some assets may be owned by the electricity lines business, but be funded in full or in part by a customer or group of customers or other parties (e.g. residential subdivision developers).

7.19 The term "capital contribution" is often used to mean any commercial arrangements whereby a customer or another party contributes to the capital cost of a new asset but where the ownership remains with the lines business.

In principle, similar arrangements are possible in which the electricity lines business shares asset ownership with other parties.

7.20 If such assets were assigned a regulatory value greater than the acquisition price (i.e. the cost net of capital contributions by other parties), there is a risk that customers would, in effect, pay too much for the services provided by the assets, and the owners would earn excessive profits on their invested capital.

7.21 Some electricity lines businesses address this issue by recognising capital contributions as income during the relevant period. This approach is consistent with the accounting standard FRS-3. Another approach is to deduct capital contributions from the regulated asset base.

54. Under what circumstances should capital contributions be excluded from the regulatory asset base? Where this is desirable, how should they be excluded?

Customer Agreements

7.22 Some investments may be linked to specific service requests and associated bilateral contracts for specific service levels. For example, a new customer seeking connection to an existing network may explicitly agree to fund the necessary connection assets, via a take or pay contract or similar. Similarly, a customer, or group of customers sharing some assets, may agree to fund some specific network investment in order to receive a higher level of security or supply quality than would otherwise be provided.

7.23 Arguably, the assets providing services subject to specific agreements between the electricity lines business and one or more customers should not be subject to any regulatory review. However, exempting such assets from regulatory review could, perhaps, be conditional upon the regulator being satisfied that customers' agreements were negotiated on fair and reasonable terms and/or were subject to competitive pressures. A further consideration is the extent to which the assets in question are specific to the agreement, or whether there is some level of shared use or benefit to other customers or parts of the network.

55. Should assets associated with contestable services be ring-fenced from other system fixed assets? What evidence can be provided to demonstrate that specific agreements with one or more customers were negotiated on fair and reasonable terms and/or subject to competitive pressure?

56. Should the value of some assets be determined by the associated contractual revenue streams (rather than by reference to historic cost or replacement cost)?

Boundary of the Regulated Business

7.24 This section discussed the boundary of the regulated business or service, as related to asset valuation.

7.25 Internationally, regulators generally distinguish between regulated and unregulated services and associated assets. Such distinctions recognise that some services or business functions are subject to competitive market forces, and therefore fall outside the purpose and scope of regulation. In some jurisdictions, such services are called "excluded services".

7.26 For example, if new customer connections (i.e. overhead or underground service mains, transformers, and related assets dedicated to connecting a single customer to the network) could be constructed on a contestable basis, there could be an argument for excluding such services (and associated assets) from the list of services subject to regulatory scrutiny (via the thresholds and price control regime).

7.27 Assuming this is the case, the question may arise as to how to value assets that provide both types of services in common. This is a question of allocating common costs between each service.

57. What assets should be included as "system fixed assets"?

58. How should an asset be valued for regulatory purposes where it also provides line services that are not subject to regulatory oversight by the Commission?

59. Should asset valuations be disclosed in respect of distinct network regions?

Valuation of Easements and Land

7.28 An easement in respect of land may grant a right to construct, operate or maintain a work, but does not involve the ownership of the land under the work. Previous legislation granted electricity lines businesses almost unlimited access to land for the purpose of constructing and maintaining their distribution networks. The Electricity Act 1992 allows owners of existing works access to land for the purpose of inspecting, maintaining or operating those works.[28] The Electricity Act 1992 also allows owners of existing works access to land if the construction of those works had not been completed before 1 January 1988 (in the case of works owned by the Electricity

[28] An "existing work" is under the Electricity Act means:

"(a) In relation to works owned by the Electricity Corporation of New Zealand, means any works constructed before the 1st day of January 1988; and includes any works that were wholly or partly in existence, or work on the construction of which commenced, before the 1st day of January 1988:

(b) In relation to works owned by any other person, means any works constructed before the 1st day of January 1993; and includes any works that were wholly or partly in existence, or work on the construction of which commenced, before the 1st day of January 1993."

Corporation of New Zealand) or 1 January 1993 (in the case of works owned by other lines operators) for the purpose of completing those works. However, since 1993 easements may have been purchased by electricity lines businesses. These easements would be registered against land titles and may provide access to land to enable the construction and operation of electricity lines.

7.29 Easements are usually granted in perpetuity. In view of this, an easement holder does not have to provide for replacement of the easement in the future, nor provide for depreciation. However, in principle, an easement could have a limited life, linked to that of the associated assets.

7.30 Acquisition of an easement is to some extent a substitute for acquisition of a comparable land title. In this regard, different regulatory valuation of land and easements might distort incentives for investment in one or the other.

7.31 In jurisdictions where replacement cost has been used to value to system fixed assets (such as New Zealand and Australia), easements have nevertheless been valued differently for regulatory purposes - at historic cost or inflated historic cost or other. The ODV Handbook, for example, provides that:

> "Only easement rights obtained and registered against a land title after 1 January 1993, (or in the case of Transpower, additionally between 1 January 1988 and 1 January 1993), and paid for, can be valued provided that the sum paid has not already been expensed."

7.32 Issues relating to easements and land are not further considered in this paper.

60. What is the best way to value land and easements? Should easements be valued differently to other system fixed assets? Are there any access concerns in respect of getting new easements or access to existing easements?

ASSET VALUATION IN OTHER INDUSTRIES

7.32 The Commission has in some instances, such as airports, decided upon its preferred valuation methodology. However, in other industries, it has yet to decide. Asset valuation in the airfields and telecommunications areas is discussed below. As a general principle, the Commission considers consistency is a good over-arching principle, however, there may be legitimate reasons for different valuation approaches to be taken in different sectors. Where this is the case, the Commission will explain these reasons.

Airfields Control Inquiry

7.33 The Commission has recently reported to the Minister of Commerce on the necessity or desirability of control of airfield activities at Auckland, Wellington and Christchurch International Airports. The Commission's report followed significant investigation into the subject, including considering different methodologies for the valuation of relevant assets. A significant portion of airfield assets are specialised assets, although the majority are non-specialised assets, particularly land. Many of the regulatory valuation issues arising in the airfields study are directly relevant to the review of valuation methodologies for system fixed assets owned by electricity line businesses.

7.34 In the airfields study, the Commission considered asset valuation from the perspective of identifying monopoly rents. Historic excess returns were estimated according to the following formula:

Excess Returns ($) = Net Earnings – (Asset Base x WACC)

7.35 The Commission considered that asset values used for this purpose should be derived using the opportunity cost principle. However, for specialised assets, which have very low opportunity cost, the asset base in this formula should have the lowest value consistent with investors' reasonable expectations at the time of the relevant investment decision (whether a decision to build a new specialised asset or acquire an equity stake in an existing specialised asset).[29]

7.36 The Commission concluded that, in the case of specialised assets used in airfield activities, investors' reasonable expectations are best reflected by the relevant historic cost (actual construction cost or acquisition cost). Moreover, the Commission considered that the historic costs (relevant to the measurement of past excess returns) should be based on book values at the time of vesting. This decision reflects a number of factors specific to the circumstances of the airfields study, and does not necessarily imply that historic cost is the preferred valuation methodology for all types of specialised assets, or in all other circumstances.

Telecommunications

7.37 The Telecommunications Act 2001 (the Telecommunications Act) gives the Commission specific regulatory responsibilities in relation to the telecommunications market. Among other things, the Telecommunications Act provides for:

- the establishment of universal telecommunications obligations, called Telecommunications Service Obligations ("TSO"); and

[29] pp. 135-138, Commerce Commission, *Airports Inquiry: Final Report*, 1 August 2002.

- the "designation" of certain services, and the pricing of designated services on the basis of various methodologies, including a forward looking replacement cost method called total service long run incremental cost ("TSLRIC").

7.38 The Telecommunications Act requires the costing of TSO to take account of the provision of a reasonable return on the incremental capital employed in providing the relevant services. The Commission's TSO Discussion Paper notes this requirement does not constrain the asset valuation methodology, and proceeds to consider a range of possible options.

7.39 The TSO Discussion Paper notes that the presence of significant sunk costs associated with the provision of TSO services rules out the application of the opportunity cost principle on dynamic efficiency grounds. The main alternative options considered are DHC and ODRC. The latter is preferred (on a preliminary basis) for the following reasons:

- for assets that are long-lived, and especially for those where technology is rapidly advancing, historic costs have little relationship with, and generally overstate, the cost of replicating the service potential of the assets;

- the Commission, in its previous *TSO Cornerstone Issues Paper*, interpreted the term "efficient service provider" as one whose costs essentially would be equal to ODRC (on a "scorched node" approach to network configuration). Hence, the ODRC approach has a prior standing;

- there is a need for consistency with respect to the TSLRIC modelling, which the Telecommunications Act defines in terms of forward-looking costs relevant to the delivery of telecommunications services. Replacement cost, as a measure of current cost, is more likely to correspond to "forward-looking" cost than historic cost. As identical assets will appear in valuations in both the TSO and TSLRIC models, and ODRC is arguably required for the latter, it would seem inconsistent not to use ODRC for the former also;

- the use of replacement cost as an asset valuation methodology is consistent with the matters the Commission must take into account when determining the net cost of the TSO, including the purpose set out in s 18 of the Telecommunications Act; and

- the use of replacement cost is consistent with the approach taken in overseas jurisdictions when assessing the cost of universal service in telecommunications.

61. What factors or considerations could provide a basis for different valuation approaches across different sectors?

SUMMARY

7.40 This chapter discussed issues relevant to the electricity sector in New Zealand and the relevant issues the Commission has (and may) consider regarding valuation methods in other industries.

CHAPTER 8 – INTERNATIONAL PRACTICE

INTRODUCTION

This chapter considers the lessons or insights that might be drawn from asset valuation policies and practices internationally. The following sectors, countries and regulatory regimes are discussed:

- United States electricity and gas markets;
- Australian gas and electricity markets; and
- United Kingdom electricity, gas and water markets.

UNITED STATES

8.1 In the early 1900's, replacement cost valuations were not uncommon for regulatory purposes in the United States. However, this practice ended following a landmark decision by the Supreme Court in 1945 (the "Hope decision").[30] Since that decision, historic cost has been the United State's most prevalent regulatory asset valuation methodology. North American investors in gas and electricity utilities expect to earn a regulated rate of return on historic (actual) capital invested, and upward revaluations of assets are generally not permitted.

8.2 Although New Zealand's history of utility ownership is different, North American practice may still offer relevant insights. New Zealand's history is more comparable to that in Australia and the UK, where some utility assets have recently been corporatised and/or privatised. Arguably, prior to privatisation there was little or no concept of "investor expectations" and in many cases information about historic costs was incomplete. Because of these factors, asset valuations were calculated because no completely acceptable valuation previously existed.

AUSTRALIA

Australian Gas Market

8.3 Gas transmission pipelines are regulated by the ACCC in accordance with the Gas Code. Section 8.12 of the Gas Code provides for the initial capital base of a new pipeline to be included at the actual capital cost of the assets at the time they first enter service (i.e. on a historic cost valuation approach). There is no scope for regulatory optimisation of new covered pipelines under the Gas Code. This contrasts with the treatment of existing pipelines where the

[30] Federal Power Commission v Hope Natural Gas 321 U.S. 591 (1945).

regulator must consider valuations based on methodologies such as optimised depreciated replacement cost.

Australian Electricity Market

8.4 The National Electricity Market ("NEM") operates in South Australia, Victoria, New South Wales and Queensland. It commenced in December 1998. The NEM is governed by a set of rules called the National Electricity Code ("the Code").

8.5 The Code defines the various roles and responsibilities in the NEM, including administration of the Code itself, which is the responsibility of the National Electricity Code Administrator ("NECA"). The Code was authorised by ACCC as an access arrangement under the Trade Practices Act, and all subsequent changes to the Code (proposed by NECA or others) are subject to ACCC approval.

8.6 Among other things, the Code defines and sets out the responsibilities of transmission network service providers ("TNSPs") and distribution network service providers ("DNSPs"). The Code also sets out various principles, objectives and requirements concerning the regulation of transmission and distribution services, including valuation methodologies. TNSPs are, or soon will be, regulated by the ACCC. DNSPs are regulated by various "jurisdictional regulators", which are the relevant state authorities.

8.7 The Code prescribes the form of economic regulation of transmission businesses, which is CPI-X, with a minimum five-year review period, applying to revenue caps. The Code also prescribes CPI-X for distribution businesses, with a minimum three-year review period. Caps may be on revenues, or prices, or a combination.

8.8 The Code does not prescribe a valuation methodology, but does provide a number of guidelines and constraints on regulatory discretion. For example, regulators must have regard to pre-existing jurisdictional valuations of assets in existence prior to 1999. For other assets, regulators must have regard to the 1994 Council of Australian Governments (COAG) agreement that deprival value should be the preferred approach.

8.9 The Code also sets out the network planning consultation and decision processes which result in new assets being added to the regulated asset base. These processes may be regarded as a form of "prudency test" for new assets, although this is not strictly the case. When valuing such assets in the future (as part of determining revenue caps), regulators must have regard to the investment decision processes. However, there is no guarantee that any new investment will be fully included in the future regulated asset base.

New South Wales

8.10 In its 1999 price control determination, the Independent Pricing and Regulatory Tribunal (IPART) adopted a building block approach with opening asset values based on ODRC, which had been the Government's previous valuation policy. IPART also noted:

> The Code does not 'lock in' asset values. Rather, the Code allows regulators scope to revalue existing assets and new assets (clause 6.10.3(5)). The Tribunal proposes to split the asset base into sunk and new assets. Consistent with the intention in clause 6.10.3(e)(5) of the Code, the Tribunal requires DNSPs to keep two separate pools of assets:
>
> i. assets in existence and in service at 1 July 1999
> ii. assets brought into existence after 1 July 1999.

8.11 In its next determination, the Tribunal may consider calculating an ODV value for each DNSP for pre-1999 assets.

Victoria

8.12 In its 2000 price control review, the Office of the Regulator General (ORG) derived an opening asset value based on the previous price control determination in 1996. The 1996 control, in turn, used values in place at 1 July 1994, prior to the sale of the five distribution businesses. This decision was made subject to an existing Tariff Order governing the future regulation of the privatised businesses. The pre-privatisation asset values specified in the Tariff Order were derived from 1994 ODRC estimates. In both 1996 and 2000, initial asset values were adjusted to take into account inflation, depreciation, and any acquisitions and disposals since the date of the initial valuation. Incidentally, the privatisation sale proceeds for each of the distribution businesses in 1994 were all significantly higher than their regulatory asset values (ODRC) at the time.

8.13 The opening asset values used in Victoria are effectively rolled forward according to the following formula:

> Closing Value = Opening Value + Net Additions - Depreciation – Disposals
>
> Where: Additions are included at cost, net of any customer contributions,
> Depreciation is measured according to the regulated depreciation schedule,
> Disposals are valued at the holding value (net of any scrap value), and
> All values are measured in constant dollar terms (i.e. inflation adjusted).

Transmission

8.14 In its 1999 draft statement of regulatory principles, the ACCC proposed ODRC as its preferred valuation methodology for transmission fixed assets. At that time, the ACCC proposed to undertake ODRC revaluations periodically, according to a guideline yet to be published, but perhaps less frequently than at each five-year regulatory review.

8.15 The draft statement of principles also describes a preferred form of regulatory depreciation, called "competition depreciation", which has features of annuity-style depreciation and also provides for adjustments to ensure regulatory depreciation keeps pace with economic depreciation. Competition depreciation has the effect of smoothing revenues over time, avoiding any direct relationship between price level and asset age. It also has the effect of reducing the risk of asset stranding borne by asset owners, where such stranding can be anticipated and agreed in advance with the regulator. The ACCC considers that instantaneous windfall losses or gains associated with asset revaluation are to be avoided if possible.

8.16 The asset valuation and depreciation principles described in the ACCC's draft statement of principles have been applied in its regulatory reviews to date. The ACCC is currently reviewing asset valuation methodologies, in preparation for finalising the statement of regulatory principles. The final statement of regulatory principles will include guidelines for the valuation and depreciation methodologies adopted.

UNITED KINGDOM

8.17 Regulatory valuation of United Kingdom (UK) utility businesses since their privatisation has been contentious for industries that were privatised prior to the establishment of price control regulation. Allegations of excessive price levels and profits were widespread in the early 1990s, resulting in a series of key decisions about valuation for regulatory purposes.

8.18 For example, in the early 1990s the UK gas regulator ("Ofgas") determined that British Gas' ("BG") profits were excessive, and BG appealed these decisions to the Monopolies and Mergers Commission ("MMC"). In the MMC's 1993 decision, BG's prices were capped with reference to its market value at privatisation. This valuation was about 60 precent of its depreciated replacement cost valuation.[31] An excerpt from a recent report from the Competition Commission suggests this principle is still considered appropriate:

> "In the 1993 MMC report, in considering the cost of capital and the asset base to which it should be applied, the MMC took into account the ratio of the 1991 market value of BG's shares to the balance sheet value of its assets, referred to as the market to asset ratio (or MAR), and apportioned equally across BG's businesses. We believe that approach to the valuation of assets at December 1991 remains appropriate. Given that discount on book value, we accept the Director General's arguments that to allow full depreciation in revenues during the period under review may be expected to result in prices higher than necessary to finance the carrying on of Transco's activities, to the detriment of consumers of gas. We have concluded that for the period under review only MAR-adjusted depreciation should be allowed on pre-1992 assets and full depreciation on subsequent investment. We have also concluded that the regulatory value of assets from April 1997 should be rolled forward by reference to the RPI and not CCA replacement cost. This approach would in our view ensure that charges to users provide a reasonable return on shareholders' existing investment and on new investment by Transco thus enabling the company to finance the carrying on of its activities."

[31] Paragraph 7.89, MMC British Gas PLC: Reports under the Gas Act 1986 …Volume 2 (1993)

8.19 In another example, the UK electricity regulator (OFFER) derived an initial value for the National Grid Company's ("NGC") asset base from its flotation value, due to concerns that use of replacement costs would lead to excessive returns to the owners. OFFER's 1996 price control proposals included the following:[32]

> "The fourth consultation paper explained that, in setting NGC's present price control in 1992, I had regard to a range of considerations. I did not commit to a particular asset valuation method. My view, set out clearly in revising the REC price controls in 1994 and 1995, was that CCA replacement value was not the most appropriate basis for calculating the revenue which should be earned in respect of existing assets if a lower revenue could yield an adequate return to shareholders' investment. It seemed to me appropriate to have regard to the money actually paid to purchase a company, that is, to flotation or initial market value."

8.20 Ofgem's current practice is explained in a recent consultation paper on regulatory accounts:

> "In setting price controls Ofgem has adopted an approach to calculating RAVs that is based on rolling forward an initial privatisation or market valuation by adjusting for depreciation, fixed asset additions, disposals and inflation. The main differences between HCA and RAV relate to the value of fixed assets and the associated depreciation charge. This would mean that it would be relatively straightforward to provide a reconciliation from historic cost values to the RAVs by means of an additional note to the HCA accounts."

LESSONS FROM INTERNATIONAL PRACTICE

8.21 International regulatory practice regarding the asset valuation of electricity utilities is context dependent.

8.22 Where electricity network assets were privatised in the UK, regulatory practice since privatisation is HC or IHC, with opening valuations based on privatisation values. Attempts by regulated businesses to adopt current cost valuations, since privatisation, have been rejected by the UK authorities.

8.23 In Australia, most State Governments introduced ODRC in the early 1990s, and most electricity networks were valued accordingly. Some publicly owned assets have since been sold, but at a time when the future regulatory regime was reasonably well defined. Recent price control decisions have reflected opening valuations based on the ODRC valuations adopted prior to the establishment of the NEM.

[32] OFFER, The Transmission Price Control Review of the National Grid Company – Proposals (1996)

8.24 Australian regulators are obliged to have regard to a 1994 agreement between State Governments that deprival value should be the preferred approach. Different regulators have indicated different attitudes about:

- which assets (old and new) are to be subject to deprival value;
- how frequently deprival valuations should be undertaken; and
- how asset values should be rolled forward between deprival revaluations.

62. What lessons can be learned from international practice?

SUMMARY

8.25 This chapter has briefly discussed some approaches to asset valuation internationally (i.e. the US, Australia and the UK) and has endeavoured to drawn some lessons from this experience.

CHAPTER 9 –IMPLEMENTATION AND OPERATIONAL ISSUES

INTRODUCTION

9.1 The purpose of this chapter is to consider possible implementation and operational issues related to the DHC, DIHC, DRC, ODRC, and ODV methods of valuing electricity line business system fixed assets. Further, these implementation and operational issues are considered in the context of their costs *vis-à-vis* the relative benefits of each valuation method in terms of a regulatory regime under Part 4A, and in terms of other organisational purposes of system fixed assets valuations.

9.2 The possible implementation and operational issues (which may be relevant to a greater or lesser extent in respect of each valuation method, and to varying degrees of complexity) identified by the Commission at this stage are the:

- determination of opening asset values coinciding with the start of regulatory monitoring under Part 4A;
- alignment of opening asset values with the detailed records of electricity line business system fixed assets;
- design, implementation, and resourcing of accounting systems and processes necessary to support the requirements of the valuation methodology and its application;
- necessary or desirable level of prescription for the valuation methodology and related accounting policies, and how this should be implemented (e.g. mandatory valuation guidelines or handbooks);
- time required preparing for and implementing the valuation methodology before the first valuation for regulatory purposes can be carried out;
- frequency of valuations for regulatory purposes;
- desirability of requiring independent valuation experts and independent auditors to certify valuation processes and outcomes; and
- extent to which the data in the system fixed asset records allows for economies of scope by having application to other organisational purposes; for example, financial reporting, price setting, asset management, and performance monitoring.

63. To what extent are the implementation and operational issues identified by the Commission relevant and, if so, to what extent for each valuation method? Are there any other implementation and operational issues that should be identified and, if so, how significant are they?

9.3 Each of the above is briefly commented on below, before considering compliance and administration costs.

IMPLEMENTATION AND OPERATIONAL ISSUES

Determining Opening Asset Values

9.4 The complexity and effort involved in establishing the opening value of the system fixed assets of each electricity lines business will likely depend on the valuation method ultimately adopted. For instance, if the prescribed ODV method used for information disclosure purposes were adopted, it is expected that opening values would be relatively simple to establish, given that all electricity lines businesses currently value their systems fixed assets using that method. For the same reason, given they are relatives of the ODV method, establishing opening values using the DRC or ODRC method would likely not be too dissimilar in complexity or effort. Conversely, if, say, DHC (or DIHC) were deemed to be the most appropriate method for valuing system fixed assets for regulatory purposes, determining DHC (or DIHC) baseline values could be more difficult for the majority of electricity lines businesses.

9.5 A question arises as to whether establishing opening system fixed asset values at *true* historic cost would, in fact, be possible. It is anticipated that all electricity lines businesses would have accounted for their systems fixed assets at DHC at least up to the time of their first ODV valuations for information disclosure purposes around 1994.[33] Therefore, it should be possible, at least in theory, to roll forward the DHC from around 1993/94 (or from even later where historic cost records continued to be maintained, in addition to ODV records) to the present by adding new assets acquired and subtracting assets disposed and additional depreciation (all at historic cost). This approach would establish the opening value of system fixed assets at DHC, or at least, bearing in mind the likely inclusion of (non-historic cost) vesting values, at a reasonable proxy for historic cost.

9.6 However, there are complicating reasons why this may not be possible:[34]

- historic cost documents and records may be too incomplete to enable a full reconstruction of system fixed assets at historic cost;
- historic cost data may not be available for assets identified since vesting and for which no records existed at vesting; and

[33] However, even at this point in time, it is questionable to what extent system fixed assets were recorded entirely at their *true* historic cost. Historic cost records at that time may have been notional in that they contained vesting values (rather than historic costs), resulting from the corporatisation process affecting electricity lines businesses during the industry reform of the early 1990s.

[34] A further complication is discussed in the next subsection. This relates to the issue of how detailed system fixed asset records would be reconciled with high-level derivations of opening asset values at DHC (or DIHC), assuming such derivations were possible.

- historic cost records may not have survived the organisational transitions following recent mergers and acquisitions.

64. If DHC (or DIHC) were the preferred method for establishing the baseline valuation of electricity line business system fixed assets for regulatory functions under Part 4A, how could this be best achieved?

65. Up to what time were historic cost-based system fixed asset records maintained? Are possible difficulties surrounding establishing a *true* historic cost-based opening valuation genuine concerns? How could these difficulties be overcome, if at all?

66. If *true* historic cost could not be derived for the baseline valuation, is there a reasonable proxy for historic cost that could be used instead? What implementation issues might exist with a "reasonable proxy" approach?

67. What implementation or operational disadvantages or pitfalls might exist if the latest ODV value of system fixed assets were used for the baseline valuation, with future assets included and accounted for in the asset base at DHC (or DIHC)?

Alignment of Opening Asset Values with Detailed Records

9.7 If DHC (or DIHC) were the preferred valuation method for system fixed assets, and it were possible to establish a baseline valuation using an historic cost-based approach (or a reasonable proxy for historic cost), it would be necessary (for those electricity lines businesses no longer maintaining historic cost records for their system fixed assets) to align the detailed asset records with the baseline valuation. One approach could be to simply allocate the baseline valuation to the detailed assets on a *pro rata* basis using the detailed ODV values.

68. Assuming it was possible to determine a baseline valuation for system fixed assets using a historic cost-based approach (or a reasonable proxy for historic cost), what implementation issues might arise in attempting to align the detailed (ODV) asset records with the baseline valuation? How could any implementation issues be satisfactorily addressed?

Detailed Accounting Systems and Processes

9.8 Any valuation method used for regulatory purposes under Part 4A would need to be supported by adequate accounting systems and processes. This would be necessary to ensure that the assets and details relevant to their valuation are completely and accurately recorded and maintained in the asset database, and that the integrity of the database is safeguarded.

9.9 Currently, all electricity lines businesses have in place accounting systems and processes supporting the prescribed ODV method. Given their relationship with the ODV method, it is expected that these systems and processes could readily accommodate the ODRC and DRC methods. Changes would likely involve downsizing (rather than completely redesigning) the incumbent systems and processes (including the use of expert financial and engineering experts), since economic value tests are not required under the ODRC and DRC methods, and optimisation assessments are not part of the DRC method.

9.10 Historic cost-based asset valuation approaches are more straightforward and less resource intensive, in terms of their use of accounting systems and processes, because of less onerous valuation work. However, there would likely be a greater need to redesign or revamp current (ODV-based) systems and processes to accommodate a valuation method based on historic cost.

69. What would be the implementation and operational implications for accounting systems and processes if regulatory asset valuation required an historic cost-based approach (DHC or DIHC)? How could the implementation issues be satisfactorily addressed and in what timeframe?

Necessary or Desirable Level of Prescription

9.11 All system fixed asset valuation methods are to a greater or lesser extent subjective, and thus involve judgements in their application. For example, in some instances, depending on the valuation method, there could be uncertainty about asset replacement costs, economic lives of assets, depreciation profiles, optimisation assumptions, and economic value test parameters. Too much flexibility in judgement can, in turn, affect the consistency or comparability of valuations and valuation-based performance assessments, both in a time series and cross-sectional sense. This is the very reason why the prescribed ODV method under the electricity information disclosure regime includes the mandatory adherence by electricity lines businesses to a valuation handbook, which gives guidelines on and sets down rules for applying the method.

9.12 Consistency of valuations and valuation-based performance assessments are likely to be important features of the regulatory functions under Part 4A. This raises the issue of the extent to which it is necessary or desirable to make the preferred valuation method prescriptive through a valuation guideline or handbook. Arguably, less prescription would be necessary in the case of an historic cost approach due to it being based on actual costs.

70. To what extent should the valuation method (DHC, DIHC, DRC, ODRC, or ODV) be prescribed by the regulator?

71. If the ODV method were adopted for regulatory purposes, is the handbook for the prescribed ODV method adequate, or are changes required?

72. In respect of historic cost-based asset valuation approaches, could reliance on accounting standards (particularly FRS-3) and conventions be relied upon to ensure consistency or comparability of valuations?

73. What implementation period would be necessary for implementation of the different valuation methods? What factors would influence the amount of implementation time needed?

Frequency of Valuations

9.13 Currently, all electricity lines businesses are required to revalue their system fixed assets, using the prescribed ODV method, at least every three years. Despite this, some electricity lines businesses choose to value their system fixed assets more frequently, often annually. Under an historic cost-based approach, asset (re)valuation is not an issue, beyond the normal requirements of accounting standards (FRS-3) and conventions.

74. What factors are relevant to deciding the appropriate period between system fixed asset (re)valuations for regulatory purposes? How often should (re)valuations of system fixed assets be undertaken for regulatory purposes?

Use of Independent Experts

9.14 Most electricity lines businesses currently use independent financial and engineering experts to assist with their valuations. In addition, independent auditors are statutorily required to audit and certify information disclosed. This implicitly includes system fixed assets based on ODV valuations.

9.15 The use of independent experts and auditors should, in theory, enhance the accuracy of valuations. One implementation issue that arises in the context of the regulatory functions under Part 4A is whether experts and auditors should be required to approve valuations. Another option is for the regulator to undertake this audit alone. A hybrid approach could involve both, as has recently been the case in the Commission's recalibration audit.

75. Should independent financial and engineering experts continue to be required to approve valuation reports?

76. What are the advantages and disadvantages of using a common auditor across all electricity lines businesses? Should this process be undertaken by the Commission?

77. What work do auditors currently perform under the electricity information disclosure regime in respect of system fixed assets? How does this audit work compare with audits carried out for statutory financial statement purposes? Are the audit scope and audit work carried out sufficient?

Multi-Purpose Uses of a Valuation Methodology

9.16 Where possible, implementation of the preferred asset valuation method for regulatory purposes should take into consideration other valuation requirements so that any available synergies are realised.

78. What factors should be borne in mind when considering alternative valuation methods for Part 4A given that electricity lines businesses use system fixed asset valuations for other purposes?

COMPLIANCE AND ADMINISTRATION COSTS

9.17 The previous section discussed possible implementation and operational issues related to valuation methods. This section focuses on possible compliance and administration costs associated with implementing or operationalising alternative system fixed asset valuation methods. These include the direct costs that would be incurred by the Commission (e.g. in developing and maintaining a valuation handbook) and by electricity lines businesses (e.g. in developing and maintaining asset registers, undertaking optimisations, retaining independent experts, procuring audits). Other costs and benefits have been discussed in Chapter 5.

9.18 The Commission is aware that electricity lines businesses will be concerned about the implementation and operational cost implications of adopting any regulatory valuation methodology. For instance, UnitedNetworks Limited stated, in response to the Commission's draft report regarding whether price control of airport services is necessary or desirable under s 54 of the Act:

> "...any change [to the asset valuation methodology, from an existing replacement cost approach to an historic cost approach] would result in the loss of investments in the systems that support the existing valuation methodology, and a requirement to incur additional cost to develop new systems."

9.19 As a result of its recently completed audit of ODV valuations, the Commission recognises the level of costs incurred by electricity lines businesses in valuing their system fixed assets. These costs include, for example, the initial preparation and population of asset registers and databases for the purposes of recording, maintaining, and manipulating the data needed to carry out ODV valuations.

9.20 Accurate asset registers are fundamental to properly accounting for system fixed assets, for both reporting and asset management purposes. Databases would likely be required to keep asset registers, although a departure from the ODV method would likely mean less sophisticated databases are needed.

9.21 Any movement away from the ODV method need not necessarily require a significant investment in additional systems. However, there is the possibility of significant one-off cost being incurred if an historic cost were required to be constructed for opening valuations.

9.22 In respect of comparing costs between different valuation methods, the Commission expects that the more relevant costs to consider in the long term are the variable costs involved in carrying out each valuation. Because of more (complex) steps, greater resources are required for the ODV method than for any of the other valuation methods. The historic cost-based methods (DHC and DIHC) do not require the collection and maintenance of asset cost data beyond the original asset costs (DIHC being a simple modification of historic cost; original asset costs are adjusted in real terms using a general price index). The Commission expects that variable costs rise with the implementation of more demanding valuation methods. Thus, the lowest valuation cost, once in operation, is likely to occur with DHC and then increase, in order of magnitude, from DIHC to DRC, ODRC, and ODV.

9.23 ODV requires assembling and storing replacement costs for each asset, and carrying out optimisation and economic valuation assessments (as does the ODRC method, with the exception of economic valuation assessments). The optimisation and economic valuation elements typically require engineering and financial consultancy expertise, and are more demanding to audit than an historic cost-based valuation method.

9.24 A requirement or decision to use more than one valuation method (as a result of different regulatory or commercial purposes) would likely result in incremental costs to line businesses, in terms of both additional investment in systems supporting the valuation methods and variable costs incurred in carrying out each valuation. However, any incremental costs that would occur as a result of using more than one valuation method would need to be considered in light of the expected benefits in terms of the objectives of a particular valuation method and, importantly, achievement of the objectives to which it pertains. That said, subject to the regulatory objectives being met the Commission would favour, all other things equal, use of a consistent methodology across different processes.

79. What are the costs associated with conducting a valuation under the different approaches? What costs would be incurred regardless of the methodology used? What costs are likely to be additional?

SUMMARY

9.25 This chapter has discussed a number of implementation and operational issues related to asset valuation methods. These included the alignment of opening values with asset records, the need for a valuation method to be supported by accounting systems and processes, the requirement for prescriptive rules, the period of time needed to implement various asset valuation methods, the frequency of ongoing valuations, auditing and the desirability of considering wider uses of asset valuation methods in choosing what is best for Part 4A. This chapter also discussed the compliance and administration costs.

CHAPTER 10 – COMPARISON OF ASSET VALUATION METHODOLOGIES

INTRODUCTION

10.1 This chapter compares the different asset valuation methodologies in terms of their likely effectiveness in the Part 4A regulatory regime. It begins by reiterating the evaluation criteria discussed in Chapter 3. It then examines the situations where an asset valuation is required; namely to establish a starting valuation, and for future valuations. The advantages and disadvantages of the different methodologies are then assessed against our evaluation criteria. Preliminary conclusions are then presented.

10.2 To highlight the advantages and disadvantages of the different approaches going forward, we have chosen options that emphasise the possible differences between them. In particular, we assume that depreciated historic costs are not indexed for inflation nor optimised. In contrast, it is assumed that the ODV approach could involve a greater degree of optimisation than that required under the current ODV Handbook. The differences between the approaches are likely to be less significant if historic costs were optimised, or indexed, or if the optimisation under ODV were more modest.[35]

10.3 The tables at the end of the chapter summarise and compare the two generic approaches to valuation. They are included for discussion purposes only.

EVALUATION CRITERIA AND VALUATION REQUIREMENTS

Evaluation Criteria

10.4 In examining possible asset valuation methodologies, the proposed evaluation criteria proposed in Chapter 3 are:

- Efficiency – the methodology should support outcomes that are allocatively, productively and dynamically efficient;
- Identification of any excessive profits – the valuation methodology should facilitate the identification of excess profits; and
- Cost effectiveness – the methodology should achieve valuation objectives for regulatory purposes at lowest cost, all else being equal.

[35] It should be remembered that ODV is ODRC plus an EV assessment. An EV assessment may be applicable to both replacement cost and historic cost valuations. Nonetheless, the term ODV is used in this chapter, although the term ODRC could have equally been used.

Requirement for asset valuation

10.5 Under the Part 4A regime, an asset valuation methodology may be required to:

- value existing assets held by electricity lines businesses (set the "opening asset valuations") at the start of the targeted control regime; and
- value the asset base in the future including additions and deletions from the asset base after the start of the thresholds regime. The new assets or the entire asset base could be revalued in the future (to reflect changes in inflation, technology and consumer demand).

10.6 The methodologies used for setting opening values and for future valuations need not be the same. It may also be possible to ring-fence additional investments and apply a methodology different to that used for existing assets.

10.7 The discussion in this chapter focuses on the valuation of the sunk assets of the electricity lines businesses. The Commission notes that, as discussed in Chapter 5, its preferred valuation approach for non-sunk assets is opportunity cost. Chapter 7 considered other industry specific issues.

Opening Asset Valuation

10.8 The main options for establishing an opening valuation are shown in Table 6.

Table 6: Possible Opening Valuation Options

1.	Book valuation at date of vesting or separation of electricity lines businesses rolled forward to account for depreciation, disposals and additions (valued at historic costs)
2.	Most recent audited historic cost valuation rolled forward to account for depreciation, disposals and additions (valued at historic costs)
3.	ODV valuation audited by Commission in 2002
4.	ODV or ODRC (or other) based on existing or new Handbook (or other rules to be developed), possibly updating March 2001 values

Valuing the Asset Base in the Future

10.9 Following implementation of the targeted control regime by the Commission, additions to the opening asset base could be valued at either DHC or ODV. At least initially, asset values obtained using these different approaches are likely to be similar given the expected limited influence of inflation and technological change in the short term.

10.10 Whatever the opening valuation methodology, once the targeted control regime is implemented and operating, some or all assets could be periodically revalued using ODRC or ODV. For example, only additions since the opening valuation might be revalued on the basis of a prudency test.

10.11 If optimisation were to apply to the entire asset base in the future, then consistency could require that the same optimisation procedure be used to set the initial asset base. To illustrate this, suppose that DHC was used to set the opening asset base but the entire asset base were to be optimised in the future according to ODRC to limit inefficient by-pass. Then at the first review, there could be a windfall gain or loss to the electricity lines business due to the difference between DHC and ODRC values for the opening asset base.

10.12 Revaluations reflecting optimisation might not necessarily be annual. The opening valuation could be rolled forward for a period of anything from one to as many as ten years depending on factors such as technological change, (with additions valued at actual or replacement cost) before optimisation of all assets was undertaken. Alternatively, only certain groups of assets (e.g., opening assets or additions) could be subject to such reviews.

10.13 Limiting capital efficiency reviews to additions could substantially reduce the direct costs of the process while ensuring that efficiency incentives applied to new investment. In this case, consumers rather than investors would bear the cost of assets in the opening valuation base becoming redundant or obsolete, except where by-pass was possible. On the other hand, limiting the application of optimisation to assets installed after the opening valuation could defeat the purpose of optimisation, in the short to medium term, because asset stranding may be more likely to affect assets in place at the time of the opening valuation than those added since then.

80. What are the pros and cons of limiting capital efficiency reviews to additions to the opening asset base? What level of cost savings could be achieved by limiting capital efficiency reviews to additions to the opening asset base?

ASSESSMENT AGAINST EFFICIENCY CRITERION

Allocative Efficiency

Establishing Opening Valuations

10.14 If asset values were used as the basis for constraining allowed revenues, then lower valuations would generally be preferred on allocative efficiency grounds for assets that were already sunk, because their opportunity costs would be low. Lower asset values would result in lower revenue requirements (if revenues were constrained on the basis of valuation) allowing prices to be set closer to marginal cost. Positive downstream efficiency effects would potentially flow-on from lower prices.

10.15 However, the structure of prices can reduce the importance of the asset valuation methodology. The use of multi-part tariffs can allow prices for marginal consumption to be set at, or close to, marginal cost irrespective of the valuation approach, or the profile of revenue recovered over time. The evaluation of pricing structures is beyond the scope of this paper.

10.16 Allocative efficiency considerations could favour DHC approaches over ODV for establishing the opening valuation for the electricity lines businesses, if DHC resulted in a lower asset valuation. More generally, allocative efficiency considerations would favour the methodology that resulted in the lowest asset values.

10.17 In the case of Transpower, the vesting value substantially exceeds the current ODV value of the company. The current ODV value could therefore be favoured over DHC (based on vesting value) on allocative efficiency grounds.

Valuing the Asset Base in the Future

10.18 A DHC approach applied to assets added to the opening base would generally result in a more steeply declining price path than ODV for the same allowed depreciation rate.[36] It would tend to result in higher revenue and prices than ODV early in an asset's life and lower prices later in an asset's life. This is because upward revaluations resulting from inflation in an ODV approach would be considered as returns, reducing current payments by customers but increasing payments in later periods (if revenues were regulated on the basis of asset value). In principle, the profile of prices over time can also be influenced by the choice of depreciation methodology.

10.19 A revenue path that is weighted towards the end of the asset life might have positive efficiency characteristics if capacity constraints develop later in the asset's life resulting in increases in marginal cost over time.[37] This condition would generally be met if demand for network services were growing and investments were lumpy, in which case this consideration might suggest a preference for ODV. However, similar outcomes could be achieved with DHC by choosing a depreciation profile that weighted the return of capital towards the end of the asset's life.

10.20 In addition, businesses derive revenue from an aggregate of assets with different ages, so that the impact of the profile of recovery on the price path is likely to be diminished. Further, as noted above, the use of multi-part tariffs would reduce the allocative efficiency impact of different profiles of revenue recovery.

[36] Assuming that prices are constrained on the basis of asset values, technological change is only moderate and inflation positive.

[37] p 12, van Zijl and Irwin, *Historic Cost and Replacement Cost: Efficiency Implications of their Use in Price Setting*, LECG, August 2001.

10.21 Optimisation further complicates the likely price path associated with the different methodologies. The more limited scope for optimisation with historic cost approaches may result in customers using older networks paying more than they would if an ODV approach had been used (assuming rapid technological change).

10.22 On balance, the Commission considers the valuation methodologies could be neutral in allocative efficiency terms.

81. What valuation methodology best promotes allocative efficiency? Please provide comment in terms of the level, structure and time profile of prices.

Productive Efficiency

10.23 The Commission is considering performance benchmarking as an option for assessing the productive efficiency of electricity lines businesses. Some performance measures, such as profits and returns as a percentage of funds invested, depend on asset valuation.

10.24 Productive efficiency can also be measured on the basis of physical capital inputs, such as installed transformer capacity, or the circuit lengths, rather than the monetary value of such inputs. For this type of benchmarking, asset valuation is not important.

10.25 Opening valuations based on the ODV methodology (assuming they are appropriately and consistently applied across businesses) may have some advantages for benchmarking in that they provide consistency across comparable businesses, which facilitates comparisons. Historic cost opening valuations may be less suitable for benchmarking, due to the legacy effect of different accounting approaches and the differential impact of inflation on those opening values.

10.26 New Zealand electricity lines businesses might also be benchmarked against overseas businesses. Given the range of different valuations methodologies used overseas, comparisons are likely to be problematic whatever valuation methodology is used in New Zealand.

10.27 An important aspect of benchmarking may be the analysis of the performance of the same business over time. Using the same asset valuation methodology for establishing the initial asset base, as well as additions and revaluations, would best facilitate this. As long as the chosen methodology is used consistently, one approach is unlikely to be superior to another in this regard. However, periodic revaluations and/or optimisations, if irregular, could create problems for benchmarking of a business's performance over time, as might changes to the prescribed methodology over time. It is unlikely that historic cost valuation approaches would change significantly over time, unless they were combined with other valuation aspects such as optimisation.

10.28 The Commission considers that benchmarking considerations (i.e. productive efficiency considerations) in respect of distribution businesses could favour ODV over DHC.

10.29 Transpower might be benchmarked against overseas businesses given the lack of comparable businesses in New Zealand. The comparability of performance over time would therefore be the primary benchmarking consideration for Transpower and neither methodology would be preferred on productive efficiency grounds.

82. Could operational efficiency be improved by the choice of valuation methodology and, if so, how?

83. How important is the ability to perform benchmarking to the choice of valuation methodology, particularly given the nature of system fixed assets?

Dynamic Efficiency

Establishing Opening Valuations

10.30 For new assets, both DHC and ODV, if applied appropriately and consistency over the life of the asset, can ensure investors earn a "normal" return. However, this may be less relevant to the decision of how to value *existing* assets. There are likely to be more important dynamic efficiency considerations for the valuation of opening asset bases.

10.31 For example, if investors were to consider that the Commission's opening asset values signalled an increased regulatory risk through values being set at "too low" levels, this could reduce incentives for investors to under take efficient investments in the future. Balanced against this view, is the concern that if opening valuations were set "too high", inefficient investment (by-pass) might be encouraged. "Regulatory risk" is discussed below. A further consideration is that valuations significantly below book values might give rise to financial difficulties for some electricity line businesses.

10.32 The Commission considers that in principle, opening asset values could range from scrap values to the current ODV values. Opening values based on ODV could be lower than current book values for a number of electricity lines businesses (because of recent acquisitions at some multiple of ODV), while opening values based on vesting values (historic cost) are likely to be lower than ODV. At the lower limit, valuing the opening asset base at scrap value would be likely to mean that all electricity lines businesses' opening asset values would be significantly lower than current book values. The Commission does not favour the use of scrap values for sunk assets.

10.33 DHC valuations of existing system fixed assets for distribution businesses, if they were based on vesting values or the actual historic costs, would generally be substantially lower than ODV valuations. A report by Simon Terry Associates, for example, claims that electricity lines businesses, in aggregate, have more than doubled their book values from $2 billion in 1993 to $4.2 billion in 1999. They attribute most of the increase to the adoption of ODV for financial reporting purposes.[38] The adoption of DHC could therefore, for some electricity lines businesses, significantly reduce their current ODV book values. The Commission has not determined what historic cost values of the lines businesses might be if they were based on vesting values.

10.34 If profits or prices were constrained on the basis of asset values (through the targeted control regime), a requirement to use DHC values (vesting or actual), or even ODV values, could significantly reduce the expected future returns for the current owners of distribution businesses. In some cases, this might place the balance sheets of some businesses under serious strain. DHC valuations based on more recent events (lines separation or business merger and acquisition transactions), would be much closer to current book values, and would have a more moderate financial impact.

84. What would be the financial and balance sheet implications for electricity lines businesses if profits or prices were constrained on the basis of a DHC (vesting value-based) valuation? What would be the implications of constraining prices on the basis of current ODV values?

Regulatory Risk

10.35 The concept of regulatory risk is often associated with dynamic efficiency given that perceptions of regulatory risk can affect incentives for investment. In considering the impact of a change of valuation methodology on perceptions of regulatory risk (and therefore dynamic efficiency), it is important to be clear about the extent of risk directly attributable to a particular method or change of method.

10.36 In terms of starting valuations, it is the impact on asset values (combined with the constraints imposed by the thresholds), rather than the valuation methodology per se, which is likely to be most important for perceptions of regulatory risk. For example, a DHC opening valuation based on values when lines businesses were separated would raise fewer concerns than DHC based on vesting values. Regulatory risk might not be increased if current ODV values were adopted, but concerns might be raised if the ODV methodology were changed to make the EV component more rigorous, or if a greater degree of optimisation were adopted.

[38] STA, *Lining up the Charges: Electricity Lines Charges and ODV*, 2000.

10.37 It is difficult to assess the exact extent of perceptions of regulatory risk resulting from different approaches. However, the following considerations are important:

- whether the change would result in a better valuation of assets for regulatory purposes than the status quo, including, for example, removing any excess returns permitted under an existing valuation approach (if this were the case);
- whether the change would be seen as being "fair", including by not advantaging investors over consumers or vice-versa;
- whether the change would be consistent with the reasonable expectations of investors at the time they made their investment; and
- other decisions made (e.g. levels of company debt) on the basis of assumptions about the regulatory regime.

10.38 As noted above, a variant of ODV may have less impact on perceptions of regulatory risk than a change to DHC for opening valuations. However, the ultimate result depends on the extent to which a change is seen as credible and durable, the magnitude of resulting changes in valuation, and the relationship between valuation and the thresholds.

10.39 Arguably, most of the costs of regulatory risk may have already been incurred with Parliament's introduction of Part 4A. The regulatory risk associated with choosing a particular valuation method may also be low because:

- there is little evidence that decisions to buy and sell electricity lines businesses is closely related to the ODV values attached to those businesses, with sales that have been observed resulting in businesses selling at multiples of their ODV; and
- the fact that Parliament has required the Commission to review asset valuation methodologies for system fixed assets could suggest uncertainty as to whether the ODV method achieved the purposes of the light handed regime, including the purpose of preventing monopoly profits.

10.40 A number of transactions of lines business assets have occurred in New Zealand in recent years. In many cases, sale prices have exceeded ODV – sometimes by multiples of around two. Any transactions involving lines business asset completed since 1994 occurred within a regulatory regime involving public disclosure of profit measures based on ODV. It is arguable that the regime involved the threat of price control based on the ODV valuations. If true, then investors should not have expected to earn a return on the portion of the transaction price in excess of ODV.

85. Are there any circumstances or considerations that would justify the regulatory valuation of assets above ODV? Should investors in electricity lines businesses have legitimately expected to earn a return on any price paid above ODV?

10.41 In addition, if it is clearly signalled that the chosen approach used in the future is to be used consistently, then the regulatory risk from a switch in methodology at the commencement of the regime may be reduced (i.e. it would be a one-off change which not affect the Commission's future approach). On the other hand, if investors consider that the regulatory direction was clearly signalled in 1994, and is now being changed, they might perceive that there could be future changes.

10.42 The perception of regulatory risk is likely to be affected by investors' perceptions as to whether the then Government endorsed the ODV methodology for purposes other than information disclosure. Since its introduction in 1994, the ODV Handbook has noted specifically that there was no regulatory requirement for prices to be determined on the basis of ODV.[39] Nonetheless, an issue is whether investors in distribution businesses reasonably assumed, on the basis of the prescription of ODV for disclosure, that ODV valuations would be acceptable for pricing purposes.

10.43 In addition to the prescription of ODV for information disclosure purposes, the then Government established Transpower with an ODV valuation methodology. The Government also required the Commission to undertake an ODV recalibration under Part 4A. These two factors might be perceived by some as endorsement of ODV.

10.44 If the Commission's approach increased regulatory uncertainty, it might become necessary to apply a risk-adjusted WACC to attract investment into the market. This could negate the objective of changing the methodology. If adoption of DHC increased investors' perceptions of regulatory risk in New Zealand sufficiently to raise the cost of capital or to deter investment, ODV would be preferred on dynamic efficiency grounds.

86. How is the choice of opening asset values likely to effect investors' perceptions of regulatory risk (and therefore dynamic efficiency) going forward?

[39] The ODV Handbook notes that the "sole purpose of this [ODV] methodology is to support the disclosure of performance measures under Regulation 15 of the Electricity (Information Disclosure) Regulations 1999" and that "there is specifically no regulatory requirement that prices be determined on the basis of system assets being valued according to ODV", Ministry of Economic Development, *Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses*, October 2000, pp 7 and 9.

87. What inferences, if any, could electricity lines businesses reasonably have drawn as to the appropriate asset valuation methodology to be used for pricing, from the introduction of information disclosure in 1994?

88. What impact might the introduction of Part 4A have had on investors expectations regarding asset valuation methodologies?

Valuing the Asset Base in the Future

10.45 As noted above, both DHC and ODV approaches can allow investors to earn a normal return on investment, so long as each is applied consistently over the life of an asset. Both approaches can therefore be consistent with the achievement of dynamic efficiency objectives if used to value additions to the starting asset base.

10.46 As discussed in Chapters 4 and 5, even if optimisation were applied to DHC, the scope for optimisation is likely to be greater under ODV, although this may provide dynamic efficiency advantages and disadvantages. Optimisation could be limited to assets added to the starting base, or could apply to the whole asset base periodically.

10.47 The optimisation regime under ODV would offer advantages if the risks of inefficient investment were high. The difficulty of specifying desired services and the investments needed to achieve these may lead to poor investment decisions. These issues may also make it difficult to conduct a prudency test in advance of investment to identify ex ante gold plating and redundancy.

10.48 The prospective rate of technological change over the next few years from distributed generation, competitive retailing, improved metering, more complex pricing, and superior monitoring and control devices could be significant. If it were desirable to reflect such potential changes in the valuation methodology, ODV would be favoured over DHC approaches.

10.49 On the other hand, investors' incentives to invest carefully (or at all) may be affected by how downward revaluations resulting from optimisation are treated. Optimisation intends to provide incentives for careful investment, but this may undermine the incentive to invest at all where there is a likelihood of significant uncompensated risks.

10.50 The extent of optimisation risk borne by investors is a regulatory parameter that needs to balance the trade-off between incentives for careful investment and ensuring an adequate return for investment. Optimisation can reduce an investor's ability to gold plate and investors should not be compensated for this. However, optimisation also creates a risk by exposing investors to unexpected technological and demand changes. If these risks were not accompanied by ex ante compensation through an increment to WACC (i.e., a risk-adjusted WACC), then the present value of investors' cash flows would not cover their investment. Reinvestment would then be unlikely to occur, which would be dynamically inefficient. However, as noted in Chapter 4, it is

difficult to determine the appropriate WACC increment to compensate for optimisation risks.

10.51 Optimisation could be used to affect the distribution of costs to customers through time (if the risks were not borne by investors). Costs would be imposed on those who were consumers at the time of an optimisation and not on future consumers.

10.52 A DHC approach could encourage a business to delay replacement of assets if the book value of assets exceeded their economic value (e.g. technological change has been rapid), and a return on the book value were allowed. This would be less likely to happen with ODV because such assets would be optimised out of the asset base.

10.53 However, ODV (and the concept of optimisation more generally) could also encourage a business to delay investments, because of the potential risk of optimisation, unless there was a corresponding increase in the allowed WACC. If the investments are particularly lumpy or the future too uncertain, this effect could be significant or encourage investment in smaller increments, which may not be efficient.

10.54 Adoption of DHC for additions to the opening asset base (with or without periodic optimisation) is unlikely to significantly affect perceptions of regulatory risk. As noted above, tightening of requirements around the EV test, or a move to a more "greenfields" form of optimisation may generate concern, particularly among the smaller and more rural based businesses.

10.55 On balance, the Commission considers it is uncertain whether DHC or ODV would be favoured on dynamic efficiency grounds.

89. Which valuation methodology would best promote dynamic efficiency?

90. To what extent is optimisation required in the case of the system fixed assets of electricity lines businesses?

91. To what extent is this optimisation being undertaken through the application of the current ODV Handbook?

Assessment Against Excessive Profits Criterion

Establishing Opening Asset Valuations

10.56 The choice of methodology for determining opening valuations has significant equity (distributional) implications if that valuation is used as the basis for setting regulatory constraints on profits. The choice of asset base affects the returns investors can earn into the future and prices paid by consumers.

10.57 Both the ODV and DHC approaches can result in normal returns being earned over time, so long as they are applied consistently and properly over the life of an asset. However, if a switch in the methodology used to set prices occurs, excess, or sub-normal, returns could result.

10.58 In assessing whether excess profits have been earned, it is important to match the asset valuation methodology used to assess excess earnings with the methodology used by businesses to set prices. If prices were set using ODV rather than DHC, and replacement costs for new assets were to rise over time, then prices would be lower in the first half of the asset's life than in the second half. However, if the assessment of excess earnings used a DHC valuation approach, then excess earnings would appear to be negative in the first period and positive in the second. The timing issue would evaporate over the full life of the asset. However, the assessment necessarily occurs part way though the life of assets. Spurious conclusions might then be drawn.

10.59 It has been suggested that some electricity lines businesses have earned excessive returns since vesting, and that they have switched from historic cost (based on vesting values) to ODV valuations to increase the value of their asset base and, therefore, justify earning higher returns.[40] The adoption of ODV as the vesting value for Transpower, arguably achieved a similar income transfer.

10.60 With inflation and limited technological change, the returns allowed on both methodologies (assuming rate of return-type regulation) tend to be downward sloping over the life of an asset, but returns for DHC start at a higher level than for ODV, cross approximately at the midpoint of the asset's life and are lower thereafter. Many systems fixed assets were part way through their lives when electricity lines businesses changed their valuation methods from DHC to ODV for the purposes of information disclosure. This could have led to over-recovery of costs if prices had been set on the basis of the ODV valuation throughout the life of the assets.

10.61 Even if the electricity lines businesses had used ODV throughout the period, they might have earned excessive profits if the methodology was not applied correctly. If businesses revalued their assets using ODV, and did not treat revaluations as part of their return on capital, they would be likely to have over-recovered costs (i.e. earned excessive profits). Some commentators have suggested that revaluation gains have not been treated as returns in the past under the ODV method.

10.62 The adoption of a DHC opening valuation, based on vesting values, it is argued, would restore the balance between investors and consumers.[41] However, for electricity lines businesses that applied ODV consistently over the life of their assets (in particular, those businesses that treated revaluation gains as income), a change to DHC for opening valuation could not be

[40] If vesting values were based on historic costs, then even an immediate switch to ODV at vesting may have had this effect given that a number of assets were part way through their life.
[41] G. Bertram and S. Terry, *Lining up the Charges: Electricity Lines Charges and ODV*, 2000.

justified. If such a change to DHC were made, it would lead to under-recovery of their investment.

10.63 Further, the investor base has not stayed constant for some electricity lines businesses. Where changes in ownership have occurred, current investors are not necessarily those who benefited from any past excessive profits. Recent investors would incur a capital loss on their investment if the asset base were reduced below what they paid for the assets, while previous owners could have already effectively received the capitalised expected future profits.

10.64 Transpower's vesting book valuation at the time it was established as a State-Owned Enterprise (1 July 1994) was determined using the ODV method. At the time, there would have been a significant difference between the current replacement cost and historic cost values of Transpower's transmission assets (given the preceding high rates of inflation). Arguably, the decision to base valuations on replacement cost (not historic cost) provided a windfall to the Crown at the time Transpower was established. Since the initial valuations, real replacement costs of line business system fixed assets have declined.[42]

10.65 Transpower's current ODV valuation is below its vesting valuation. It has applied the ODV methodology consistently since the time of vesting (i.e., through treating revaluation gains as income). Therefore, there do not appear to be strong income distribution reasons for changing from current ODV values for its starting valuation.

10.66 The Commission has not investigated the consistency of application of the ODV methodology over time to other electricity lines businesses, nor whether this has led to excess profits in the past. This issue is important to the choice of how to determine opening values.

92. Have electricity lines businesses earned excessive profits in the past?

93. How have revaluations gains been treated by electricity lines businesses in the past?

94. How should the issue of consistency (including the treatment of revaluation gains) influence the choice of asset valuation methodology?

95. How would the Commission's choice of opening values affect the profile of expected returns under different valuation methods into the future?

[42] Standard replacement costs in the ODV Handbook have not changed since 1994 indicating a reduction in real replacement costs.

Valuing the Asset Base in the Future

10.67 ODV or DHC could be used to value additions to the opening asset base. Both methodologies could, in principle, ensure investors earn a normal return on new investments. In addition, either valuation methodology could be used to identify "excessive profits", or to determine the sharing of profits over the life of the assets. With the opening system fixed asset values having been established (by whatever valuation methodology is decided by the Commission to be appropriate), the asset valuation methodology for future valuations (which may or may not be the same as the valuation methodology used to set the opening valuations) should then be used for the remaining life of the opening asset base and the entire life of new assets for regulatory purposes under Part 4A.

10.68 Whichever long-term valuation methodology is chosen, it is important it is applied consistently throughout the life of the assets. Thus, if ODV is the chosen methodology, and a nominal WACC is used, businesses should treat revaluations as income.

10.69 In the Commission's view, both historic cost and replacement cost valuation methods can potentially achieve the income distribution objectives (i.e. the concern with excess profits) of Part 4A for distribution businesses and for Transpower.

96. Can both ODV and DHC valuation methods deal with the issue of excess profits? What factors should be looked at in determining whether each valuation methodology has been applied consistently over time to avoid excessive profits?

97. When using a nominal WACC and a replacement cost methodology, should gains due to inflation be treated as income in the year after they occur? Could they be spread over a number of years? What are the difficulties with this approach, e.g., could there be a 'spiralling up' of moneys that have to be redistributed to customers in later years? Would interest need to be charged on this outstanding amount?

Assessment Against Cost Effectiveness Criterion

Establishing Opening Asset Valuations

10.70 Arguably, the most straightforward and least cost option for establishing opening valuations would be to use the March 2001 ODV valuations that have been audited by the Commission. However, adjustments might be required given deficiencies revealed by the Commission's audit of the ODV values. Updating the ODV valuations to a more recent date (or to reflect any change in the prescribed ODV method) would involve some costs, but is required under the disclosure regulations in any case. Further detailed auditing of

values by the Commission may not be necessary. The issue of past revaluation gains, however, would have to be considered separately.

10.71 The historic cost records of a number of electricity lines businesses prior to vesting may be incomplete. Even with a substantial amount of work, it may not be possible to reconstruct the necessary records for some electricity lines businesses. A "pure" historic cost valuation approach is, therefore, probably not feasible for establishing opening values.

10.72 The book values of system fixed assets at the time of vesting might also be uncertain in some cases. Some work might be required to separate the book value of the system assets at that time from the other businesses (generation and retail) in the period between vesting and the implementation of the disclosure regime in 1994.

10.73 Valuations at the time of separation of electricity lines businesses are known and relate only to the electricity lines businesses. The valuation approaches used at the time to establish book values may differ between the different businesses, reflecting the different rates of adoption of ODV for pricing as well as disclosure purposes. Some work may be required to identify the value of the assets added since vesting. Mergers and acquisitions might further complicate the collation of historic cost data.

10.74 The Commission considers that transaction cost considerations could favour using the 31 March 2001 ODV valuations to establish the opening asset bases for distribution businesses.

10.75 Determining the vesting valuation of Transpower is not subject to many of the complications noted for distribution businesses. However, a "pure" historic cost valuation is likely to be difficult and costly to reconstruct.

98. How difficult would it be to obtain a valuation based on a "pure" historic cost valuation? How difficult would it be to obtain a valuation based on book value at vesting plus additions and deletions valued at historic cost? Is the information available from separation or more recently? Does the quality of information available preclude the use of any opening valuation methodology?

Valuing the Asset Base in the Future

10.76 Replacement-cost approaches are information intensive, involving many judgments, for example, in selecting comparable current day assets and evaluation of the optimisation process. Operating costs may also be optimised to match with optimised assets, although this is generally considered unnecessary, as it would not usually have a material impact on the regulatory outcome. Different valuers are likely to make different judgments, particularly for ODV. The subjectivity means that ODV valuations are potentially

susceptible to manipulation, and that even without manipulation valuations may differ across businesses and over time.

10.77 These problems can be reduced somewhat by prescribing acceptable approaches as with the publication of the ODV Handbook. ODV is likely to involve somewhat higher information costs than ODRC, because of the extra EV tests required under the former but not the latter. The form of any ODV Handbook need not necessarily be based on the one currently used for disclosure purposes.

10.78 The costs of an ODV approach would be substantially lower if optimisation and revaluations were limited to additions to the asset base over a period, with complete revaluations being limited to relatively long intervals (say every five or ten years). However, if revaluations were matched by a reduction in allowed income infrequent revaluations might complicate the recovery of returns over time (i.e., result in a big reduction in cash income in the years following the revaluations).

10.79 The use of DHC, or IHC with a real WACC, could avoid the complication of having to treat revaluation gains as income, and the associated costs of analysis. Booking revaluation gains as income may be costly, requiring an approach similar to that currently used by Transpower, which involves a sharing of revaluation gains with customers over a number of years.

10.80 A DHC approach involves relatively low information costs once a starting asset base is established, since the valuation at the close of a period is simply the opening valuation less depreciation plus asset additions during the period. Generally, historic cost data is objective and can be readily audited by independent parties so that it is relatively robust to manipulation and easier to control. Optimisation of historic cost values may be limited, and would, if they were conducted, increase the costs and reduce the objectivity of historic cost valuation. Transpower supports the idea that a 'used and useful' test may be appropriate for the application of an optimised historic cost approach.[43]

10.81 Cost effectiveness considerations would favour a DHC approach for future valuations of the asset base (i.e. having already determined the opening asset base, DHC would be less costly assuming any capital efficiency reviews cost less than an ODV-type optimisation and revaluation).

SUMMARY OF ASSESSMENT

10.82 The factors relevant to choosing a methodology for establishing opening valuations, and for future valuations (including additions to the asset base) are outlined for the electricity lines distribution businesses below and summarised in Table 8. The valuation approaches used for establishing initial valuations and future valuations could potentially be different. The factors relevant to Transpower are summarised in Table 9.

[43] Transpower *Response to the Issues Paper: Review of Asset Valuation Methodologies*, June 2002, p 9.

Establishing Opening Valuations for Distribution Businesses

10.83 The different methodologies provide advantages and disadvantages for establishing opening valuations for the distribution electricity lines businesses. The relevant factors are summarised below.

Efficiency

10.84 A DHC starting valuation would likely be lower than an ODV valuation for distribution lines businesses, if it were based on vesting values, and would therefore be more consistent with efficient pricing of sunk assets at opportunity cost (allocative efficiency). The impact of lower prices on downstream industries might also be significant. However, the use of multipart tariffs can allow prices to be set close to marginal cost under both approaches, reducing the impact of valuation differences. DHC could be favoured on allocative efficiency grounds.

10.85 ODV is likely to be better than DHC for benchmarking between businesses where comparisons involve asset values (e.g., ROI). Benchmarking is an option for encouraging productive efficiency, although asset valuation is used in a limited number of benchmarks. Moreover, some benchmarking could be done using physical assets only, so that asset valuation may be irrelevant. ODV could be favoured on productive efficiency grounds.

10.86 There may be dynamic efficiency implications for the valuation of opening asset bases. If investors were to consider that the Commission's opening asset values signalled an increased regulatory risk through values being set "too low", this could reduce incentives for investors to undertake efficient investments in the future. Balanced against this view, is the concern that if opening valuations were set "too high", inefficient investment (e.g. by-pass) might be encouraged. A further consideration is that valuations significantly below book values might give rise to financial difficulties for some electricity line businesses.

10.87 The Commission considers that in principle, opening asset values could range from scrap values to the current ODV values. Opening values based on ODV could be lower than current book values for a number of electricity lines businesses (because of recent acquisitions at some multiple of ODV), while opening values based on vesting values (historic cost) are likely to be lower than ODV.

10.88 Some investors may have inferred that ODV asset values could be used for pricing given the then Government's prescription of this methodology for disclosure purposes. As well, if DHC were based on vesting values, and returns were constrained on that basis, a few businesses might face financial difficulty. If so, adoption of a DHC approach could increase the perception of regulatory risk, with negative implications for investment into the future. Such considerations could be favour current ODV on dynamic efficiency grounds, if the regulatory risk of choosing DHC were significant.

Excessive Profits

10.89 The choice of opening valuation methodology could significantly impact on the distribution of wealth between investors and consumers (assuming profits were constrained on the basis of those asset values). For instance, DHC based on vesting values, would likely be substantially lower than ODV values and would, therefore, benefit consumers (all other things being equal) by reducing owners' future profits.

10.90 One potential reason for preferring DHC is the suggestion that some (but not all) electricity lines businesses have earned, or are earning, excessive profits, and that adoption of a DHC approach would address this. The Commission has not conducted its own analysis of whether electricity lines businesses have earned, or are earning, excessive profits, and has not therefore reached a conclusion on the validity of this claim.

10.91 Nonetheless, one view is that the purpose of a control regime is to protect consumers from the market power that could be exercised by monopoly businesses, subject to efficiency considerations. The acceptance of this view might lead to DHC being favoured on distributional grounds.

Cost Effectiveness

10.92 The lowest cost option for establishing an initial asset base would be to use the ODV values as at 31 March 2001, which have been audited by the Commission. The costs of the valuations and auditing have been incurred. Other approaches are likely to involve one-off costs and may be difficult to implement in a timely manner. Cost effectiveness considerations would favour the use of the 31 March 2001 ODV values to establish opening values.

99. On balance, what is the preferred methodology for opening valuations of distribution businesses system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

Valuing the Asset Base in the Future

10.93 The different methodologies provide advantages and disadvantages for future valuations of the distribution businesses. The relevant factors are summarised below.

Efficiency

10.94 The profile of recovery of capital costs for new (future) investments can be determined by the choice of depreciation schedule. There is therefore little reason for preferring one approach over another on allocative efficiency grounds.

10.95 ODV is likely to be better than DHC for benchmarking between businesses where comparisons require asset values. Such benchmarking is likely to have a relatively limited impact on productive efficiency. Nonetheless, ODV could be favoured on productive efficiency grounds.

10.96 Both ODV and DHC can allow investors to earn a normal return on investments over the life of an asset as long as they are applied consistently for the life of the assets. Under ODRC, the risks of sub-optimal investment as well as technological change can either be borne by consumers or investors, depending on the treatment of revaluations. However, if investors were to bear the risk, then an ex ante adjustment to WACC (which would be difficult to calculate) could be required to ensure they could expect to earn a normal return. The treatment can be chosen to optimise the trade-off between providing incentives to minimise poor investment decisions while ensuring that investors receive a return sufficient for the risks they bear.

10.97 Under DHC, optimisation is more limited so customers may bear a greater share of the risks of poor investment. Dynamic efficiency considerations, for this reason, could favour ODV as optimisation potentially minimises the potential for gold plating and over investment. This assumes optimisation is required (and undertaken in practice), that such optimisation is limited under a DHC approach, and that the benefits of such optimisation outweigh the costs.

10.98 As discussed above, DHC and ODV raise different issues regarding dynamic efficiency. On balance, the Commission considers it is uncertain whether DHC or ODV would be favoured on dynamic efficiency grounds.

Excessive Profits

10.99 Both DHC and ODV can form the basis for ensuring that businesses do not earn excessive returns on new investments and/or that the benefits of efficiency gains are shared.

10.100 If DHC were to be used for setting prices in the future, the Commission considers the opening asset base can be treated as if it were the DHC value.

10.101 Income distribution considerations do not favour one approach over another for future valuations if each is applied consistently and appropriately.

Cost Effectiveness

10.102 The historic cost valuation method is likely to be less costly to apply and less subjective to manipulation than ODV for additions to the starting asset base. A DHC approach avoids the complication and costs of having to deal with revaluations. Booking revaluation gains in the year after they occur is expected to be difficult, notwithstanding the approach Transpower has taken to dealing with the issue. These cost considerations could favour a DHC approach.

100. On balance, what is the preferred methodology for future valuations of distribution businesses system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

Establishing Opening Valuation for Transpower

10.103 The factors relevant to the establishment of an opening valuation for Transpower are outlined below.

Efficiency

10.104 Given the significant optimisation undertaken in the past, an ODV valuation is likely to be lower than a historic cost valuation based on Transpower's vesting valuation and would, therefore, be more consistent with efficient pricing of sunk cost assets (allocative efficiency). A "pure" historic cost approach is unlikely to be feasible for Transpower.

10.105 Because Transpower is the only transmission company, it would not be possible to benchmark it against other lines businesses. Relevant overseas businesses may not be comparable, and are likely to use a variety of valuation methodologies so that neither ODV nor historic cost approaches offer advantages for benchmarking (a component of productive efficiency).

Excessive Profits

10.106 Transpower has applied the ODV methodology consistently since vesting, including appropriate treatment of revaluation gains. There are no clear reasons on income distribution grounds for choosing between ODV and DHC in the case of Transpower.

Cost Effectiveness

10.107 It could be costly to reconstruct historic cost accounts for Transpower.

101. On balance, what is the preferred methodology for opening valuations of Transpower's system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

Valuing Transpower's Asset Base in the Future

Efficiency

10.108 The price path associated with an ODV approach may be more consistent with efficient pricing of sunk assets (allocative efficiency). Given that any benchmarking may be with overseas businesses, neither methodology is preferred on productive efficiency grounds. Optimisation has both advantages and disadvantages, so the choice between ODV and DHC is uncertain in dynamic efficiency terms.

Excessive Profits

10.109 Either methodology could be used to ensure that Transpower does not earn excessive profits.

Cost Effectiveness

10.110 A DHC approach is likely to be more cost-effective to operate on an ongoing basis.

102. On balance, what is the preferred methodology for future valuations of Transpower's system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

CONCLUSION

10.111 Tables 7 and 8 provide a summary of the assessment of the factors relevant to the choice of methodology for determining opening and future valuations. The tables distinguish between distribution and transmission services. They are intended to facilitate discussion. Where a method may be favoured regarding a particular evaluation criterion, this is indicated with a "+". The choice of method can also be "neutral" or "uncertain" against a particular criterion.

10.112 This summary compares two theoretical approaches. The practical implementation of any methodology is likely to vary to some degree from the theory. For example, optimisation under ODV may not be at the theoretical "greenfields" level, and an optimised DHC may be possible.

Table 7: Comparison of Valuation Methodologies for Distribution Businesses

ESTABLISHING OPENING VALUATIONS FOR DISTRIBUTION BUSINESSES					
Methodology	**Allocative efficiency**	**Productive efficiency**	**Dynamic efficiency**	**Excessive profits**	**Cost effectiveness**
ODV		+ (If benchmarking against replacement costs encourages productivity gains)	+ (If the regulatory risk of choosing DHC is important and has lasting impact)		+ (As valuations have already been done and the costs incurred)
DHC	+ (If past profits excessive, otherwise neutral)			+ (If past profits excessive, otherwise neutral)	
VALUING ASSETS OF DISTRIBUTION BUSINESSES IN THE FUTURE					
ODV	Neutral	+ (If benchmarking against replacement costs encourages productivity gains)	Uncertain (Greater optimising possible under ODV)	Neutral (If revaluation gains treated as income when using a nominal WACC)	
DHC	Neutral		Uncertain (Less optimising reduces asymmetric risk)	Neutral	+ (If optimisation limited)

Table 8: Comparison of Valuation Methodologies for Transpower

ESTABLISHING OPENING VALUATIONS FOR TRANSPOWER					
Methodology	**Allocative efficiency**	**Productive efficiency**	**Dynamic efficiency**	**Excessive profits**	**Cost effectiveness**
ODV	+ (If ODV lower than DHC)	Neutral (Benchmarking against overseas businesses)	Neutral	+ (Transpower has applied ODV method consistently, including treating revaluations gains as income)	+ (ODV valuation exists. It could be costly to reconstruct HC)
DHC		Neutral	Neutral		
VALUING TRANSPOWER'S ASSETS IN THE FUTURE					
ODV	Neutral	Neutral (Benchmarking against overseas businesses)	Uncertain (Greater optimising possible under ODV)	Neutral (If revaluation gains treated as income when using a nominal WACC)	
DHC	Neutral	Neutral	Uncertain (Less optimising reduces asymmetric risk)	Neutral	+ (If optimisation limited)

GLOSSARY

Term	Acronym	Definition / Description
Assets		Defined in the Commerce Act 1986 to include intangible assets.
Avoidable Cost		Those costs that would be avoided (saved) if an activity were to cease.
Brownfields		A form of optimisation involving the progressive or incremental replacement of assets in the normal course of business, retaining the historic configuration of the assets, but replacing under-utilised and removing redundant assets.
Consumer Price Index	*CPI*	A measure of inflation in the prices of a basket of consumer goods weighted by the level of consumption of each good throughout the economy.
Current Cost Accounting		An accounting policy under which assets are revalued from time to time at current cost (using a methodology such as r*eplacement cost*).
Deprival Value		The benefit derived from an asset that would be lost by a business were it deprived of that asset.
Easement		A right of access to land, in this case to construct, operate and maintain a power line (without ownership of the land).
Economic Value	*EV*	Under the *ODV* methodology, *economic valuation* is conceptually similar to *optimisation*, but involving consideration of non-network technologies (such as generation and demand-side options).
Greenfields Optimisation		A form of optimisation involving the designing and building of an entirely new optimal network of assets, regardless of historic constraints that may have applied.
Gold-plated Assets		Assets are gold-plated when they are overly lavish (e.g. over-designed) for their intended purpose.
Historic Cost	*HC*	The actual cost incurred in purchasing an asset in the past.
Indexed Historic Cost	*IHC*	*Historic cost*, modified according to an inflation index such as *CPI.*
Infrastructure Accounting		See *Renewals Accounting.*

Term	Acronym	Definition / Description
Modern Equivalent Assets	*MEA*	The modern equivalent of an existing asset that delivers the same level of service as that existing asset.
Opportunity Cost		The highest alternative use value of a resource or asset.
Optimisation		A retrospective analysis of the usefulness of existing assets according to a well-defined methodology. *Optimisation* may involve notionally re-sizing and reconfiguring assets according to modern best practice and current demand forecasts.
Optimised Depreciated Replacement Cost	*ODRC (or DORC)*	Similar to optimised replacement costs, but including adjustments for depreciation.
Optimised Deprival Value	*ODV*	Similar to deprival value, but including adjustments for optimised assets.
Optimised Replacement Cost	*ORC*	Similar to replacement costs, but including adjustments for optimised assets.
Price		Defined in the Commerce Act 1986 to include valuable consideration in any form, whether direct or indirect; and includes any consideration that in effect relates to the acquisition or supply of goods or services or the acquisition or disposition of any interest in land, although ostensibly relating to any other matter or thing.
Prudency Test		A regulatory analysis of a capital investment, to assess whether its purchase (was) justified, and therefore admissible into the *RAB*.
Regulated Asset Base	*RAB*	The regulated value of assets providing regulated services (distinguishable from assets providing unregulated services and those that have been optimised out).
Renewals Accounting		An accounting policy under which no depreciation is expensed on the statement of financial performance. Instead, all asset maintenance and renewal expenditure is expensed to the statement of financial performance. Any portion of asset expenditure that increases its service potential is treated as capital expenditure.
Reoptimisation		Where an asset that has been previously optimised down is valued back upwards. This could be, for example, due to an increase in demand beyond what was previously expected.

Term	Acronym	Definition / Description
Replacement Cost	*RC*	The lowest current cost of replacing an asset with another of similar service potential.
Return on Investment	*ROI*	A measure of rate of profit, conceptually comparable to *WACC*.
Revaluations		*Revaluation* is the difference in asset value between two balance dates that is not attributable to depreciation or capital additions or disposals. *Revaluations* may arise for a number of reasons, including a change in accounting methodology, application of a *current cost* accounting policy for asset valuation, or change in market value of the assets in question.
Stocks and Spares		Assets that are not currently in service, but which are available as needed to restore service promptly following sudden failure of in-service assets.
Stranded Asset/Cost		An asset is said to be *stranded* when its owner cannot recover the outstanding balance of costs attributable to the asset. For example, a downward *revaluation*, due to *optimisation*, could represent a *stranded cost*, if the *revaluation* were not recoverable (via contractual or regulatory mechanisms).
Sunk Cost		*Sunk costs* are costs that, once incurred, cannot be recouped, or recovered through the redeployment of assets to alternative uses (there may be no alternative uses).
System Fixed Assets	*SFA*	As defined in the Electricity (information Disclosure) Regulations 1999.
Weighted Average Cost of Capital	*WACC*	The average return required to compensate debt and equity holders of a business for their investment, given the systematic risks associated with the investment.
Works Under Construction		Assets that are not yet providing line services (*SFA* that are not yet commissioned).

APPENDIX 1 – FULL OF LIST OF QUESTIONS

CHAPTER 2 – PURPOSE OF THE REVIEW

1. Should the same valuation methodology necessarily be used for thresholds assessments and for control?

2. What factors should be considered in deciding whether a consistent or different approach is desirable?

3. What level of detail regarding asset values should be publicly disclosed? How should asset valuation requirements be prescribed in practice (e.g. a handbook)?

4. To what extent should there be any different approach to asset valuations (than for thresholds and control) used for disclosure purposes?

CHAPTER 3 – EVALUATION CRITERIA

5. Are the proposed evaluation criteria of efficiency, excessive profits and cost effectiveness for assessing the valuation methodologies appropriate given the regulatory context in which asset valuations may be used?

6. What other evaluation criteria, if any, should the Commission consider?

7. In assessing asset valuation methodologies for system fixed assets, how important is allocative efficiency?

8. How are the level, structure and profile of prices over time affected by the choice of valuation methodology?

9. How does the choice of valuation methodology affect service quality and the ability for electricity lines businesses to provide services of a quality that reflects consumer demands?

10. In assessing asset valuation methodologies for system fixed assets, how important is productive efficiency? What factors should be considered?

11. In assessing asset valuation methodologies for system fixed assets, how important is dynamic efficiency? What factors should be considered?

12. How important is the identification of excess returns as a criterion for the assessment of valuation methodologies? What factors should be considered?

13. How important is cost effectiveness as a criterion for the choice of valuation methodology? What factors should be considered?

CHAPTER 4 – VALUATION AND REGULATORY CONTROL

14. How great is the scope for bilateral or multilateral contracting regarding asset investment?

15. How should contractual management of asset-related risks be dealt with in the context of regulatory asset valuation?

16. Who is best placed to manage the various forms of investment risk faced by electricity lines businesses?

17. In a regulated environment, how should investment risks be compensated? Is it preferable that some risks be compensated through WACC and others through the valuation methodology (e.g. through the choice of depreciation regime or treating revaluation gains/losses as income)?

18. What are the relative merits of dealing with inflation through WACC or the valuation methodology?

19. Is it appropriate that investors bear the risk of asset failure? In what circumstances would it not be appropriate for investors to bear the risk of asset failure?

20. How can accounting depreciation best be kept in line with economic depreciation?

21. How should assets be treated when they remain useful beyond their expected life?

22. How should uncertainty as to the useful economic life of an asset be accounted for in terms of regulated depreciation?

23. What effect would economic depreciation have on price profiles over time?

24. Is capital efficiency best determined ex ante or ex post, or by a mixture of both? Are some factors pertaining to capital efficiency best considered ex post and others best considered ex ante? How are capital efficiency assessments best conducted?

25. What investment incentives do the various types of capital efficiency reviews create?

26. How frequently should capital efficiency reviews be conducted? What factors should be considered in deciding how frequently to conduct such reviews?

27. Does the level of inflation/deflation in the electricity industry suggest one valuation methodology would be better than others? Would compensation for inflation through indexation preserve the purchasing power of investors' committed funds? What are the pros and cons of indexation?

28. What relevance does FRS-3, or any other standards and policies, have for the Commission's criteria for evaluating valuation methodologies?

29. What other accounting policies or practices, if any, are relevant to the review?

30. What scope is there for substitution of capital and operating expenses for electricity lines businesses system fixed assets?

31. Should the regulatory asset valuation methodology include prescribed accounting policies, such as in relation to capitalisation and depreciation?

CHAPTER 5 – ASSET VALUATION METHODOLOGIES

32. Are there some system fixed assets that could be put to alternative uses outside of the electricity industry and, therefore, appropriately valued at opportunity cost? What assets have high specificity (i.e. only have value in their current use)?

33. What could explain the evidence of transactions of electricity lines businesses' system fixed assets greater than their ODV? How important are current and intangible assets in explaining the evidence?

34. What are the pros and cons of combining capital efficiency reviews with a historic cost approach? How great is the scope for capital efficiency reviews under a historic cost method?

35. What events could be used as a base for valuing system fixed assets at historic cost? What are the relative merits of using the book values at each of these particular events as a base for a historic cost value? What would be the most appropriate date to use for assessing the historic costs of electricity lines businesses?

36. What are the pros and cons of indexing historic cost values for inflation?

37. How important is it that an asset valuation methodology replicates or mimics competitive market outcomes, given the regulatory objections of Part 4A and the Commission's evaluation criteria?

38. Does the ODRC approach have economic merit in terms of mimicking competition? Do any other asset valuation approaches have more merit in this regard?

39. If electricity lines businesses have revalued their assets in the past but have not matched those revaluations with income forgone, should their current return on capital be calculated using a real WACC?

40. If revaluation gains have not been treated as income, should consumers now be compensated in some way? If so, how?

41. Are there likely to be significant differences between the inflation of asset prices and the inflation implicit in a nominal WACC calculation?

42. If businesses bear the cost of downward revaluations is this risk asymmetric (i.e. to the disadvantage of investors) and how could it be reflected in the WACC without compromising incentives for efficient investment?

43. If businesses bear the cost of downward revaluations is this risk asymmetric (i.e. to the disadvantage of investors) and how could it be reflected in the WACC without compromising incentives for efficient investment?

44. How important is an EV assessment to the theoretical underpinning of ODV?

45. Why does the EV component have a limited impact on ODV values (as per the ODV Handbook)? Are the factors identified by the Commission significant?

46. What are the additional costs of an EV assessment (over and above an ODRC assessment)? Do the costs outweigh the benefits?

47. Are there significant numbers of "uneconomic" customers for electricity lines businesses? How should the costs of any uneconomic customers be allocated?

CHAPTER 6 – CURRENT USE OF THE ODV METHODOLOGY

48. If the prescribed ODV method were to be used as an input into the regulatory functions under Part 4A, what, if any, changes would be required to the fourth edition of the ODV Handbook? What effect would any necessary changes have on the values of system fixed assets?

CHAPTER 7 – INDUSTRY SPECIFIC ISSUES

49. Are the standard costs currently listed in the ODV Handbook appropriate?

50. How significant is the rate of technological progress and the potential for shifts in demand for the valuation of electricity lines businesses system fixed assets?

51. Is there evidence that the replacement costs of system fixed assets will rise or fall (and how fast) relative to the rate of CPI inflation?

52. Is there evidence that rates of technological change are sufficiently high to warrant full depreciation over a period significantly shorter than the relevant asset's technical life?

53. What industry specific issues can affect the prudency of investment decisions? What relevance do these issues have for the choice of valuation methodology?

54. Under what circumstances should capital contributions be excluded from the regulatory asset base? Where this is desirable, how should they be excluded?

55. Should assets associated with contestable services be ring-fenced from other system fixed assets? What evidence can be provided to demonstrate that specific agreements with one or more customers were negotiated on fair and reasonable terms and/or subject to competitive pressure?

56. Should the value of some assets be determined by the associated contractual revenue streams (rather than by reference to historic cost or replacement cost)?

57. What assets should be included as "system fixed assets"?

58. How should an asset be valued for regulatory purposes where it also provides line services that are not subject to regulatory oversight by the Commission?

59. Should asset valuations be disclosed in respect of distinct network regions?

60. What is the best way to value land and easements? Should easements be valued differently to other system fixed assets? Are there any access concerns in respect of getting new easements or access to existing easements?

61. What factors or considerations could provide a basis for different valuation approaches across different sectors?

CHAPTER 8 – INTERNATIONAL PRACTICE

62. What lessons can be learned from international practice?

CHAPTER 9 –IMPLEMENTATION AND OPERATIONAL ISSUES

63. To what extent are the implementation and operational issues identified by the Commission relevant and, if so, to what extent for each valuation method? Are there any other implementation and operational issues that should be identified and, if so, how significant are they?

64. If DHC (or DIHC) were the preferred method for establishing the baseline valuation of electricity line business system fixed assets for regulatory functions under Part 4A, how could this be best achieved?

65. Up to what time were historic cost-based system fixed asset records maintained? Are possible difficulties surrounding establishing a *true* historic cost-based opening valuation genuine concerns? How could these difficulties be overcome, if at all?

66. If *true* historic cost could not be derived for the baseline valuation, is there a reasonable proxy for historic cost that could be used instead? What implementation issues might exist with a "reasonable proxy" approach?

67. What implementation or operational disadvantages or pitfalls might exist if the latest ODV value of system fixed assets were used for the baseline valuation, with future assets included and accounted for in the asset base at DHC (or DIHC)?

68. Assuming it was possible to determine a baseline valuation for system fixed assets using a historic cost-based approach (or a reasonable proxy for historic cost), what implementation issues might arise in attempting to align the detailed (ODV) asset records with the baseline valuation? How could any implementation issues be satisfactorily addressed?

69. What would be the implementation and operational implications for accounting systems and processes if regulatory asset valuation required an historic cost-based approach (DHC or DIHC)? How could the implementation issues be satisfactorily addressed and in what timeframe?

70. To what extent should the valuation method (DHC, DIHC, DRC, ODRC, or ODV) be prescribed by the regulator?

71. If the ODV method were adopted for regulatory purposes, is the handbook for the prescribed ODV method adequate, or are changes required?

72. In respect of historic cost-based asset valuation approaches, could reliance on accounting standards (particularly FRS-3) and conventions be relied upon to ensure consistency or comparability of valuations?

73. What implementation period would be necessary for implementation of the different valuation methods? What factors would influence the amount of implementation time needed?

74. What factors are relevant to deciding the appropriate period between system fixed asset (re)valuations for regulatory purposes? How often should (re)valuations of system fixed assets be undertaken for regulatory purposes?

75. Should independent financial and engineering experts continue to be required to approve valuation reports?

76. What are the advantages and disadvantages of using a common auditor across all electricity lines businesses? Should this process be undertaken by the Commission?

77. What work do auditors currently perform under the electricity information disclosure regime in respect of system fixed assets? How does this audit work compare with audits carried out for statutory financial statement purposes? Are the audit scope and audit work carried out sufficient?

78. What factors should be borne in mind when considering alternative valuation methods for Part 4A given that electricity lines businesses use system fixed asset valuations for other purposes?

79. What are the costs associated with conducting a valuation under the different approaches? What costs would be incurred regardless of the methodology used? What costs are likely to be additional?

CHAPTER 10 – COMPARISON OF ASSET VALUATION METHODOLOGIES

80. What are the pros and cons of limiting capital efficiency reviews to additions to the opening asset base? What level of cost savings could be achieved by limiting capital efficiency reviews to additions to the opening asset base?

81. What valuation methodology best promotes allocative efficiency? Please provide comment in terms of the level, structure and time profile of prices.

82. Could operational efficiency be improved by the choice of valuation methodology and, if so, how?

83. How important is the ability to perform benchmarking to the choice of valuation methodology, particularly given the nature of system fixed assets?

84. What would be the financial and balance sheet implications for electricity lines businesses if profits or prices were constrained on the basis of a DHC (vesting value-based) valuation? What would be the implications of constraining prices on the basis of current ODV values?

85. Are there any circumstances or considerations that would justify the regulatory valuation of assets above ODV? Should investors in electricity lines businesses have legitimately expected to earn a return on any price paid above ODV?

86. How is the choice of opening asset values likely to effect investors' perceptions of regulatory risk (and therefore dynamic efficiency) going forward?

87. What inferences, if any, could electricity lines businesses reasonably have drawn as to the appropriate asset valuation methodology to be used for pricing, from the introduction of information disclosure in 1994?

88. What impact might the introduction of Part 4A have had on investors expectations regarding asset valuation methodologies?

89. Which valuation methodology would best promote dynamic efficiency?

90. To what extent is optimisation required in the case of the system fixed assets of electricity lines businesses?

91. To what extent is this optimisation being undertaken through the application of the current ODV Handbook?

92. Have electricity lines businesses earned excessive profits in the past?

93. How have revaluations gains been treated by electricity lines businesses in the past?

94. How should the issue of consistency (including the treatment of revaluation gains) influence the choice of asset valuation methodology?

95. How would the Commission's choice of opening values affect the profile of expected returns under different valuation methods into the future?

96. Can both ODV and DHC valuation methods deal with the issue of excess profits? What factors should be looked at in determining whether each valuation methodology has been applied consistently over time to avoid excessive profits?

97. When using a nominal WACC and a replacement cost methodology, should gains due to inflation be treated as income in the year after they occur? Could they be spread over a number of years? What are the difficulties with this approach, e.g., could there be a 'spiralling up' of moneys that have to be redistributed to customers in later years? Would interest need to be charged on this outstanding amount?

98. How difficult would it be to obtain a valuation based on a "pure" historic cost valuation? How difficult would it be to obtain a valuation based on book value at vesting plus additions and deletions valued at historic cost? Is the information available from separation or more recently? Does the quality of information available preclude the use of any opening valuation methodology?

99. On balance, what is the preferred methodology for opening valuations of distribution businesses system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

100. On balance, what is the preferred methodology for future valuations of distribution businesses system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

101. On balance, what is the preferred methodology for opening valuations of Transpower's system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.

102. On balance, what is the preferred methodology for future valuations of Transpower's system fixed assets? Please comment on the relative importance of the factors considered by the Commission and any other factors considered relevant.