

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

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11 November 2002

1 Introduction

Meridian Energy welcomes the opportunity to comment on the paper "Review of Asset Valuation Methodologies: Electricity Lines Businesses' System Fixed Assets" released by the Commerce Commission in October 2002.

We have not considered all the questions raised by the Commission however would like to make a number of observations regarding valuation methodologies and the regulatory regime faced by electricity lines businesses.

1.1 Objective

An asset valuation methodology for electricity lines companies should promote economically efficient investment and operational behaviour in all demand and supply side sectors of the electricity industry.

1.2 Issues and Conclusions

Three primary issues must be resolved in order to promote the attainment of the overall objective:

- Valuation methodology, and particularly the allocation of risks associated with actual and/or potential new investment as between customers and lines companies;
- The structure of customer charges with respect to the recovery of lines company costs; and
- The nature and extent of information disclosed to the regulator and to the public at large in order to facilitate the timely and responsive identification of contestable investment opportunities.

A lines asset valuation methodology should deal with these issues in a way that promotes economic efficiency over time and that uses transparent and stable regulatory and commercial mechanisms. Different approaches exist, but not all approaches provide the same incentives for the lines companies to establish economically efficient pricing structures or facilitate the same degree of transparency.

As discussed below, we recommend the use of replacement cost with optimisation (rather than historical cost) as the more appropriate valuation methodology for electricity lines assets, primarily because replacement cost with optimisation provides superior incentives to promote economically efficient pricing.¹ Replacement cost with optimisation also requires a progressive information disclosure regime that promotes a more transparent assessment of potential investment opportunities.

¹ We note that this conclusion is also consistent with those contained in the recent paper by Professor Lewis Evans and Dr Graeme Guthrie ("Efficient Price Regulation of Networks that have Sunk Costs: Should Caps be Based on Historical or Replacement Cost?", www.iscr.org.nz, August 2002). Evans and Guthrie find that industries with relative technological stability, such as electricity distribution, may be candidates for replacement cost regulation rather than historic cost.

The combination of replacement cost with optimisation and a progressive information disclosure regime can create consistent and convergent pressures on lines companies to structure their pricing, evaluate their investments and operate their businesses in a manner consistent with economic efficiency, to the benefit of all.

2 Valuation Methodology for Electricity Lines Businesses

2.1 Introduction

A clearly important objective in any electricity industry regulatory proposal is the assurance of a satisfactorily reliable supply. Each part of the supply chain contributes to the perception of reliability to the consumer. Certainly, the network infrastructure must be up to the task.

It is difficult to argue with such a high level objective, but it is not easy to translate it into specific detailed requirements given the further (and equally "standard") objective of economic efficiency. Economic efficiency is achieved by promoting appropriate "economising" behaviour. The challenge, of course, is how to ensure that the investments that are needed to deliver the desired level of reliability (however measured) are actually those (and only those) that consumers pay for. Competition promotes such outcomes because a firm knows that if it makes wasteful investments, it will not earn a return on those investments. But there is no direct analogue to competitive market discipline for monopolistic entities, and thus other approaches are necessary.

2.2 Historical Cost

One approach is to scrutinise investments as they are made. Investments that cannot be shown to be prudent are not permitted. The US regulatory process has historically operated on this basis. This approach can require an extensive and vigilant regulatory process in order to impose the appropriate level of discipline on utility investment programmes. If the regulatory process cannot deal effectively with the often substantial information that must be evaluated prior to approving investment, then investments *will* be made that should not have been made or, quite possibly some investments that should have been made (perhaps because they offer additional benefits or could have been provided by the competitive sector) would be displaced by the investments made under the protective cloak of overwhelmed regulatory processes.

On the other hand, a potential benefit of the historical cost approach is the certainty that it creates for the investing utility. The consumers bear the risk that the investment, once approved, could turn out to be unnecessary or could otherwise represent an inefficient expenditure of society's scarce resources. In exchange for taking on this risk, the consumer should be charged a tariff that reflects a lower rate of return to the utility than would otherwise have been required. Of course, this aspect, too, requires vigilant or highly formulaic regulation to ensure that the rate of return earned on invested capital is appropriately low. It would make no sense to allow regulated businesses the opportunity to earn higher "market" based returns if they do not, in fact, face "market" risks, unless there is some unambiguously clear and correspondingly offsetting value proposition for consumers.

In effect, a historical cost approach treats each new investment as a long term contract between the utility and consumers (with the regulator as the consumers' agent), obligating consumers to pay the original cost of the asset plus a reasonable rate of return. Conceptually, this long-term contract-based approach obligates consumers to make the full repayment to the utility no matter what happens in the future. Because consumers are not equally in a position to evaluate the risks they are being asked to accept, the historical cost

approach requires that the regulatory process be capable of accepting the potentially significant burden of screening the investments to establish that they represent a prudent application of the consumers' money. This burden can also leave the regulator exposed in the event that it does not permit certain investments to be made and then a supply disruption occurs as a result.

2.3 Replacement Cost

A replacement cost approach involves a different allocation of risk between the utility and the consumer and regulator. Whereas the historical cost approach described above requires that the regulator approve investments which are then recovered by the utility,² replacement cost exposes the utility to risk that future replacement costs will be lower than current costs (and may also expose the consumer to the risk that future replacement costs will be higher than current costs).

Replacement cost is conceptually analogous to competitive markets where market prices are assumed to tend towards the long-run cost of new entry. A replacement cost-based framework imposes a discipline on the regulated utility to make investment decisions that take account of possible future trends in relevant technologies and procurement costs, whereas a historical cost approach shifts the burden of considering such factors more directly to the regulator. The differences in the two approaches, replacement and historical costs, are analogous to the difference between "yes, but" and "no, unless". In principle, these two approaches seemingly *should* produce the same end result, but the burdens they place on the regulatory process and the opportunities afforded to the market at large to contribute positively to the development of sound outcomes over time are quite different.

Under a historical cost approach, the investment, once made and approved (explicitly or implicitly) by the regulator, should not subsequently be reviewable or exposed to risks associated with changes in technologies or cost drivers. Under a replacement cost approach, on the other hand, the efforts of the regulator can be joined by the commercial environment in general in producing efficiency enhancing pressures on the regulated lines business.³

² We discuss below why we doubt the efficacy of *ex post* optimisation in combination with historic cost valuation of electricity lines assets.

³ This is not to argue that replacement cost is *always* preferable to historic cost. The two approaches really must be viewed as alternative forms of contracting with consumers. Historic cost assumes a long-term contract between the investor and consumers. A replacement cost basis provides no similar long-term contracting facility between the regulated utility and the consumers. If a long-term contract were to be required to bring forth new investment such a contract would need to be negotiated outside the scope of a replacement cost-based regulatory regime – perhaps between the utility and specific consumers or between third party providers and consumers. If technological change is rapid and affects the very core assets and business proposition of the regulated utility, then the inability of the utility to enter into effective long-term contracts (perhaps because there are no manageable subsets of consumers with which to separately negotiate) could work to the detriment of dynamic efficiency by reducing the incentive of the utility (or anyone) to bring forth substantial investments in new technology. It is difficult to imagine, however, that the core business of a electricity lines company is exposed to such fundamental technological development risks as to raise the question of whether long term "regulatory contracts" are actually required to ensure investment in core lines business activities. Most of the core assets of the lines businesses are long-lived, sunk and have few, if any, meaningful substitutes. As a result, a replacement cost regime contributes greater value in the form of efficiency enhancing discipline than it might potentially subtract in the form of reduced long-term contract protection for substantial new investments.

2.4 Summary: Historical Cost versus Replacement Cost

The primary difference is the burden placed on the regulatory process. Historical cost will generally place a greater burden on regulatory processes. Replacement cost will tend to result in the utility having a stronger incentive (all else being equal) to make investments that are sensible given perceived trends in relevant technology and cost drivers. In principle, such considerations can be left to the regulator to enforce (as in the case of historical cost), and this can be seen as optimal if the investment environment is sufficiently uncertain that sufficient investment will not take place without the protection of a long-term regulatory contract. The use of historical costs has the advantage of reducing the commercial risk to the utility, and therefore it should be possible to justify a lower rate of return on the investments made than would be the case if those investments were exposed to the commercial risks associated with variations in future replacement costs.

2.4.1 Recommendation: Replacement Cost for Electricity Lines Businesses

We recommend replacement cost as the basis for valuation to be applied to electricity lines businesses. To gain the “simplicity” that may appear to be a benefit of the historic cost valuation approach, the regulatory process applicable to electricity lines business would need to become considerably more intrusive. We believe there would be significant costs associated with the development of a sufficiently vigilant investment pre-approval process for lines businesses given their diverse circumstances and characteristics, and we particularly see risk of higher costs and loss of economic efficiency for New Zealand as a whole if a historic cost valuation approach with pre-approval were to be adopted but were then not backed up with sufficient regulatory oversight.

We see optimisation as an important part of the replacement cost approach, but not of the historical cost approach, as discussed below.

3 Pricing to Consumers

3.1 Introduction

A focus only on historical versus replacement cost as a basis for regulating the investments of a lines company will tend to miss the most important issue: pricing of lines company services to consumers. Our concern here is not so much the static inefficiencies that may flow from poor pricing, but the dynamic efficiency implications for investment in alternative technologies.

Economic efficiency is principally concerned with establishing a system of pricing signals that promote efficient investment and operating behaviour. The impact of lines company pricing can have quite significant impacts on consumer preferences and behaviour. For example, if a consumer is paying a particular amount for lines company “services” and concludes that it could achieve similar service levels at lower cost by making its own investment in distributed generation, then the consumer will want to do this. If an apparent investment opportunity for the consumer arises solely as a result of the structure of prices set by the lines company – and not from any fundamental economic benefit associated with the potential investment – then the pricing structure should be changed or a regulatory prohibition against the new investment may be required. Around the world, regulatory prohibitions against third party investment have been used for decades to protect incumbent monopolists against a host of threats that might otherwise have fostered greater dynamic

efficiency had more careful attention been paid to the economic efficiency aspects of pricing structures.⁴ We would strongly prefer to see heightened focus on pricing issues as these will drive the attractiveness of new investment opportunities and affect the behaviour and preferences of consumers. Those investment opportunities and consumer preferences should be driven, to the greatest extent possible, by efficient price signals. The mode of regulation of the lines companies can affect the lines company's incentive to establish efficient pricing, and therefore can affect both the general investment environment and the short- and long-term behaviour of consumers.

3.2 Pricing versus Investment

Issues of pricing should generally be separated, to the extent possible, from concern over investment adequacy in the lines businesses. Pricing issues relate to the specific structure of charges imposed on different customers. Different customers will have different alternative investments available to them and may have different elasticities of demand, etc. An economically "optimal" structure of charges designed to recover the fixed costs of the lines company operations should take these considerations into account so as to minimise the creation of "false" incentives for consumers or third party investors to bypass the system or make otherwise "wasteful" investments or act so as to reduce the amount of electricity they use relative to what they would have used had they faced a more efficient price signal.

The regulatory issue at stake in developing a lines company regulatory framework is how to promote the development of a more efficient pricing structure. The responsibility for developing and maintaining such a structure *could* be left to the regulatory process – potentially increasing the burden placed on that process to develop and defend a given pricing structure. Alternatively, the burden could be placed on the lines companies themselves to develop and maintain a pricing structure that is most consistent with economic efficiency.

The optimisation framework is one way to facilitate the shifting of the burden of devising efficient pricing structures from the regulatory process to the lines companies. Contestability is another.

3.3 Optimisation

If a customer's charges are set such that the customer has a viable investment alternative that would reduce its lines charges in a way that increases the customers' total benefits from electricity supply, then the customer should be allowed to make such investments. If, as a result, the lines company must write down or write off assets that are no longer required, or must write down charges so as to "compete" with the customer's alternative, then the lines company should face this risk. In this way, the lines company has an incentive at all times to track trends in the market, understand its customers' requirements and be responsive to the importance of efficient pricing signals. The customer, on the other hand, can be freed to seek ways to reduce its lines charges by identifying less expensive ways to meet its overall requirements.

⁴ This is not to say that such prohibitions have been universally "bad", only that in the course of time, most of these have been replaced by some form of contestable process as economic regulation has become more sophisticated.

This process of challenge and response mimics competitive market processes, and should be harnessed to promote the development over time of a pricing structure that improves economic efficiency in investment and energy usage and reduces the regulatory burden compared to the counterfactual: an unending series of frequent, potentially contentious, detailed reviews.

The existence of an optimisation regime implies a likelihood that some assets will be written-off (or written-down) before the end of their economic life. To compensate for this risk and to preserve investment incentives, a certain premium on the weighted average cost of capital needs to be paid to lines businesses. The premium would depend on factors such as uncertainty about the economic life of assets, volatility in demand growth, the potential for asset stranding via customers moving away from an area, as well as the potential for the implicit price control provided by the regulatory regime for electricity lines businesses to limit upside returns but leave firms exposed to downside risks. These factors suggest that lines businesses operating in low-density low-growth areas could require a different risk premium than lines businesses operating in high-density and high-growth areas.

3.3.1 Optimisation is Inconsistent with Electricity Lines Historic Cost Recovery

We recommend combining replacement cost and optimisation for electricity lines businesses. We do not recommend combining historical cost valuations with optimisation for electricity lines businesses generally. In principle, a historical cost based approach *could* be combined with some form of *ex post* prudence determination (a fairly coarse form of optimisation), as it was in the US when nuclear plant cost overruns were reviewed by the various state regulators to determine whether the recovery of the full cost of the overrun should be recoverable from the consumers. These proceedings were horrendously complex and contentious and involved billions of dollars, in part because they challenged the basis for the historic cost valuation approach that had been long applied to the industry. Only lawyers and consultants would ever dream of wanting to go through those experiences again.

The hopefully-not-to-be-repeated nature of the US “used and useful” nuclear prudence determinations is clear enough, but it could be dismissed as being too extreme to hold much relevance for the New Zealand regulatory context. In fact, the Commission, in its price control inquiry into airfield activities⁵, has adopted an explicit “used and useful” test for optimising both land and non-land assets, with land valued at opportunity cost (i.e. replacement cost) and specialised non-land assets valued at historic cost. Consequently, we consider whether a “used and useful” test would be applied to electricity lines businesses as a form of optimisation used in conjunction with a historic cost approach.

The most important reason for distinguishing the system fixed assets of an electricity lines business from those airfield assets to which a historic cost valuation approach has been agreed lies in the technical characteristics of the respective assets. The airfield assets valued at historic cost by the Commission values are those related to the development of a second runway at Auckland International Airport. Certain costs are to be carried forward, but are not to be included in the asset base until the second runway is put in service. In effect, if the second runway is never built, these costs will not be recovered. Both the completion and use of the second runway are fairly discrete events that can readily be projected and/or observed. The application of the used and useful test in this context is about as

⁵ Commerce Commission, *Part IV Inquiry into Airfield Activities at Auckland, Wellington, and Christchurch International Airports*, Final Report, 1 August 2002.

straightforward as can be, and the cost of administering the test and monitoring the airfield's investment activities should be relatively low as a result.

In contrast, it is often extremely difficult to determine the extent to which electricity network assets are in fact used and useful. The properties of electrical networks are such that most assets (lines, substations, transformers, etc.) will “automatically” be used – in the sense that electricity flows through them from the moment they are connected to the network. This means that it is necessary to use engineering rules, rather than simple “utilisation” measures, to determine whether a lesser network configuration would have been sufficient for the expected level of demand.

If these rules are applied in advance of the investment being made, then we have either a commercial investment evaluation or a pre-investment prudence test. If these engineering rules are applied *after* the investment has been made, then we have the basis for either a commercial market opportunity assessment or a regulatory asset value optimisation determination. If the regulator is undertaking an optimisation assessment, then the regulator must value the extent to which the actual asset is required as compared to a notional (i.e. “replacement”) asset that matches the current system requirements (given that many factors are likely to have changed over time). If a replacement cost valuation approach applies, then this process presents no particular difficulties, as current replacement costs for the capacity required can be measured and applied to develop the value of the notional (optimised) asset.

It is more difficult to apply such standards to a network valued based on historic cost. Whereas historic costs will exist for the physical asset, no analogous “historical” costs will exist for the notional (optimised) asset. The notional asset only exists in the current “replacement” context. Historical costs could be compared to current replacement costs (and truncated to replacement cost if found to be higher), but doing so abrogates the very logic (long-term contract between the utility and consumers) that supports the use of a historical cost approach in the first place. Blending historical costs with replacement-cost-based optimisation would also introduce potentially severe risk allocation asymmetries in that there would be no analogous opportunity to “write up” a historic cost asset whose value when compared to replacement opportunities has actually increased.⁶

In our view, when assets are valued at historic cost it is far simpler, significantly less subjective, and more compatible with economic theory (in the sense that historic cost valuations form the basis of a long-term contract with consumers if administered consistently by the regulatory process) to employ a generalised pre-investment prudence test than to suffer through the inevitably confusing and difficult marriage of historic cost valuation and ex-post optimisation.⁷ Put differently, a historical cost approach is better matched to the assurance of full cost recovery, provided the initial investment has been sufficiently scrutinised by the regulator. Once regulatory approval has been granted, there is little gained in conducting a subsequent review except to call into question the very regulatory process that led to the approval of the investment.

⁶ If there were, then historic cost would, of course, simply be transformed into replacement cost.

⁷ Alternatively, if there are specific applications that merit long-term contracting, then a very carefully targeted application of historic cost valuation (such as has been applied in the case of Auckland's potential second runway) may be acceptable – though the marriage of “some” historic cost valuations with “some” replacement cost valuations can pose its own regulatory challenges.

3.3.2 Reduced Regulatory Burden

Periodic optimisation can be implemented with a manageable regulatory burden if the optimisation proceedings are conducted as periodic “random” audits of varying degrees of detail. The “threat of optimisation” must be credible in order to provide a sufficient incentive for the lines company to develop and maintain more efficient pricing structures. It is crucial, however, that the lines company be exposed to any risk of reduced revenue arising from getting its pricing structure “wrong”. If there is no downside risk, then there would be insufficient incentive for the lines company to develop an efficient pricing structure in the first place. It may be necessary, under certain circumstances, for optimisation to carry a further penalty aspect. A penalty could be implemented in the form of a factor greater than 1.0 being applied to any value that is reduced due to optimisation. For example, if a utility is found to have failed to disclose sufficient information for customers and third party investors to properly evaluate the potential opportunities to invest at lower cost than the lines company charges, then any optimisation could carry a penalty impact. Otherwise, optimisation would simply lead to adjusted valuations (up or down) in the normal way.

4 Information Disclosure Requirements

The above discussion leads naturally to the consideration of information disclosure requirements, the third leg of the stool constructed of the asset valuation approach, optimisation as an incentive for self-administered pricing reform and commercial pressures from consumers and third party investors able to assess opportunities that can challenge what might otherwise be the un-natural monopoly activities of the lines company.

Logically, if replacement cost is to be used together with optimisation and pricing structures are to be a focal point in order to improve economic efficiency, then third parties should be free to propose alternative solutions to consumers to reduce any or all aspects of their energy costs, including both lines and energy components. In effect, third parties must be free to propose investments that have the potential to “contest” both existing and potential lines investments.

In order for the process by which lines companies and third party investors and/or consumers are able to evaluate the investment opportunities that exist, “monopoly” lines companies must meet satisfactory information disclosure requirements. Failure to develop and enforce satisfactory information disclosure would have the effect of limiting the ability of third parties and consumers to identify and act on potential opportunities, and would weaken the incentive on lines companies to develop and maintain an economically efficient pricing structure.

In particular, the asset management plans of lines businesses must be developed to a high standard and made public in a timely fashion. Many of the existing asset management plans appear to be very light on detail about the potential for alternatives to network investment. Indeed, we note Ministry of Economic Development comments that:

“It is expected that the disclosed AMPs would have close links with companies' actual asset management. Schedule 2 of the Electricity (Information Disclosure) Regulations specifies what items of information must be disclosed. It is expected that these disclosures should explain a company's general asset

management strategy. Some reports explain little and appear more directed at token compliance.”⁸

Further many, if not most, plans can be:

- inwardly focused, and at times simply fail to acknowledge that other investment options could be used to meet projected requirements (ie. distributed generation)⁹;
- vague with respect to possibilities of generation opportunities within the operating area because such opportunities are potentially being husbanded by the lines companies themselves¹⁰;
- of insufficient dependability in that the plans are qualified as not being suitable for reliance by external parties (including the regulator?); and
- lacking in detailed information on relevant network performance, such as GXP capacity limits and present loadings. Such information, for example can be useful for generators seeking to connect to the transmission network and wanting to know if there are additional benefits that would be created by the investment for the distribution company so as to broaden the scope for covering the cost of such investments.

These are just some examples of issues that should be addressed in the asset management plans if those plans (or other published materials) are to be more useful to the market in assessing potential opportunities to the benefit of consumers. At a minimum, further information disclosure specificity for lines companies is warranted (compare the “Statement of Investment Opportunities” provisions of Part F of the proposed rulebook to those of Schedule 2 of the Electricity (Information Disclosure) Regulation 1999).

And perhaps the most important consideration is that existing plans have not generally included a network schematic. Transpower's latest Security System Forecast document includes in Figure 5 a schematic of their network. This identifies all lines with capacity, capacitors, transformers etc. If such information were provided in the asset management plans of the distribution companies, it would be extremely helpful and would be entirely consistent with the level of transparency required to make an optimization and contestability driven regulatory approach work.

⁸ Electricity (Information Disclosure) Regulations Newsletter, August 2002

⁹ While we acknowledge that the Electricity (Information Disclosure) Regulations 1999 state that the requirement to identify “distributed generation” options under Schedule 2 (e) (iii) and (vi) came into force on 13 July 2001, it did not apply until the 2002/03 financial year (the current plan). We therefore look forward to significant improvements in this area in subsequent years.

¹⁰ The Electricity Industry Reform Amendment Act 2001 increased the ability of lines businesses to invest in new renewable sources of generation.