CRA Charles River Associates

FINAL REPORT

Prepared For:

Contact Energy

Level 1, Harbour City Tower
29 Brandon St
Wellington

Balance of the EV Account for Transpower's HVDC Assets

Prepared By:

CRA International (Hong Kong Limited

trading as Charles River Associates

1902A Tower Two Lippo Centre

89 Queensway, Hong Kong

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Author(s): Andrew Shelley (Consultant)

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1. INTRODUCTION

I, **Andrew Victor Shelley** of Wellington, economics consultant, say:

1. My full name is Andrew Victor Shelley. I am a Consultant with the economic consulting firm of Charles River Associates (formerly CRA International). I am based in Wellington.

1.1. QUALIFICATIONS

2. I have a Bachelor of Business Studies degree and a Master of Arts (first class honours) in Economics, both from Massey University.

3. I have been an economics consultant for 10 years. I specialise in the analysis of economic and regulatory issues for network and utility industries. I have particular experience in the electricity and telecommunications industries. I have frequently advised companies in the electricity industry on regulatory and economic issues, particularly in regards to the economic regulation of electricity distribution and electricity transmission.

4. From 1995 to 1998 I was a Pricing Analyst and then a Strategic Analyst at Transpower New Zealand Ltd (then called "Trans Power"), the owner and operator of New Zealand's electricity transmission system. When the New Zealand Electricity Market was introduced in 1996 Transpower altered its pricing for the HVDC link so that charges for it were paid solely by generators located in the South Island. I was the analyst charged with developing the pricing for the HVDC.

5. My curriculum vitae is attached as Appendix A.

6. I confirm that I have read the Code of Conduct for Expert Witnesses as set out in the High Court Rules and I have adhered to the code in preparation of this report.

1.2. INSTRUCTIONS

7. I have been asked by Contact Energy to:

   7.1. provide my opinion on whether the change in the balances of the "Economic Value (EV) account" over the period 2007-2009 is consistent with what would be observed in a competitive market;

   7.2. calculate the EV account balances that I consider are consistent with competitive market outcomes; and

   7.3. assess whether the proposed input methodologies for Transpower adequately address issues relevant to the EV balances.

1.3. DOCUMENTS REFERENCED

8. A full list of the documents that I have referenced in preparing this report is provided in **Appendix B**. Selected documents which I refer to by a shortened title are:

   8.1. Commerce Commission, DRAFT Commerce Act (Transpower Input Methodologies) Determination 2010, published on 2 July 2010. I refer to this document as the *IM Draft Determination*.

   8.2. Commerce Commission, Individual Price-Quality Path (Transpower) Draft Reasons Paper, 28 June 2010. I refer to this document as the *IPP Draft Reasons Paper*.

   8.3. Commerce Commission, *Input Methodologies* (*Transpower*), *Draft Reasons Paper*, 25 June 2010. I refer to this document as the *IM Draft Reasons Paper*.

   8.4. Commerce Commission, Decision and Reasons for not amending Transpower's administrative settlement to include Instantaneous Reserves Fees as Pass-Through costs, 22 June 2009. I refer to this document as the *Instantaneous Reserves Decision*.

   8.5. Commerce Commission, Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses, 30 August 2004. I refer to this document as the *ODV Handbook*.

   8.6. New Zealand Gazette, *Commerce Act (Transpower Thresholds) Notice 2008*, 26 June 2008, Issue 106, pp. 2793-2823. I refer to this document as the *Transpower Thresholds Notice 2008*.

1.4. CONCLUSIONS

9. The aggregate balance of the EV account over the period 2007-2009 is consistent with the regulatory arrangements specified in the *Transpower Thresholds Notice 2008*. These arrangements included a cap on the level of operating expenditure that Transpower was able to recover. The annual increase in allowed operating expenditure was limited to the increase in the Consumers' Price Index (CPI), which could be considered to be a proxy for the increase in costs that might be observed in a competitive market.

10. The EV account has been separated into two separate accounts: an HVDC account that relates to the revenues and costs associated with the HVDC link that provides for power transfer between the North Island and the South Island; and an HVAC account that relates to the revenues and costs associated with the rest of the electricity transmission system. I refer to the balances of those accounts as the "EV account balances". Until 2007 only the aggregate balance of the two accounts was disclosed publicly.

11. In my opinion the change in the separate HVDC and HVAC EV account balances over the period 2007-2009 is not consistent with the changes that would be observed in a competitive market:

    11.1. Although operating costs for both the HVAC system and the HVDC system increased by more than the rate of inflation, the allocation mechanism employed by Transpower resulted in a reduction in costs allocated to HVAC customers. This is in part because Transpower's calculation included the "instantaneous reserves" costs for the HVDC which the Commission ruled were not recoverable. The resulting cross-subsidisation is not consistent with the outcomes expected in a workably competitive market, where an increase in costs for one class of customers would not result in a decrease in price to another group of customers. The resulting EV account balances are therefore also not consistent with the outcomes expected in a workably competitive market.

    11.2. The HVDC EV account balance increases to a level ($102.8m)[1] that is significantly greater than my estimate of stand-alone costs for the HVDC system ($65.5m)[2], which is the maximum level of price that would be charged in a workably competitive market. Stand-alone cost is also the price that would be charged if the HVDC system was owned and operated by an independent regulated supplier.

12. In a competitive market prices for a product or service fall between the incremental cost floor and the stand-alone cost ceiling. Given the Commerce Commission's decision to disallow the recovery of certain increases in costs for the HVDC, I calculate that the HVDC EV balance for 2009 should be a debit balance between $65.5m and $75.2m;[3] and

13. In my opinion the proposed input methodologies for Transpower do not adequately address issues relevant to the EV balances. In particular:

    13.1. The EV account balances are an asset and how the Commission has adopted a mechanism for recovery of those balances that is equivalent to the recovery of the costs of physical assets. Section 52T(1)(a)(ii) of the Commerce Act 1986 ("the Commerce Act") requires that there is an input methodology (IM) for the valuation of assets. However, the *IM Draft Reasons Paper* does not contain a detailed examination of the initial value of assets, but just assumes that the values are reasonable. This assumption may be valid for the RAB where the relevant valuation methodology is precisely specified for the current regulatory period, but it is not valid for the EV account balances, where Transpower was provided with no regulatory guidance on the appropriate approach to cost allocation.

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1 See Table 1 in Appendix C.

2 See paragraph 90.

3 See paragraph 90.

13.2. In my opinion, therefore, the asset valuation IM for Transpower should require the recalculation of the EV account balances in accordance with defined cost allocation principles. Those principles should include that:

(1) all costs directly attributable to the HVAC or HVDC should be so allocated;

(2) consistent with the *Instantaneous Reserves Decision*, the increase in Instantaneous Reserves due to the removal of Pole 1 should not be recovered; and

(3) any allocation should be subject to a stand-alone cost constraint for the HVDC, calculated in accordance with (2) above.

13.3. The cost allocation principles should also specify the nature and type of cost allocator that is permissable.

13.4. The issues that I have identified in paragraph 11 could occur again in the future given the methodology that Transpower uses to allocate the capped operating expenditure. In my opinion the cost allocation IM should specify the principles that Transpower should apply in allocating costs between the HVAC and HVDC customer classes. These principles should be the same as those I suggest in paragraph 13.2.

1.5. REPORT STRUCTURE

14. Transpower New Zealand Ltd ("Transpower") owns the electricity transmission system which plays a central role in transferring power from large scale generators to consumers. I discuss some aspects of the New Zealand power system and associated wholesale electricity market further in section 2.

15. Historically Transpower has implemented an "Economic Value Account" (EV account) to track under- and over-recoveries of revenue and revaluation gains and losses. By charging interest on the balance of that account and by recovering the balance over time Transpower will, over the longer term, earn a return that is equal to its allowed rate of return (or Weighted Average Cost of Capital (WACC). In section 3 I describe the genesis of the EV account mechanism in Transpower's self-regulatory framework that applied from the early 1990s, and how it has evolved from a mechanism where revaluations, volume risk, and cost risk were all being drivers of the EV account balance, to the mechanism which now is primarily related to volume risk and changes in pass-through costs.

16. In section 4 I analyse the movement in the EV account balances over the 2007-2009 period, and calculate the balances that in my opinion are consistent with the outcomes expected in a competitive market.

17. In section 5 I discuss the changes that, in my opinion, should be made to the asset valuation IM to correct the past allocation of costs and provide an HVDC EV account balance that is consistent with outcomes in a competitive market or with a stand-alone regulated supplier given the Commission's decision not to allow Transpower to recover increased Instantaenous Reserves costs. I also discuss the changes that, in my opinion, should be made to to the cost allocation IM to ensure that future EV account balances are consistent with outcomes in a competitive market.

2. THE NEW ZEALAND WHOLESALE ELECTRICITY MARKET

18. In this section I briefly summarise some aspects of New Zealand's power system and wholesale electricity market that are relevant to my analysis.

2.1. THE POWER SYSTEM

19. The power system can be broadly considered to have three components:

    19.1. Generators, which generate the electricity;

    19.2. Consumers or end-use customers, who use the electricity; and

    19.3. The transmission and distribution networks which "transport" the electricity from the generators to consumers.

20. The electricity transmission system can be divided into two parts: the High Voltage Alternating Current (HVAC) system in the North Island and the South Island; and the High Voltage Direct Current (HVDC) link that provides for electrical power transfer between the two Islands.

21. Transpower New Zealand Ltd ("Transpower") owns the electricity transmission system, and thus plays a central role in the power system. Without Transpower's transmission system there would be no way for power to be transferred from large scale generators to consumers.

2.2. WHOLESALE MARKET

22. New Zealand has a wholesale electricity market in which "generators compete to sell their electricity to electricity retailers and other purchasers such as major commercial and large industrial users".[4] The wholesale electricity market therefore ensures that generators are paid for their generation. It also ensures that retailers are able to purchase the electricity required by their customers.

4 Electricity Commission website http://www.electricitycommission.govt.nz/industry, accessed 5 August 2010.

23. The rules and institutions governing the wholesale electricity market also ensure that the power system continues to operate in the event of a failure of a generator or a ket part of the transmission system. This includes the provision of, and payment for, a variety of services collectively called "ancillary services".

2.3. ANCILLARY SERVICES AND INSTANTANEOUS RESERVES

24. Transpower's calculation of the EV account balances (Appendix C) contains a line item called "ancillary services" which has a material impact on the change in the EV account balances. **Ancillary services** are important services other than the generation of electricity which are required to ensure that the power system continues to operate in the event of fluctuations to the level of demand or supply, or the loss (failure) of individual components of the power system such as generators or transmission lines. The Electricity Governance Rules define an ancillary service as being the services of "black start, over frequency reserve, frequency keeping, instantaneous reserve or voltage support".[5] It is only instantaneous reserves that are important for the analysis in this report.

25. The Electricity Commission defines **instantaneous reserves** as:

> *Generation capacity that is made available to be used in the event of a sudden failure of a generating or transmission facility in order to maintain system frequency at 50 Hz. Fast instantaneous reserve is available within six seconds and must be able to operate for one minute. Sustained instantaneous reserve is available within 60 seconds and must be available for 15 minutes.*[6]

26. The Electricity Governance Rules also include interruptible load as a category of instantaneous reserves, being "energy that is being consumed that is able to be disconnected" to maintain the system frequency at 50Hz.[7]

27. If generators make part of their generation capacity available for the provision instantaneous reserves then they cannot be using that capacity to also generate electricity. By definition, the capacity must be available and ready to generate electricity within 6 seconds or 60 seconds as appropriate. Providing instantaneous reserves therefore deprives the generator of the ability to earn revenue from selling its generation in the wholesale market. To ensure that sufficient instantaneous reserves are made available, generators are therefore paid for the provision of reserves.

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5 *Electricity Governance Rules*, 1 May 2010, Part A, p. 1.

6 Electricity Commission website http://www.electricitycommission.govt.nz/glossary, accessed on 5 August 2010.

7 *Electricity Governance Rules*, 1 May 2010, Part A, p. 27.

28. Similarly, the provision of interruptible load may impose costs on the parties that are disconnected, including costs such as loss of production. Providers of interruptible load are therefore also paid for the provision of reserves.

2.4. RECOVERING THE COSTS OF INSTANTANEOUS RESERVES

29. The cost of the payments for instantaneous reserves is recovered from market participants. The broad principle applied is that the costs are charged to the parties who make it necessary for the costs to be incurred. The Electricity Commission states:

> *The principle driving the cost allocation methodology for ... instantaneous reserves is to allocate costs to persons who "cause" the need and can act to reduce costs. The availability charges are allocated to [Transpower] (HVDC) and to generators with units over 60MW, as it is the possible failure of [those] assets... that give[s] rise to the need to procure instantaneous reserves and ensure co-ordination in the New Zealand [power] system to avoid cascade failure.*[8]

30. The HVDC link could, for example, be transferring electricity from the South Island to the North Island. When this occurs, from the perspective of the North Island HVAC system the HVDC is similar in effect to a generator located at Wellington. If there was a failure of part of the HVDC link when there were significant levels of power transfer then the effect would be the same as the loss of a generator of the same size capacity. It would be necessary for the System Operator to "dispatch" the Instantaneous Reserve to prevent failure of the entire system. Transpower, as owner of the HVDC link, is therefore allocated a share of the costs of instantaneous reserves just as is a generator.

3. TRANSPOWER'S ECONOMIC VALUE AND SELF-REGULATORY FRAMEWORK

31. For most of its history Transpower has been self-regulated, with no specific regulatory controls on either its overall level of revenue or its prices. In order to place some discipline around the level of prices it could charge and the returns that it could earn, a framework was put in place that was generally premised on contestable market principles. This framework included:

    31.1. the ODV valuation methodology (discussed in paragraphs 38-41 below); and

    31.2. the EV account mechanism for returning valuation gains and losses to consumers (discussed in paragraphs 42-49 below).

8 Electricity Commission, *Under-Frequency Event Charge Causer Determination*, Consultation Paper, April 2010, para 2.3.3, p. 7.

32. The EV account also incorporated changes in revenue due to volume risk and changes in the revenue requirement due to costs differing from forecast (discussed in paragraphs 50-53 below). In total, the EV account meant that over time Transpower would earn its WACC, and would not earn more or less than this amount. Wattie (2006) notes that:

> *over time, Transpower should generate sufficient cash to provide both debt and equity providers with returns equal to cost of capital. Returns in excess of cost of capital suggest that revenue and prices exceed those which would apply in competitive equilibrium. Returns below cost of capital mean investors are not being adequately compensated for the risks they bear in relation to the capital they have provided to the Company.*[9]

33. Transpower no longer undertakes periodic revaluations of its assets, so these are the only aspects of the original EV account mechanism that continue. However, revaluations remain a significant contributor to historical EV account balances.

3.1. Contestability, Perfect Competition, and Workable Competition

34. Given the debate that has occurred regarding the relevance of the contestable market model to regulation in New Zealand,[10] it is worthwhile recapping why the model is relevant. First, I note that the only necessary difference between perfect contestability and perfect competition is the number of incumbents in the market: perfect competition assumes that there are many small incumbent firms, whereas perfect contestability assumes that there is just one or a few incumbents. In all other respects the two models are essentially the same. In particular, entry to the market and exit from the market is costless and can occur instantaneously,[11] and producers and consumers have perfect foresight. This means that the same outcomes occur under perfect contestability as occur under perfect competition, and in particular that the firm will face incentives to maximise productive efficiency and prices will be set to maximise allocative efficiency.

9 Wattie, B., *Development and Application of EV Methodology to Revenue Setting*, PricewaterhouseCoopers, 27 February 2006, para. 3.14, p. 7.

10 See, for example, Yarrow, G., M. Cave, M. Pollitt, and J. Small, *Asset Valuation in Workably Competitive Markets*, A Report to the New Zealand Commerce Commission, May 2010, pp. 29-32.

11 See Baumol, William J. "Contestable Markets: An Uprising in the Theory of Industry Structure", *American Economic Review*, March 1982, 72(1), pp. 1-15. On p. 3 Baumol states "entry is absolutely free, *and exit is absolutely costless*" (emphasis in original).

35. Section 3(1) of the *Commerce Act* 1986 defines competition as "workable or effective competition". The Commission briefly summarises some aspects of the case law concerning workable competition.[12] In essence, the differences between workable competition and the standard of perfect competition or perfect contestability can be summarised as:

    35.1. Entry to the market and exit from a workably competitive market is not necessarily costless, a firm may incur sunk costs that cannot readily be recouped on exit from the market;

    35.2. Parties in a workably competitive market do not have perfect foresight, so producers must invest without being certain of future conditions;[13] and

    35.3. Resources are not always readily available in a workably competitive market and a potential entrant may have to wait for resources to become available before being able to enter the market.

36. As a result of the above differences, the adjustment process in a workably competitive market is not instantaneous and it may take a considerable passage of time for the market to reach equilibrium. As such, the courts have defined workable competition as a dynamic process.[14]

12 Commerce Commission, *Input Methodologies* (*Electricity Distribution Services*) *Draft Reasons Paper*, 18 June 2010, paras 2.6.14 and 2.6.15, p. 22.

13 For example, the definition of workable competition that the Commission cites (*supra*, para. 2.6.15) from *Fisher and Paykel Ltd v Commerce Commission* [1990] 2 NZLR 731, 759, includes the statement that "each participant is constrained to act efficiently and in its planning to take account of those other participants or likely entrants as **unknown quantities**" (emphasis added).

14 See, for example, *Re Queensland Co-operative Milling Association Ltd: Re Defiance Holdings Ltd* (QCMA) (1976) 8 ALR 481.

37. Notwithstanding these differences, the models of perfect competition and perfect contestability provide a benchmark against which to judge the efficiency of prices and price levels. There is some concern though that these "perfect" models do not allow firms to earn the "functional rents" that are required to provide the incentives for them to pursue beneficial economic activities, such as undertaking research and development, taking advantage of economies of scale to invest at a more highly than immediately required in anticipation of uncertain future demand growth, etc.[15] Nevertheless, the contestable market model is the model that underpinned Transpower's self-regulatory framework.

3.2. ASSET VALUATION

38. Transpower was originally an operating subsidiary of the Electricity Corporation of New Zealand (ECNZ). To facilitate the connection of independent generation to the New Zealand electricity system Transpower was first corporatised as a subsidiary to ECNZ (April 1988) and then on 1 July 1994 became an independent State Owned Enterprise (SOE).[16] Two related and important questions that needed to be addressed were: what the should be the valuation for Transpower's assets, and how should price levels be set on a reasonable basis?

39. Gale and McWha (2000) note that the first recommendation on the valuation of Transpower assets was made by Southpac in April 1990, who recommended the use of optimised depreciated replacement cost (ODRC).[17] In December 1990, Oxford Economic Research Associates (Oxera) and Ernst & Young then developed the ODV methodology, which caps asset valuations at the lesser of ODRC and the cost of an alternative means of supply.[18]

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15 In *Telecom Corporation of New Zealand Limited v Commerce Commission* (1991) 4 TCLR 473 the High Court discussed the concept of functionless rents, which were described as "monopoly rents, supra-normal profits that arise neither from cost savings nor innovation". By implication those rents that do arise from cost savings and innovation have a positive economic function. See also Evans, L. "The Efficiency Test Under Competition Law and Regulation in the Small Distant Open Economy that is New Zealand", invited paper, *New Zealand Economic Papers*, 38(2), December 2004, pp. 241-264, who states that "[the function of profits is as] the catalyst to competition, entry and innovation that enhances dynamic efficiency."

16 Ministry of Economic Development, *Chronology of New Zealand Electricity Reform*, the main developments in New Zealand's electricity reforms to October 2004, Electricity Group, Resources and Networks Branch, April 2005.

17 Gale, S. and V. McWha (2000), *The Origins of ODV*, Report to Air NZ, NZ Institute of Economic Research, August, pp. 1, 5-6.

18 *Ibid*.

40. The ODV methodology is a sophisticated subset of what can be broadly considered to be current cost accounting methods of asset valuation. One of the earlier uses of current cost accounting in regulatory contexts was the Byatt Report's introduction of the term "Modern Equivalent Asset" in the United Kingdom in 1986.[19] The concept of Modern Equivalent Asset was carried over into New Zealand's Optimised Depreciated Replacement Cost (ODRC) regime. The general process for ODV valuations is:[20]

    40.1. Optimise the system so that redundant assets are removed, excess capacity is removed, and where appropriate a more efficient asset configuration is employed;

    40.2. Value the optimised assets at the value of modern equivalent assets (MEA). This provides the Optimised Replacement Cost;

    40.3. Depreciate the assets valued at MEA so that they have the same residual life as the physical system. This provides the ODRC; and

    40.4. Test that there is not a cheaper alternative way of providing the service. If there is, then value the assets at the cost of that alternative. This provides the ODV value.

41. The efficient entrant concept is entirely consistent with the principles underlying the ODV valuation: in a contestable market an efficient entrant would be able to enter the market and price below any incumbent that was seeking to recover the value of assets that were not necessary for delivering the service. As a result the value of such assets would be written off ("optimised out" in the language of ODV valuations). The relationship between ODV/ODRC valuations and contestable markets is explicitly recognised by the *ODV Handbook*:

    the ODV method assumes a hypothetical operating environment where the relevant market is contestable and there are no material barriers to entry into that market by an alternative service provider or efficient new entrant. In such a situation the incumbent ELB's revenue could not exceed the amounts customers would need to pay an efficient new entrant employing a sustainable, cost reflective pricing strategy.[21]

19 Byatt, I.C.R. (chair), (1986) *Accounting for Economic Costs and Changing Prices: A Report to HM Treasury by an Advisory Group*, Volumes I and II, (London: HMSO).

20 For a more comprehensive description of the process see the *ODV Handbook*, para. 1.7, pp.8-9.

21 *ODV Handbook*, para. 1.2, p. 7.

3.3. REVALUATIONS AND THE EV ACCOUNT

42. One criticism that is sometimes levelled at ODV and other current cost valuation frameworks for regulated assets is that when replacement costs are increasing these valuation frameworks allow the regulated supplier to set its prices on the basis of the higher replacement costs, and thus earn a return on capital that was never invested. On this basis the critics of ODV make claims of monopoly pricing.[22] This view is only correct if the process of setting revenue and prices makes no adjustment for revaluation gains and losses. However, if pricing and revenue setting is based on a more complete implementation of the contestable market model then the view is incorrect.

43. Assume that the incumbent firms in a contestable market price at the long term equilibrium level and thus earn the normal rate of return. Assume then that some situation arises which means that replacement costs will increase in future. Replacement costs set the cost of entry, and an increase in future entry costs means that future equilibrium prices will also rise. Recall that parties in a contestable market have perfect foresight, so they can perfectly anticipate both the increase in replacement costs and the consequent increases in equilibrium prices. If an incumbent leaves its current prices unchanged, then it will earn normal profits at the current price level, but will earn positive profits at the new higher level. Potential entrants also know this, and know that they too can earn positive profits by entering the market at the existing price level (or by undercutting the incumbents). The prospect of entry therefore forces the incumbent firms to lower their existing prices. The reduction in prices will be such that the net present value (NPV) of the reduction in revenue from lower prices is exactly equal to the NPV of the expected increase in revenue due to higher future replacement costs. The net result of this is that increases in asset values due to increases in replacement costs are treated as income by the incumbent firm(s), and prices to consumers are reduced to reflect this income.

44. If, however, a firm in a contestable market constructs assets which are not required to serve the market then it will not be able to raise prices to earn a return on the inefficiently high costs. The moment it raises prices the potential entrants will enter the market and take away the incumbent's sales. More genereally, any write-down in asset values to reflect assets which are not required to serve the market cannot be passed on to customers and must instead be borne by investors in the firm.

22 This seems to be the fundamental premise of Betram, G., I. Dempster, and S. Terry, *Pipeline Profits: Gas Pipeline Rates of Return*, Simon Terry Associates Ltd, July 2001. See particularly the discussion on pp. 27-32, including the specific comment that "increases in asset values... actually [secure] a far higher Internal Rate of Return on the initial investment committment" (p. 28). Yarrow et al (2010:30) appear to make the same assumption when they discuss "re-distribution of income from consumers to shareholders."

45. The Commerce Commission has adopted a regulatory framework that is consistent with the behaviour described in paragraph 43, treating revaluation gains as income when evaluating the profitability of electricity lines businesses.[23]

46. Transpower's self-regulatory framework pre-dates the previous Part 4A and the current Part 4 regulatory frameworks. Long before the issue had ever been considered by the Commission, Transpower generally treated revaluation gains as income (and symetrically treated writedowns as losses). Consistent with the contestable markets model, Transpower did not pass all revaluation gains and losses to the customer. Revaluation gains and losses were classified into two categories:[24]

    46.1. broadly, those revaluation gains and losses that would have a market-wide impact in a contestable market – such as changes in replacement costs which would alter the cost of entry – were allocated to consumers; and

    46.2. those revaluation gains and losses that were due to supplier-specific inefficiencies – such as assets being optimised out of the asset base, or optimised to a lower capacity – were allocated to Transpower's shareholder.

47. By this means Transpower's customers would not pay for assets that were not required or were overbuilt, and the treatment of other valuation gains and losses as income meant that Transpower would not earn excess returns.

48. The mechanism that Transpower used to incorporate the impacts of revaluations into its revenue setting process was the "Economic Value Account" (EV account). The balance of the EV account was forecast and a portion of the average balance was returned to customers (if in the customers' favour) or added to the revenue requirement (if in Transpower's favour).

49. As part of its 2008 Administrative Settlement with the Commerce Commission, Transpower ceased making periodic revaluations of its assets from 1 July 2007,[25] so asset revaluations no longer contribute to annual movements in the EV account balances, but they are a significant contributor to historical balances.

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23 Commerce Commission, *Input Methodologies (Electricity Distribution) Emerging Views Paper*, 23 December 2009, p. 40.

24 The economic value accounts included Transpower's annual reports would typically include the note that "Asset revaluations arising from adjustments such as optimisations and economic value adjustments are not passed on to customers but are attributable solely to the shareholder." See, for example, Transpower, "Memorandum Accumulated Economic Gain (Loss) Account", *Annual Report 1999/00*, p. 69.

25 Commerce Commission, *Decision and Reasons for Not Declaring Control of Transpower New Zealand Limited & Decision to Reset Transpower's Thresholds*, 13 May 2008, para. 290-293, pp. 63-64.

3.4. OTHER CONTRIBUTIONS TO THE EV ACCOUNT

50. In addition to revaluations, two important components of the annual change in the balance of the EV mechanism were:

    50.1. The difference between revenue actually received and an ex-post calculation of Transpower's revenue requirement using actual costs;[26] and

    50.2. Interest charged on the EV account balance. Where the EV account balance was in the customers' favour Transpower would pay interest to customers; and where the EV account balance was in Transpower's favour, Transpower would charge exactly the same rate of interest to customers.

51. Because Transpower no longer revalues its assets, the elements in paragraph 50 are the key remaining drivers of the EV account.

52. The effect of paragraph 50.1 is that:

    52.1. Transpower does not bear any volume risk – if volume is lower than forecast and revenue is consequently lower, then the shortfall in revenue is added to the EV account and recovered in future years;[27]

    52.2. Transpower does not bear any cost risk – if costs (including allocations of cost) are higher than forecast then the difference would be added to the EV account and recovered from customers in future years.

53. The absence of any cost risk for Transpower does not provide any incentives for Transpower to manage costs, and is not consistent with outcomes in a competitive market or a contestable market. The Commission recognised this during the Adminstrative Settlement negotiations and, as part of the Threshholds giving effect to the Settlement, it imposed an operating expenditure cap on Transpower.[28]

54. At an aggregate level, this means that Transpower now bears the risk of costs being higher than the agreed cap (or receives the benefit of costs being lower than the cap), while customers bear the volume risk.

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26 This is defined in the *Transpower Thresholds Notice 2008*, pp. 2795-2796, as the "ex-post economic gain or loss" and is separately calculated for HVAC and HVDC customers.

27 Similarly, if volume is higher than forecasts and revenue is consequently higher, then the excess revenue is deducted from the EV account and provides a credit that lowers customer charges in future years.

28 *Transpower Thresholds Notice 2008*, definition of "indexed opex" p. 2797, and section 6(3), p. 2812.

55. This also means that *in aggregate* Transpower's customers do not bear cost risk.[29] However, in practice because Transpower's customers are split into two distinct groups – HVAC customers and HVDC customers – each group of customers conitnues to face costs risks as Transpower can vary cost allocations between those two groups. I show in section 4 below that this has resulted in very significant increases in the costs allocated to HVDC customers and consequential increases in EV account balances that are not consistent with competitive market outcomes.

3.5. SEPARATE EV ACCOUNTS FOR HVAC AND HVDC

56. A further general implication of the competitive and contestable market models is that the costs of serving a particular group of customers should be recovered from that group of customers and not from some other group of customers. For Transpower the two groups of customers are HVAC customers and HVDC customers. If, for example, the HVDC revenue requirement calculated using "year-end costs" reflects the true cost of serving HVDC customers,[30] then the difference between actual revenue and that revenue requirement is an economic gain or loss that should be attributed to HVDC customers (and the same principle applies in relation to HVAC customers). For that reason Transpower has maintained separate EV accounts for HVAC and HVDC customers, and this approach is required by the *Transpower Thresholds Notice 2008*. (although as a practical matter that information has not always been transparently presented to HVDC customers – see paragraphs 61 and 62 below).

29 The exception is pass-through costs which the Commission has deemed should be borne in full by Transpower's customers.

30 The *Transpower Thresholds Notice 2008* defines a "year end revenue requirement", "substituting actual data for forecast data where appropriate". See, for example, the HVDC year end revenue requirement, p. 2797.

3.6. TRANSPOWER'S HISTORICAL EV ACCOUNTS

57. The measurement of Transpower's economic gains and losses commenced when Transpower became an independent SOE on 1 July 1994.[31] By 30 June 1997 the accumulated losses attributed to customers stood at $146.1m.[32] Transpower then revalued its assets and recorded a $448.5m downwards revaluation of its assets.[33] Coupled with other economic losses the total economic loss for the 1997/98 year was $533.5m,[34] and after adding interest the accumulated losses attributed to customers at 30 June 1998 were a total of $695.7m.[35]

58. Transpower officially stated that "Directors consider that accumulated economic value losses at 30 June 1998 are not recoverable from customers at this time,"[36] and reset the balance of the EV account to zero.[37]

59. I have not been able to locate a copy of Transpower's 1998 ODV valuation, so I have not been able to identify the precise reasons for the large downwards revaluation.[38] However, in my experience of working on Transpower's HVDC pricing I became aware that changes in the assumed optimal configuration of the HVDC link could have significant impacts on the MEA values and hence the ODV of the link. To the extent that the change in valuation reflected assumptions that arguably should have applied from 1 July 1994, the change in valuation was not so much a "revaluation" that should have been treated as income, as a restatement of values to a level that more accurately reflected what the value of Transpower's assets should have been. If that was the case, then valuations for prior periods could also have been restated (downwards), which may have had the effect of turning the recorded economic losses into economic profits.

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31 Transpower New Zealand Ltd, "Economic Value Statements", *Annual Report 1997/98*, p. 75.

32 Op. cit, p. 78.

33 Op. cit., p. 71.

34 Op. cit., p. 72.

35 Op. cit., p. 77.

36 Transpower New Zealand Ltd, *Annual Report 1997/98*, p. 6.

37 Transpower New Zealand Ltd, "Economic Value Statements", *Annual Report 1997/98*, p. 78.

38 Neither Contact Energy Ltd nor Meridian Energy Ltd had a copy of the relevant valuation report, and neither did the Energy Library (www.energylibrary.org.nz).

60. As a rough order-of-magnitude calculation, Transpower's WACC in 1998 was 8.3%, the reduction in asset values was $448.5m, and depreciation and the "service potential adjustment" was 7.1% of the value of long term assets.[39] The reduction in asset values would therefore result in an approximate annual reduction in revenue of (8.3% + 7.1%) x $448.5m = $69.1m. Over the three years 1994/95, 1995/96, and 1996/97 this is a cumulative difference of $207.3m, which is greater than the accumulated economic losses.[40] It is possible, therefore, that writing off the EV account balance was a more profitable action than restating historical positions that might result in an EV account balance in the customers' favour. Furthermore, to the extent that a significant portion of the revalaution may have been related to the HVDC link, restating the historical asset values and EV account balances may have resulted in a credit balance owing from Transpower to HVDC customers.

61. Since 1 July 1998 Transpower appears to have continued to maintain the EV account, and to maintain separate HVAC and HVDC accounts, although the information on the account has not always been published,[41] and until the *Transpower Thresholds Notice 2008*, no information was published on the separate HVAC and HVDC accounts (from the information available it appears that only the aggregate was ever published).

62. Transpower claims that in 2004 it again set the value of the EV account to zero,[42] but other information provided by Transpower indicates that this did not happen for the HVDC EV account.[43]

63. From 2004 Transpower has maintained the EV account balances as I have described in paragraphs 46-53 above.

4. COMPETITIVE MARKET OUTCOMES AND THE EV ACCOUNT BALANCES

64. I have been asked to provide my opinion on whether the change in EV account balances is consistent with what would be observed in a competitive market. To perform that assessment I:

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39 Transpower New Zealand Ltd, "Economic Value Statements", *Annual Report 1997/98.* That document provides: depreciation = $22.4m, service potential adjustment = $138.3m, and the value of long term assets = $2,264.2m. Depreciation and the service potential adjustment are (22.4 + 138.8)/2,264.2 = 7.10% of the value of long term assets.

40 Note that this calculation does not include any interest charged on EV account balances.

41 There are Economic Value Statements in Transpower's *Annual Report* for 1999/2000, 2000/01, 2001/02, 2002/03, but not 2003/04, 2004/05. The *Annual Report* 2005/06 reported the aggregate balance (p. 56) but contained no details on the calculation.

42 Transpower, *Annual Report* 2004/05, p. 5.

43 See Appendix C.

64.1. Consider the outcomes that would be consistent with outcomes in a competitive market;

64.2. Summarise the changes in Transpower's actual and allocated operating expenditure (opex) for the period 2007-2009;

64.3. Demonstrate that the changes in allocated opex are not consistent with competitive market outcomes; and

64.4. Calculate the EV account balances that would arise with an allocation of opex that is consistent with a competitive market.

4.1. COMPETITIVE MARKET OUTCOMES

65. In a competitive market we would observe the following outcomes:

65.1. Prices will generally reflect costs and thus will increase (or decrease) when the costs of all suppliers increase (or decrease);

65.2. Where a supplier inefficiently incurs additional costs it will not be able to recover those costs through higher prices;

65.3. An increase in the costs of serving one group of customers will not result in a decrease in the price charged to a different group of customers.

66. One of the most fundamental outcomes of a competitive market is that over time the process of competitive rivalry drives prices towards the long-run cost of entry.[44] If prices are higher than cost, then investors are able to enter the market and earn a higher than normal return. The prospect of abnormally high returns attracts new entry and the additional supply caused by new entry then drives prices down. It is only when prices have been driven down to the point where they are equal to cost that new entry ceases.[45]

44 Entry-related costs in this sense include a reasonable return on capital that reflects the risks faced by investors and alternative investment opportunities.

45 Baumol, W.J. and A.S. Blinder, *Economics: Principles and Policy*, South-Western Cengage Learning Inc., 11th ed., 2009, p. 208.

67. In long run equilibrium in a competitive market all firms are operating at the point where there average total cost (i.e total cost per unit of output) at a minimum.[46] As discussed in paragraph 66 above, price is also equal to cost in long-run equilibrium. This means that any cost increase will result in all firms incurring a loss. The only way to avoid the loss is to raise prices, and because all suppliers face the increase in cost, they will all have the same incentive to raise prices. Thus if there is an increase in costs faced by all suppliers, prices will rise to reflect the new general level of cost.

68. It might be thought that when the general level of cost increases a firm might be tempted to delay raising its prices, thereby capturing a larger share of the market. While the firm might well temporarily capture a larger market share, each sale will be at a loss (with price being below cost). For this to be a profitable strategy the firm would need to be able to earn abnormally high profits in the future that must at least offset the losses incurred by selling at a price below cost. But because the market is competitive any abnormally high profits will attract entry. The only chance of the strategy being successful requires that at least some other suppliers exit the market during the period of below-cost pricing, and subsequent re-entry into the market is slow. Slow re-entry suggests that such a market is not actually competitive. Under competitive market conditions it will not be possible to recoup the deliberately incurred loss, so firms will raise prices as soon as they believe that there has been an increase in the general level of cost.

69. Where a supplier inefficiently incurs costs above the general level it will not be able to recover those costs and will therefore incur a loss. If the supplier tries to increase price to reflect its own idiosyncratic costs then it will be setting its price above the general level. Consumers will abandon the high-cost high-price supplier in favour of those pricing at the general level. The high-cost supplier therefore has no choice but to price at the general level. This outcome of competitive markets provides incentives for firms to operate efficiently and not to incur inefficient costs that are not generally incurred by other suppliers.

70. As I have discussed above, prices in a competitive market will reflect the general level of cost of providing the relevant goods or services. If a supplier reduces price below cost for one set of products, then it will make a loss, with no expectation of being able to earn a higher return in future to offset that loss. Similarly if a supplier increases price above the general level of cost for a set of products, then it will lose the sales of that product. It follows that an idiosyncratic increase in costs for a Product "X" will neither result in an increase in the price of Product X nor a decrease in the price of a separate Product "Y", as both actions will result in the firm incurring a larger loss than just the loss resulting from the idiosyncratic costs. Such pricing behaviour can only be sustained when the supplier is able to engage in cross-subsidisation because the market is not competitive.

46 *Op. cit.*, p. 212.

4.2. SUMMARY OF CHANGES IN OPERATING EXPENDITURE

71. I include as **Appendix C** Transpower's calculation of the EV account balances for 2007 through to 2009.

72. For ease of reference I have extracted the operating costs from **Appendix C** and presented them as Table 3 in **Appendix D**.

73. Under the *Transpower Thresholds Notice 2008*, increases in Transpower's allowed opex was capped at the rate of increase in the consumers price index (CPI),[47] which was 4.0% for the 2008 year and 1.9% for the 2009 year.[48] The CPI cap on allowed opex broadly provides a measure of the increase in the general level of costs that might be expected in a competitive market. The corresponding increases in allowed opex were $8.0m from 2007 to 2008 and a further $3.9m from 2008 to 2009.[49]

74. For the HVAC system:

    74.1. Actual operating costs increased by $16.9m or 10.1% from 2007 to 2008, and by a further $17.5m or 9.5%from 2008 to 2009.[50]

    74.2. Although actual opex increased by more than the capped rate for total opex, Transpower *reduced* the allocation of opex to HVAC customers by $0.85m or 0.47% from 2007 to 2008, and by a further $3.72m or 2.08% from 2008 to 2009.[51]

75. For the HVDC system:

    75.1. Actual operating costs for the HVDC system increased by $11.20m or 58.6% from 2007 to 2008, and by a further $12.4m or 40.9% from 2008 to 2009.[52]

    75.2. Transpower's allocation of opex to HVDC customers increased by $8.9m or 43.5% from 2007 to 2008, and by a further $7.6m or 26.1% from 2008 to 2009.[53]

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47 *Transpower Thresholds Notice 2008*, definition of "indexed opex" p. 2797.

48 Statistics New Zealand, "Table 1", *Consumers Price Index: June 2010 Quarter – Tables*, 16 July 2010. The annual change in the "all groups" CPI for the year ended June 2008 is 4.0%. The annual change in the "all groups" CPI for the year ended June 2009 is 1.9%.

49 Table 3, Appendix D.

50 *Ibid*.

51 *Ibid*.

52 *Ibid*.

53 *Ibid*.

76. The practical effect of the changes in allocated opex were to increase the deficit in the HVDC EV account balance by more than it otherwise would have increased, and to allow a greater reduction (and credit) in the HVAC EV account balance.

4.3. CHANGES IN ALLOCATED OPEX ARE NOT CONSISTENT WITH COMPETITIVE MARKET OUTCOMES

77. The primary reason for the increase in actual operating costs for the HVDC link was the increase in "instantaneous reserves" costs that had to be borne by Transpower after it decommissioned "Pole 1" of the HVDC link. Transpower applied to the Commission for permission to pass the increase in costs through to customers, but was declined. The Commission stated that:

> *the incentive to manage risk and manage costs appropriately, as provided by the [Administrative Settlement between the Commission and Transpower], is consistent with the concept that a well-functioning workably competitive market would apply the risk to those who can best manage those risks. Encouraging Transpower to manage its risk and costs provides Transpower with incentives to improve efficiency and provide services at a quality that reflects consumer demands (consistent with section 52A(1)(ii)).*[54]
>
> *the charging methodology of instantaneous reserve costs set out in the Rules has been designed to provide Transpower with the incentives to manage the risk caused by the services it provides. Transpower is responsible for planning the grid and is in the best position to manage both the risks and associated costs. Rules 11.5.1 to 11.5.3 therefore promote the objectives of the Purpose Statement by providing Transpower with the right incentives to innovate and invest in its assets in order to manage the likelihood of its exogenous events;*[55]
>
> *allowing Transpower to pass through these instantaneous reserve costs would provide poor incentives for Transpower's future behaviour for investment decisions. Such a decision would not provide regulated entities with the incentives to innovate and invest in their assets and to provide services at a quality that reflects consumer demands for the long-term benefit of consumers.* [56]

78. The Commission decided that the increase in HVDC costs was not consistent with the costs that would be recoverable in a competitive market, and allowing recovery of those costs would not provide Transpower with the appropriate incentives to manage risk or invest appropriately. In the terminology that I have used in paragraphs 65-70, the additional instantaneous reserves costs can be considered to be "idiosyncratic costs", borne by Transpower because of decisions that it made, but not being reflective of the general level of cost that would prevail in a competitive market.

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54 *Instantaneous Reserves Decision*, para. 115, p. 25.

55 *Instantaneous Reserves Decision*, para. 130, p. 29.

56 *Instantaneous Reserves Decision*, para. 130, p. 30.

79. Although the Commission disallowed recovery of the additional instantaneous reserves costs Transpower continued to include them in the formula that it used to allocate the capped allowed opex (this is shown in row "[g] Ancillary Services" in Table 1 in Appendix C). The result was that the opex allocated to HVAC customers fell, even though the actual opex for those customers increased at a rate greater than the CPI cap on allowed opex. Given that costs for the HVAC system increased by more than the CPI cap (which is a proxy for the cost increase expected in a competitive market), the competitive market outcome would be that allocated costs increased by CPI, with the additional increase in costs being unrecoverable (i.e. a loss to Transpower).

80. To the extent that the CPI cap is a proxy for a competitive market I would therefore expect the allocation of allowed opex to HVAC customers to increase by 4.0% or $7.2m from 2007 to 2008 and 1.9% or $3.5m from 2008 to 2009, with a value of $189.9m in 2009. This is considerably higher than the $174.7m allocated by Transpower. The corresponding increases in HVDC costs would be 4.0% or 0.8m from 2007 to 2008 and 1.9% or $0.4m from 2008 to 2009, with a value of $21.6m in 2009. This is considerably less than the $36.8m allocated by Transpower.

81. This analysis suggests that there might be just one possible allocation of cost between the HVAC and HVDC systems. However, there are a range of allocations possible that are consistent with a workably competitive market, and a CPI cap might not be the best proxy. Transpower can be considered to be jointly producing two sets of regulated services: HVAC transmission and HVDC transmission. In a workably competitive market these services would be priced between incremental cost and stand alone cost.[57] The incremental cost of a service is the difference in the regulated supplier's costs with and without the service supplied.[58] Equivalently, the incremental cost of a service is the additional cost that the firm incurs in supplying that service when it already provides other services. The stand-alone cost is the cost of supplying just that service, standing alone.[59] Where there are common costs that are incurred once, for the supply of either one or both services then stand-alone cost will be greater than incremental cost.

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57 Price must be at least equal to incremental cost, otherwise firms would incur a loss when selling the product or service and would exit the market. This would contract supply and allow prices to rise. Prices must also be no more than stand-alone cost. If prices are greater than stand-alone cost then a firm producing just the relevant product or service could enter the market and compete prices down to the point where they were equal to its cost (which is, by definition, stand-alone cost).

58 Note the similarity to "average incremental cost" from Baumol, W.J. and J.G. Sidak, "The Pricing of Inputs Sold to Competitors", *Yale J. On Reg.* 11(1), Winter 1994, p. 176. Baumol and Sidak (1994) divide incremental cost as defined here by the output of the service to obtain average incremental cost. Our concern is with allocating the cost in total rather than the per-unit cost so there is no need to divide by the unit output.

59 Baumol and Sidak (1994), p. 177.

82. Common costs will include costs such as those often classed as “admin and general” costs. In some instances there may be significant sharing of assets between the two services, in which case there would also be asset related costs that would be classed as common costs. I understand that this is not the case for the HVAC and HVDC services, as provision of the two services requires distinctly different assets. In the case of the HVAC and HVDC services the only common costs appear to be those classed as “admin and general”.

83. If a firm in a workably competitive market prices a service below incremental cost then it will make a loss on each unit sold, and as I have discussed in paragraph 70 the firm will not have any expectation of being able to recover that loss in the future. If a firm in a workably competitive market sets a price above stand-alone cost then consumers will be able to purchase the service at a cheaper price from other suppliers, including those that might enter the market to supply just that service.

84. I note at this point that allocating costs to the HVDC link on a stand-alone cost basis is implicitly treating the HVDC link as if it was owned and operated by a separate regulated supplier (i.e., a notional entity other than Transpower). The cost allocations that would occur in a competitive market would not exceed the costs incurred by such a supplier. I understand that given the distinct nature of the HVDC link it would be feasible and practical to implement such arrangements, and this would also be consistent with Transpower’s practice of charging separate prices for the HVAC and HVDC systems.

85. Given the information in Transpower’s EV calculation (Appendix C) I estimate that the incremental cost for the HVDC system has fallen from $41.0m in 2007 to $36.8m in 2008 to $34.2m in 2009. These figures exclude the increase in ancillary services costs which the Commerce Commission ruled was unrecoverable. It is more difficult to estimate stand-alone costs, as it is necessary to estimate the “admin and general costs” which would be incurred by a company that was only supplying the HVDC system. It is difficult to establish exactly what the magnitude of these costs would be, but I note that most costs related to the HVDC are already included as direct costs and only a relatively simple central administrative structure would be required. It seems unlikely, however, that these costs would exceed $3m per annum, which is ten times higher than the allocation currently received by the HVDC.[60]

86. Where two products or services are jointly provided then the interactions of supply and demand in the two markets will determine the level of common costs between the two services. It is unlikely that either product would be supplied at a price equal to stand-alone cost. In its discussion of cost allocation in the *Input Methodologies* (*Electricity Distribution Services*) *Draft Reasons Paper*, the Commission notes:

60 For the current allocation to the HVDC see row [f] “A+G” in Transpower’s calculation in Appendix C.

In the extreme theoretical case where the demand for one service is perfectly price inelastic (i.e. demand for the service remains unchanged in response to a change in price) and demand for another service is perfectly price elastic (i.e. demand collapses to zero in response to a price increase), Ramsey principles applied to cost allocation would suggest that all common costs should be allocated to one service and none to the other. Such a theoretically extreme outcome is, however, highly unlikely where the services are supplied in workably competitive markets, given that the extreme outcome involves the notion of perfectly elastic or inelastic prices.[61]

87. It follows that the estimates of Stand Alone Cost are an upper bound estimate of the costs that would be allocated in a competitive market, and provide an upper bound estimate of the EV account balance.

4.4. EV Account Balances Consistent with a Competitive Market

88. I have been asked to calculate the EV balances that I consider are consistent with competitive market outcomes. As there is not a single unique allocation of cost that would occur in a competitive market, I have calculated the EV balances using four approaches that could all be considered to be consistent with competitive market outcomes:

88.1. **Approach A**: the increase in instantaneous reserves costs is removed from the cost allocation calculation because, as identified by the Commission, that increase in costs would not be passed on to consumers in a workably competitive market. I then calculate the EV balances using Transpower's own allocation methodology;

88.2. **Approach B**: the allocated opex costs are indexed forwards at CPI from 2007 as this reflects the allowed increase in total allowed opex and is one proxy for how costs might be expected to move in a competitive market (see the discussion above in paragraphs 79 and 80);

88.3. **Approach C**: the costs allocated to the HVDC link are set equal to my estimate of stand-alone cost (see paragraph 85). The cost allocated to the HVAC system is the residual difference between total allowed opex and the allocation to the HVDC system. As noted in paragraph 86, the EV account balances calculated using the estimate of stand-alone cost are an upper bound estimate of the balances that would occur in a competitive market; and

61 Commerce Commission, *Input Methodologies* (*Electricity Distribution Services*) *Draft Reasons Paper*, 18 June 2010, para. 3.2.41, p. 52.

88.4. **Approach D**: the costs allocated to the HVDC link are set equal to incremental cost (see paragraph 85). As with Approach 3, the cost allocated to the HVAC system is the residual difference between total allowed opex and the allocation to the HVDC system. The EV account balances calculated using the estimate of incremental cost are a lower bound estimate of the balances that would occur in a competitive market.

89. Approaches A, C, and D all exclude recovery of the increased Instantaneous Reserves costs that the Commission has ruled are unrecoverable for the reasons discussed in paragraphs 77 and 78.

90. My calculations are provided in **Appendix E**. The resulting EV account balances under each approach are as follows:

90.1. **Approach A**: with no increase in ancillary service charges the EV account balances at the end of 2009 when applying Transpower's methodology are a $68.0m debit (owing from customers) for the HVDC, and a $74.0m credit (owing to customers) for the HVAC. The net balance of the EV account is a $6.0m credit at the end of 2009.

90.2. **Approach B**: with allocated opex constrained by a CPI cap, the EV account balances at the end of 2009 are a $78.9m debit (owing from customers) for the HVDC, and a $84.9m credit (owing to customers) for the HVAC. The net balance of the EV account is a $6.0m credit at the end of 2009.

90.3. **Approach C**: if the HVDC is allocated costs equal to Stand Alone Cost excluding the unrecoverable Instantaneous Reserves costs, then the EV account balances at the end of 2009 are a debit balance of $75.2m for the HVDC and a credit balance of $81.2m for the HVAC. The net balance of the EV account is a $6.0m credit at the end of 2009.

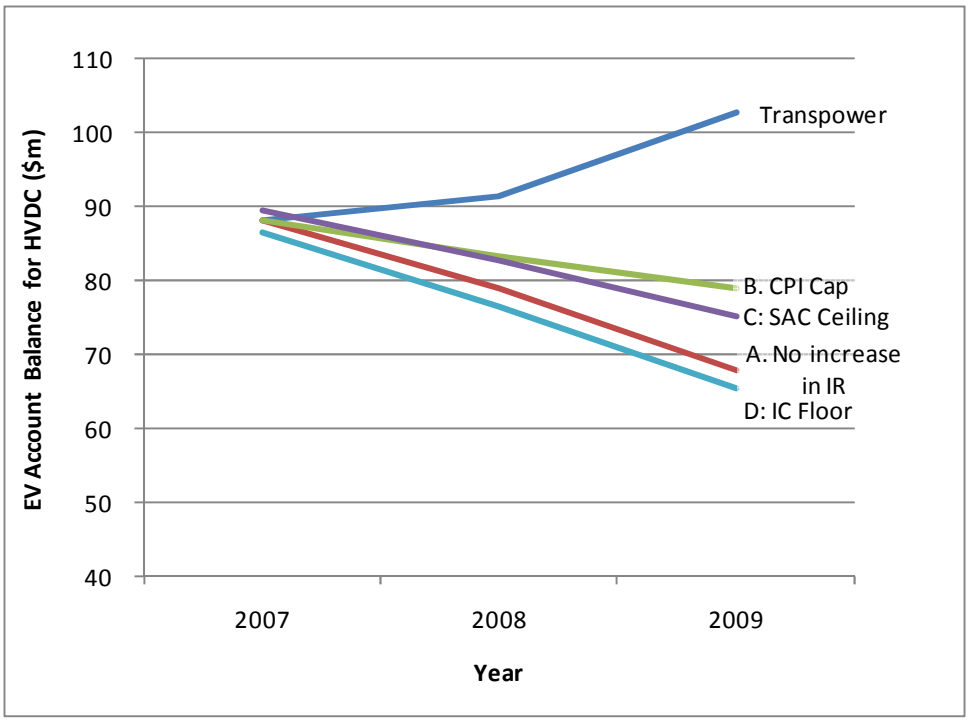
90.4. **Approach D**: if the HVDC is allocated costs equal to Incremental Cost excluding the unrecoverable Instantaneous Reserves costs, then the EV account balances at the end of 2009 are a debit balance of $65.5m for the HVDC and a credit balance of $71.5m for the HVDC. The net balance of the EV account is a $6.0m credit at the end of 2009.

91. I note first that the various approaches have no impact on the net balance of the EV account to be recovered by Transpower. All of the various approaches leave Transpower with a net credit balance of $6.0m at the end of 2009. The key issue is the allocation of that balance between customer groups and the extent to which Transpower's allocation of costs exceeds that which is consistent with an allocation that might occur in a competitive market.

92. The results under the various approaches are summarised in the chart in Figure 1 below. Under all four of the approaches that I have examined the EV account balance for the HVDC declines over time. The balance calculated with Approach A lies between the bounds provided by the Incremental Cost floor (Approach D) and the stand-alone cost ceiling (Approach C). The EV account balance calculated with the CPI cap (Approach B) exceeds the stand-alone cost ceiling because operating costs for the HVDC link have fallen with the removal of Pole 1 whereas the CPI cap allows allocated costs to continue to increase.

93. The most notable feature in Figure 1 is that the EV account balance for the HVDC obtained with Transpower's calculation rapidly rises well above the estimate of the stand-alone cost ceiling.

Figure 1: EV Account Balances for HVDC applying different approaches



94. Given the results of my analysis, I conclude that at the end of 2009 the EV account balance for HVDC customers should be a debit balance between $65.5m and $75.2m. A debit balance greater than that is not consistent with the costs that a firm would be able to recover in a competitive market.

95. From an economic perspective the appropriate bounds are provided by the incremental cost floor (Approach D) and the stand-alone cost ceiling (Approach C), and there is no reason to prefer one of those methods over the other. In this instance the CPI cap on HVDC operating expenditure (Option B) is not appropriate because it does not reflect the reduction in operating costs (and service) that occurred with the removal of Pole 1 from service. Workably competitive markets will not generally produce a long-run price that is equal to the extreme of either stand-alone cost or incremental cost, although in some circumstances prices may be close to those limits. Approach A, which calculates the EV account balance by excluding the Instantaneous Reserves costs, produces an outcome that lies between the bounds of incremental cost and stand-alone cost, and is consistent with the Commerce Commission's decision that the increase in Instantaneous Reserves costs should not be recovered by Transpower. On this basis Approach A may be the preferable approach to calculating the EV account balance for the HVDC.

5. INPUT METHODOLOGIES AND THE EV ACCOUNT

96. I have been asked to assess whether the proposed input methodologies for Transpower adequately address issues relevant to the EV balances.

97. Section 52T(1) of the Commerce Act specifies that "to the extent applicable for the type of regulation under consideration", there should be input methodologies for, *inter alia*, valuation of assets and for the "allocation of common costs, including between activities, businesses, consumer classes, and geographic areas". In my opinion both the asset valuation IM and the cost allocation IM should address relevant aspects of the EV account balances.

98. I discuss in paragraphs 100-105 below that, from an economic perspective, the EV account balances are an asset, and the Commission's approach to recovering those balances treats them as an asset. In my opinion it is appropriate, therefore, for the opening or initial value of the EV account balances to be addressed in the asset valuation IM and, that the input methodology should at the least specify that the opening or initial EV account balances should not exceed the balances that would occur if the respective service (HVAC or HVDC) was provided by a stand-alone regulated supplier.

99. The problems with the EV account balance for the HVDC have arisen because of Transpower's approach to cost allocation. There has also been no transparency in how the allocation was performed. In my opinion it is appropriate, therefore for the cost allocation IM for Transpower to treat the HVAC and HVDC services as separate activities or customer classes for which costs must be allocated, and require a transparent allocation of those costs. The IM should also specify relevant cost allocation principles.

5.1. ECONOMIC VIEW OF EV ACCOUNT BALANCES AS AN ASSET

100. From an economic perspective an asset is nothing more than something that generates a future stream of cash inflows. Conversely, a liability is something that generates a future stream of cash outflows.

101. Assets may be physical, financial, or intangible. Physical assets are buildings, plant, and machinery that are used for generating products and services that are then sold for profit. The major physical assets of electricity generators are the generation plants that are used to generate electricity.

102. Financial assets are generally financial contracts that generate a stream of future cash flows, such as a hedge contract or when a lender makes a loan to another party. Strictly speaking financial assets such as hedge contracts may be both assets and liabilities, but they are usually described as financial assets.

103. Intangible assets cannot be readily identified as a specific "thing" such as a physical piece of equipment or a financial contract, yet they still give rise to future cash flows. An example is "goodwill" which might reflect the brand reputation of the firm. A firm with a strong and well respected brand may be able to charge higher prices and earn higher revenues and cash flows because of that brand. Those higher cash flows are considered to be generated by the goodwill asset. Patents, copyrights, and customer lists are also considered to be intangible assets.

104. The Commission has considered the types of assets that should be included in the Regulated Asset Base (RAB) for Transpower. Transpower's physical "system fixed assets" are included. Certain intangible assets are included, but goodwill is specifically excluded.[62]

105. The EV account balances are financial assets, and the Commission has proposed a specific mechanism for the recovery of those assets, just as it has proposed a specific mechanism for the recovery of the costs of Transpower's physical assets. The value of the EV assets is proposed to be recovered via an annual addition to (or subtraction from) the Maximum Allowable Revenue (MAR) plus an annual interest charge on the balance of the account, charged at the Weighted Average Cost of Capital (WACC).[63] The value of Transpower's physical assets is recovered in the MAR via (a) an annual depreciation charge and (b) a capital charge calculated as the product of the RAB and the WACC.[64] The mechanisms for recovering the value of physical assets and for recovering EV assets (i.e. the EV account balances) are equivalent.

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62 *IPP Draft Reasons Paper*, para 2.4.1, p. 12.

63 The interest charge is specified at *IPP Draft Reasons Paper*, 3.9.5.

64 See, for example, the formula at *IPP Draft Reasons Paper*, para 3.5.3, p. 21. The formula refers to the "Building Blocks Allowed Revenue", but is the same formula that is used for deriving the MAR.

106. The Commerce Commission's draft decision is that the initial RAB value (i.e. the RAB that applies from 1 July 2011) for Transpower is the closing value from the previous regulatory period, being the value that was established pursuant to the Administrative Settlement between Transpower and the Commission and formalised in the *Transpower Thresholds Notice 2008*.[65] In reaching this decision the Commission is able to rely on: (a) its review of the RAB as at the start of the Administrative Settlement; (b) the agreed processes for including capital expenditure in the asset base; and (c) the specified method of depreciation. The initial RAB will therefore be consistent with the prior decisions of the Commission.

107. The *IM Draft Reasons Paper* does not explicitly consider the EV account balances. Instead, the EV account balances are addressed in the *IPP Draft Reasons Paper*. The Commerce Commission's draft decision is that the initial value of the EV account balances is the closing value from the previous regulatory period:

> *the balances at the end of the settlement, including any ex-post economic gains or losses for the 2010/11 financial year, should be carried forward to be the opening balances for the start of the regulatory period 2011/12.*[66]

108. In reaching its draft decision, the Commission relies on: (a) the opening balances in the respective HVAC and HVDC EV accounts as at the start of the Administrative Settlement (1 July 2008), and (b) that

> *Since that time, changes to the EV accounts have been carried out in accordance with the requirements of the settlement.*[67]

109. However, the *Transpower Thresholds Notice 2008* only states that operating costs are to be "allocated between the [HVAC] revenue requirement and the HVDC revenue requirement".[68] The *Transpower Thresholds Notice 2008* does not contain any provisions specifying how the costs should be allocated or the principles that the allocation should comply with. I agree that Transpower has allocated its operating costs between HVAC and HVDC, as it was entitled to do, but in the absence of guiding principles there is no guarantee that the allocations or resulting EV account balances are either efficient or consistent with competitive market outcomes.

65 *IM Draft Reasons Paper*, para 4.3.1, p. 32.

66 *IPP Draft Reasons Paper*, para 3.9.14, p. 29.

67 *Ibid*.

68 *Transpower Thresholds Notice 2008*, p. 2812.

110. I note that the opening value of the RAB (physical assets) at the start of the Administrative Settlement was derived using the ODV methodology, which as I have described in paragraph 41 is based on competitive market outcomes. The EV account balances should also be valued appropriately, and under the Commerce Act it is appropriate that the competitive market outcomes are the benchmark for that valuation.

111. My analysis in paragraphs 88-95 suggests that the HVDC EV account balance is neither consistent with competitive market outcomes nor consistent with the balance that would have occured if the HVDC was owned and operated by a stand-alone regulated supplier.

112. In my opinion, therefore, the asset valuation IM for Transpower should require the recalculation of the EV account balances in accordance with defined cost allocation principles. Those principles should include that:

(1) all costs directly attributable to the HVAC or HVDC should be so allocated;

(2) consistent with the Instantaneous Reserves Decision, the increase in Instantaneous Reserves due to the removal of Pole 1 should not be recovered; and

(3) any allocation should be subject to a stand-alone cost constraint for the HVDC, calculated in accordance with (2) above.

113. The cost allocation principles should also specify the nature and type of cost allocator that is permissable.

5.2. Cost Allocation

114. The issues that I have identified with the EV account balance for the HVDC are a result of cost allocations. Just as these issues have arisen in the past, they could also arise in the future. HVAC customers and HVDC customers are different customer classes, and the HVAC system and the HVDC system can be considered to be separate activities, so in my opinion it is appropriate to specify a cost allocation IM which identifies HVAC and HVDC as separate activities or separate customer classes and requires an appropriate allocation of common cost between them.

115. This would mean that – just as occurs with electricity distribution services – there will be separate input methodologies for pricing and for cost allocation, with the pricing methodology potentially being under the jurisdiction of the Electricity Commission or its likely replacement the Electricity Authority. The cost allocation IM is a separate methodology that allocates the costs used for profitability analysis. In electricity distribution services and gas distribution services the cost allocation IM will be used to allocate costs between regulated services (such as electricity and gas distribution services) and unregulated services, as well as between different regulated services (i.e. potentially between electricity distribution services and gas distribution services).

116. Profitability analysis is at the heart of establishing the EV account balances, so a cost allocation IM is relevant to the EV account. The supply of transmission services on the HVAC system and the supply of transmission services on the HVDC system can be considered to be separate regulated services, and a cost allocation IM is required to ensure that common costs are allocated in an appropriate manner between the two services.

117. Under a cost allocation methodology Transpower would be required to select an appropriate allocator for allocating the "admin and general" costs between the HVAC and HVDC systems. The very nature of these costs as common costs means that there will not be a causal allocator available and Transpower will be required to select an appropriate proxy allocator.

118. As noted in paragraph 109, the *Transpower Thresholds Notice 2008* provides no guidance on how costs should be allocated. I have also reviewed Transpower's pricing publications as far back as December 2002, and have been unable to identify any discussion of how "admin and general" costs are allocated between the HVAC and HVDC systems. Transpower's publication *Pricing for Grid Connection Services*, December 2002, simply states:

> *The revenue requirement associated with overhead costs of the inter-island link forms part ofthe HVDC revenue requirement. It is allocated through the HVDC rate and hence through the HVDC charge to customers who inject electricity into the grid system in the South Island.*[69]

There is no discussion of how the allocation is performed.

119. Even the *Electricity Governance Rules* specify only that "HVDC Revenue" is determined by Transpower's Board "in accordance with Part 4A of the Commerce Act".[70] There is no further detail in the Rules regarding how the revenue requirement is calculated, and no directions as to cost allocation. In practice Transpower has applied a building blocks methodology to calculate the HVDC Revenue which is equivalent to the Commission's methodology for calculating the MAR. However, the approach used for allocating overhead costs is unspecified.

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69 Transpower New Zealand Ltd, *Pricing for Grid Connection Services from 1 April 2003*, p. 20.

70 *Electricity Governance Rules* consolidated as at 1 June 2010, Part F, Section IV, Schedule F5 Transmission Pricing Methodology, Appendix A, p. 234. Downloaded from http://www.electricitycommission.govt.nz/pdfs/rulesandregs/rules/rulespdf/completerules-1Jun10.pdf on 21 July 2010.

120. The lack of transparency identified in paragraphs 118 and 119 should be rectified by requiring Transpower to disclose its cost allocation methodology to the same level of detail as is required for EDBs. Given the significant difference between HVAC and HVDC customers, transparency would also be aided by requiring Transpower to disclose the methodology used for allocating costs between those two customer classes, rather than just between system operator activities and the supply of electricity lines services as required in the *IM Draft Determination*.[71] Cost allocation principles should be specified, as I have suggested in paragraphs 112 and 113.

5.3. CONCLUSIONS

121. I discussed in paragraphs 100-105 that, from an economic perspective, the EV account balances are an asset, and the Commission's approach to recovering those balances treats them as an asset. The Commission's draft determination is that the balance of assets carries over from the end of the current regulatory period (30 June 2011) to the start of the next regulatory period (1 July 2011), for both the RAB and the EV account balances. However, as I have shown earlier in paragraphs 88-95, the balance of the EV account for the HVDC is not consistent with the outcomes that might be expected in a competitive market, nor from a stand-alone regulated supplier given the Commission's determination that the increased Instantaneous Reserves costs could not be recovered by Transpower. Therefore, in my opinion, the Commission should revisit the cost allocations that led to the respective balances for the HVAC and HVDC accounts, and should specify in the asset valuation IM the cost allocation principles that should be followed in arriving at the opening or initial EV account balances, including that the allocation of cost to the HVDC should not exceed that which would occur if the HVDC service was provided by a stand-alone regulated supplier.

122. The problems with the EV account balance for the HVDC have arisen because of Transpower's approach to cost allocation. Transpower appears to have complied with all the relevant methodologies and rules that were placed on it, but the resulting allocation was not consistent with the outcomes that would be expected in a competitive market or would be expected if the HVDC service was provided by a stand-alone regulated supplier. There has also been no transparency in how the allocation was performed. In my opinion the cost allocation IM for Transpower should treat the HVAC and HVDC services as separate activities for which costs must be allocated, and require a transparent allocation of those costs. The Commission should also specify relevant cost allocation principles.

71 *IM Draft Determination*, Subpart 1 Cost Allocation, p. 5.

Andrew Shelley
8 August 2010

APPENDIX A: CURRICULUM VITAE

ANDREW SHELLEY

Consultant

MA (first class honours) Economics
Massey University

B.B.S. Information Systems
Massey University

Andrew Shelley is a regulatory economist with over 14 years experience analysing complex economic and regulatory issues for energy-intensive, network and infrastructure industries. His recent work focuses on analysing the firm's response to regulation, including the impact of New Zealand's proposed emissions trading scheme on energy-intensive and emissions-intensive firms, and the impact of formal price control on utility revenues, cash flows, and investment.

Andrew has particular expertise in the electricity and telecommunications industries. He has advised on electricity transmission and distribution regulatory issues such as asset valuation, cost of capital, revenue requirements, pricing structure, and cash flow modelling. In addition to providing regulatory advice he has appeared as an expert witness in commercial arbitrations relating to New Zealand's electricity market, and developed expert evidence for a number of court cases. He has also advised firms in industries such as gas transmission and distribution, forestry, postal services, and rail networks.

Mr. Shelley's previous employment includes the positions of Principal at CRA International, Senior Consultant at PHB Hagler Bailly Asia Pacific Ltd, Costing & Economics Manager at Telecom New Zealand Ltd, and Strategic Analyst and Pricing Analyst at Transpower New Zealand Ltd. Mr Shelley is located in Wellington, New Zealand.

PROFESSIONAL HISTORY

2008 – current	Consultant, CRA International Director, Andrew Shelley Economic Consulting Ltd Senior Consultant, Oakley Greenwood Pty Ltd
2001 – 2008	Senior Associate, Associate Principal, and Principal, CRA International
1999 – 2000	Senior Consultant, PHB Hagler Bailly – Asia Pacific Ltd
1998 – 1999	Costing and Economics Manager, Network Group, Telecom New Zealand
1995 – 1998	Pricing Analyst and Strategic Analyst, Transmission Services, Transpower New Zealand Ltd
1995	Analyst Programmer, Foodstuffs (Wellington)
1993 – 1994	Study for Master of Arts
1990 – 1993	Analyst Programmer, Farmers' Mutual Insurance Group

CONSULTING EXPERIENCE

Utility Price and Revenue Regulation

- Advising Unison Networks Ltd in its responses to the Commerce Commission's implementation of the price control provisions contained in the Commerce Ammendment Act. This has included preparation advice in respect of, and preparation of submissions in response to the Commission's consultations on "Regulatory Provisions of the Commerce Act", "Input Methodologies", regulatory taxation, asset valuation, and cost allocation.

- For Energex distribution network (Brisbane), development of a cost-based pricing model for regulated distribution services. This project also included the provision of advice on pricing policy, particularly with regard to developing prices that reflected the impact of demand growth on capital expenditure. Delivery of the pricing model also included provision of a user guide, technical documentation, and user training.

- On behalf of Unison Networks Ltd, preparation of a submission in response to the New Zealand Commerce Commission's initial proposals for resetting the price path and quality thresholds in 2009.

- Advising Vector Ltd on economic issues arising from the New Zealand Commerce Commission's draft decisions on price control for gas distribution services.

- For the Electricity Networks Association, preparation of a submission to the New Zealand Electricity Commission on Transpower's proposed transmission pricing methodology, and on proposed changes to the Benchmark Transmission Agreements.

- Advising a New Zealand generator on the principles of utility revenue requirements.

- Advising a New Zealand utility on issues of cost allocation related to setting regulated prices.

- For Vector Ltd, a detailed financial analysis of the implications of placing Vector under formal price control.

- For a New Zealand electricity lines business, development of a financial model to assess the relative performance of all electricity lines businesses under the Commerce Commission's CPI-X price path vs formal "building block" revenue regulation.

- Preparation of a series of expert reports for Unison Networks Ltd in response to the New Zealand Commerce Commission's draft intention to declare control of Unison, and for use by Unison in its subsequent Administrative Settlement negotiations. This work included analysis of the cost of capital, cash flows, financial ratios, and capital expenditure under various price control scenarios, as well valuation issues.

- An assessment of the costs and benefits of Transpower being placed under formal price control.

- Advising NGC on the calculation of excess profits, including detailed consideration of the theoretical basis for calculating excess profits, arguments on the treatment of gains on sale and the appropriate treatment tax effects.

- Advising a major Asian utility on recent developments in the regulation of infrastructure industries in selected countries.

- Developing a comprehensive financial model for an Australian Distribution Network Service Provider to analyse how the firm's financial performance would respond to different forms of regulation and price and revenue controls.

- Development of a comprehensive simulation model to assess the impact of a wide range of potential regulatory changes on a major Asian utility.

New Zealand Electricity Market and Transmission

- Advising a New Zealand electricity retailer and generator on economic issues related to the Ministerial Inquiry into the Wholesale Electricity Market.

- For a New Zealand electricity lines business, providing expert testimony in a commercial contract arbitration on the relationship between transmission charges and embedded generation.

- Advising Transpower on the appropriate discount rate for use in the Grid Investment Test.

- For the Electricity Networks Association, preparation of a submission to the New Zealand Electricity Commission on Transpower's proposed transmission pricing methodology, and on proposed changes to the Benchmark Transmission Agreements.

- Advice on forecast prices in the New Zealand wholesale electricity market.

- For Meridian Energy, analysing the magnitude of the potential benefits that might arise from the Electricity Commission encouraging investment in transmission alternatives.

- For a New Zealand electricity generator, preparation of a report on the economic consequences of short notice extension of transmission outages.

- For a New Zealand electricity market participant, providing a review of the principles of electricity transmission pricing.

- Critique of Transpower's valuation and pricing for a small New Zealand electricity lines business. This work included a detailed revaluation of parts of the Transpower network based on an alternative engineering assessment of the required network assets.

- Development of "opportunity cost" valuations of the power generated by a hydro scheme. The valuations were based on the forecast cost of alternative generation schemes, and included the effects of potential carbon taxes or tradable emissions permits.

Cost of Capital

- Advising Unison Networks Ltd in its responses to the Commerce Commission's implementation of the price control provisions contained in the Commerce Ammendment Act, including advice on the appropriate weighted average cost of capital (WACC) for electricity distribution.
- For the Economic Regulation Authority in Western Australia, providing advice on the WACC to apply to a regulated railway.
- Advising various energy sector clients on the cost of capital appropriate for investment in electricity generation in Australia, Hong Kong, Malaysia, and the Philippines.
- Advising Transpower on the appropriate discount rate for use in the Grid Investment Test.
- Advising an Australasian transmission network owner on the appropriate asset beta for its WACC calculation.
- For an Australian telecommunications operator, advising on the cost of capital and method of asset value annuitisation for a submission to the Australian Competition and Consumer Commission.
- Assessment of the WACC for various activities of a major Australasian telecommunications firm, with particular emphasis on the impact of the regulatory regime. This included a detailed review and critique of approaches to setting regulated rates of return for telecommunications firms in Australia, North America and the United Kingdom.

Other Projects

- For the Ministry for the Environment (MfE), quantifying the potential impact of the proposed New Zealand Emissions Trading Scheme on three energy-intensive businesses. This work included the development of spreadsheet-based financial models for each of the three businesses, including separate models for "manufacturing", "full import" and "importation of intermediate product".
- Advising the Inland Revenue Department on economic issues related to tax avoidance litigation.
- Provision of advice on the costs and benefits of converting plantation forestry to dairy farms, including valuation of the impacts on greenhouse gas emissions.
- Providing economic advice and analytical support to the New Zealand Commerce Commission in a Commerce Act s36 case.
- For the New Zealand Ministry of Health, collation and analysis of data on the operating costs of air ambulance services.
- Advising an Australian electricity generator on the market for renewable energy certificates (RECs).

- For the New Zealand Electricity Efficiency and Conservation Authority (EECA), quantifying the benefits of the direct use of natural gas.
- Assessment and valuation of strategic options (including sale and acquisition options) for a New Zealand electricity lines business.
- For an Australian electricity generator, developing a framework for the valuation of easements used by electricity networks, including a review of the regulatory approach to easement valuation.
- For Telecom NZ Ltd, contributing to a number of public submissions to the New Zealand Telecommunications Commissioner, with particular emphasis on incentive effects of regulatory proposals and dynamic efficiency, cost recovery, reasonable rate of return on capital, funding of telecommunications service obligations (TSOs), and accounting for intangible benefits when calculating the cost of TSOs.
- Providing advice on how to adjust for differences in wage rates, cost of capital, and factor intensities in an international benchmarking study.
- Valuation and assessment of a proposed long-term contract for rail transportation, including a review of the approaches to rail price regulation in Australia.
- Review of the process and rules for the New Zealand Government's 2GHz radio spectrum auction.

SELECTED PUBLIC CONSULTING REPORTS

Comments on Cost Allocation and the Regulatory Asset Base, Prepared for Unison Networks Ltd, 15 March 2010. Available on the Input Methodologies page of the Commerce Commission's website (http://www.comcom.govt.nz/input-methodologies), under the heading "Electricity Distribution and Gas Pipelines Workshop - Post-Workshop Submissions".

Implementing the Deferred Tax Approach, letter to Unison Networks Ltd, 26 January 2010. Available on the Input Methodologies page of the Commerce Commission's website (http://www.comcom.govt.nz/input-methodologies), under the heading "Tax Workshop - Pre-Workshop Submissions and Comments on Workshop Process".

Input Methodologies: Economic Issues, Prepared for Unison Networks Ltd, 13 August 2009. Available on the Input Methodologies page of the Commerce Commission's website (http://www.comcom.govt.nz/input-methodologies), under the heading "Input Methodologies Discussion Paper - Submissions".

with Anna Kleymenova and Tim Giles, *WACC for TPI's Iron Ore Railway*, Prepared for Economic Regulation Authority, 11 June 2009. Available on the Economic Regulation Authority's website at http://www.erawa.com.au/3/867/48/weighted_averag.pm.

with Mike Thomas, *Regulatory Provisions of the Commerce Act*, Prepared for Unison Networks Ltd, 16 February 2009. Available on the New Zealand Commerce Commission's website at http://www.comcom.govt.nz/IndustryRegulation/regulatoryprovisionsofthecommercea.aspx.

with Jeremy Hornby and James Mellsop, *Response to Commerce Commission's Discussion Paper: Threshold Reset 2009*, Prepared for Unison Networks Ltd, February 2008. Available on the New Zealand Commerce Commission's website at http://www.comcom.govt.nz/IndustryRegulation/Electricity/ElectricityLinesBusinesses/TargetedControl/thresholdsforcontrol200914.aspx.

with Lewis Evans, Jeremy Hornby, and James Mellsop, *Comments on Commission's Draft Decisions Paper on Supply of Gas Distribution Services*, Prepared for Vector Ltd, 29 November 2007. Available on the New Zealand Commerce Commission's website at http://www.comcom.govt.nz/IndustryRegulation/Gas/CommissionReportsandDocuments/draftdecisions.aspx.

with Jeremy Hornby and Michael Thomas, *Discount Rate for the Grid Investment Test*, Final Report, prepared for Transpower NZ Ltd, 29 March 2007. Available on the New Zealand Electricity Commission's website at http://www.electricitycommission.govt.nz/pdfs/submissions/pdfstransmission/NI-GUP-Mar07/Transpower-GIT-Disc-Rate.pdf .

with Erik Westergaard, *Consultation on the Proposed Transmission Pricing Methodology*, Final Report, prepared for Electricity Networks Association, 2 February 2007. Available on the New Zealand Electricity Commission's website at http://www.electricitycommission.govt.nz/pdfs/submissions/pdfstransmission/tpm-Jan07/ENA.pdf.

with Jeremy Hornby and James Mellsop, *The Costs and Benefits of Regulating Transpower*, Final Report, prepared for Transpower NZ Ltd, 27 February 2006. Available on the New Zealand Commerce Commission's website at http://www.comcom.govt.nz//IndustryRegulation/Electricity/ElectricityLinesBusinesses/TargetedControl/ContentFiles/Documents/Transpower%20(CRA%20International).PDF

with Lewis Evans, Jeremy Hornby, and James Mellsop, *Cross Submission on the Intention to Declare Control of Unison*, Final, Prepared For Unison Networks Limited, 21 December 2005. Available on the New Zealand Commerce Commission's website at http://www.comcom.govt.nz/IndustryRegulation/Electricity/ElectricityLinesBusinesses/TargetedControl/Overview.aspx from the link for the Unison Post-Breach Inquiry.

with Lewis Evans, Jeremy Hornby, and James Mellsop, *Review of the Commerce Commission's Intention to Declare Control of Unison*, Final Report, Prepared For Unison Networks Limited, 28 October 2005. Public version available on the New Zealand Commerce Commission's website at http://www.comcom.govt.nz/IndustryRegulation/Electricity/ElectricityLinesBusinesses/TargetedControl/Overview.aspx from the link for the Unison Post-Breach Inquiry.

with Michael Thomas, *Net Benefits of Transmission Alternatives*, Final, Prepared for Meridian Energy Limited, 22 July 2005. Available on the New Zealand Electricity Commission's website at http://www.electricitycommission.govt.nz/pdfs/submissions/pdfstransmission/options-trans-alt/Meridian.pdf.

APPENDIX B: DOCUMENTS REFERENCED

123. The that I have referenced in the preparation of this report are:

123.1. Baumol, W.J. "Contestable Markets: An Uprising in the Theory of Industry Structure", *American Economic Review*, March 1982, 72(1), pp. 1-15.

123.2. Baumol, W.J. and A.S. Blinder, *Economics: Principles and Policy*, South-Western Cengage Learning Inc., 11th ed., 2009.

123.3. Baumol, W.J. and J.G. Sidak, "The Pricing of Inputs Sold to Competitors", *Yale J. On Reg.* 11(1), Winter 1994, pp. 171-202.

123.4. Betram, G., I. Dempster, and S. Terry, *Pipeline Profits: Gas Pipeline Rates of Return*, Simon Terry Associates Ltd, July 2001.

123.5. Commerce Commission, DRAFT Commerce Act (Transpower Input Methodologies) Determination 2010, published on 2 July 2010. I refer to this document as the IM Draft Determination.

123.6. Commerce Commission, Individual Price-Quality Path (Transpower) Draft Reasons Paper, 28 June 2010. I refer to this document as the IPP Draft Reasons Paper.

123.7. Commerce Commission, Input Methodologies (Transpower), Draft Reasons Paper, 25 June 2010. I refer to this document as the IM Draft Reasons Paper.

123.8. Commerce Commission, Input Methodologies (Electricity Distribution Services) Draft Reasons Paper, 18 June 2010.

123.9. Commerce Commission, Input Methodologies (Electricity Distribution) Emerging Views Paper, 23 December 2009.

123.10. Commerce Commission, Decision and Reasons for not amending Transpower's administrative settlement to include Instantaneous Reserves Fees as Pass-Through costs, 22 June 2009. I refer to this document as the Instantaneous Reserves Decision.

123.11. Commerce Commission, Decision and Reasons for Not Declaring Control of Transpower New Zealand Limited & Decision to Reset Transpower's Thresholds, 13 May 2008.

123.12. Commerce Commission, Handbook for Optimised Deprival Valuation of System Fixed Assets of Electricity Lines Businesses, 30 August 2004. I refer to this document as the ODV Handbook.

123.13. Electricity Commission, *Under-Frequency Event Charge Causer Determination*, Consultation Paper, April 2010.

123.14. Gale, S. and V. McWha, *The Origins of ODV*, Report to Air NZ, NZ Institute of Economic Research, August 2000.

123.15. Ministry of Economic Development, Chronology of New Zealand Electricity Reform, the main developments in New Zealand's electricity reforms to October 2004, Electricity Group, Resources and Networks Branch, April 2005.

123.16. New Zealand Gazette, *Commerce Act (Transpower Thresholds) Notice 2008, 26 June 2008*, Issue 106, pp. 2793-2823. I refer to this document as the Transpower Thresholds Notice 2008.

123.17. Transpower New Zealand Ltd, Pricing for Grid Connection Services from 1 April 2003, December 2002.

123.18. A spreadsheet prepared by Transpower New Zealand Ltd which sets out the calculation of the EV account balances from 2003 to 2009. I understand that Transpower provided this spreadsheet to Meridian Energy Ltd, who then provided the spreadsheet to Contact Energy. An extract of this spreadsheet is provided in **Appendix C**.

123.19. Statistics New Zealand, "Table 1", *Consumers Price Index: June 2010 Quarter – Tables*, 16 July 2010.

123.20. Transpower, *Annual Report*, various years.

123.21. Wattie, B., Development and Application of EV Methodology to Revenue Setting, PricewaterhouseCoopers, 27 February 2006.

123.22. Yarrow, G., M. Cave, M. Pollitt, and J. Small, *Asset Valuation in Workably Competitive Markets*, A Report to the New Zealand Commerce Commission, May 2010.

APPENDIX C: SUMMARY OF TRANSPOWER'S EV CALCULATION

124. Transpower's EV calculation as supplied in spreadsheet form to Meridian Energy and Contact Energy. Notations in left hand column added by Andrew Shelley.

Table 1: Transpower Calculation of EV account balance for HVAC and HVDC, 2007-2009

			2009	2009	2008	2008	2007	2007
	Note: Some rounding errors may occur		$m AC	$m DC	$m AC	$m DC	$m AC	$m DC
[a]	**Average Operating Capital**		**1,802.9**	**240.2**	**1,696.3**	**272.0**	**1,678.9**	**308.2**
[b]	Post Tax Wacc		7.8%	7.8%	7.7%	7.7%	7.2%	7.2%
[c=a x b]	Post tax Capital Charge	A	**140.6**	**18.7**	**130.6**	**20.9**	**120.9**	**22.2**
[d]	Maintenance		**135.8**	**8.4**	**126.4**	**8.5**	**110.9**	**11.1**
[e]	Intercompany		11.9	5.4	6.4	5.7	6.3	6.0
[f]	A+G		54.8	0.3	52.2	0.3	50.9	0.3
[g]	Ancillary Services		-	28.6	-	15.8	-	1.7
[h=d+e+f+g]	**Subtotal, subject to Opex Cap**		**202.5**	**42.7**	**185.0**	**30.3**	**168.1**	**19.1**
			9.5%	*40.9%*	*10.1%*	*58.6%*		
	Opex Cap		211.5		207.6		199.6	
			1.9%		*4.0%*			
[i]	Opex Cap Re-apportionment		**- 27.8**	**- 5.9**	**- 6.6**	**- 1.1**	**11.1**	**1.3**
[k=h+i]	**Total**		**174.7**	**36.8**	**178.4**	**29.2**	**179.2**	**20.4**
			-2.08%	*26.1%*	*-0.47%*	*43.5%*		
[m]	Pass through costs		13.2	0.1	17.8	-	11.2	0.1
[n=k+m]	**Total**		**187.9**	**36.9**	**196.2**	**29.2**	**190.4**	**20.5**
[D]	Depreciation and Write-offs		131.0	24.1	122.7	24.4	114.5	31.1
[T]	Tax Charge (Including interest tax shield)		48.9	7.3	48.3	14.8	47.1	13.0
[MAR=n+o+T]	**Total**		**658.8**	**92.8**	**613.0**	**90.4**	**561.5**	**85.4**
[R]	Actual Revenue		**511.3**	**82.9**	**460.6**	**92.8**	**433.8**	**65.5**
[EBIT=R-D-n]	Earnings Before Interest and Tax		**192.4**	**21.9**	**141.7**	**39.2**	**128.9**	**13.9**
	Lease Adjustment						-	-
[ROC=EBIT-T]	**Total Return on Operating Capital**	B	**143.5**	**14.6**	**93.4**	**24.4**	**81.8**	**0.9**
[EV= c - ROC]	**EV (Gain) / Loss**	A-B	**- 2.9**	**4.2**	**37.2**	**- 3.4**	**39.1**	**21.3**
	EV (Gain) / Loss - Pre Revaluation		**- 2.9**	**4.2**	**37.2**	**- 3.4**	**39.1**	**21.3**
Customer								
EV Opening Balance pre adjustments			**98.2**	**- 91.5**	**125.8**	**- 88.1**	**174.2**	**- 62.4**
Adjustment							- 20.4	
EV Opening Balance			**98.2**	**- 91.5**	**125.8**	**- 88.1**	**153.8**	**- 62.4**
Interest at cost of equity pre 2006/07 / WACC from 2006/7			7.7	- 7.1	9.7	- 6.8	11.1	- 4.5
Plus EV Loss			**2.9**	**- 4.2**	**- 37.2**	**3.4**	**- 39.1**	**- 21.3**
Less Commercial Adjustment (post tax)							-	
Customer Balance Closing			**108.8**	**- 102.8**	**98.2**	**- 91.5**	**125.8**	**- 88.1**

Table 2: Transpower calculation of EV account balance for HVDC, 2003-2009

ECONOMIC VALUE (GAIN / LOSS) ANALYSIS - HVDC 2003 TO 2011

26-May-10

Calculation of Economic (Gain) / Loss	Key	Actual 2009 $m DC	2008 $m DC	2007 $m DC	2006 $m DC	2005 $m DC	2004 $m DC	2003 $m DC	Notes
Average Operating Capital	A	240.2	272.0	308.2	310.0	328.5	349.5	382.8	Average operating capital primarily consists of the average fixed asset balances, but also working capital (such as debtors)
Post Tax Wacc	B	7.8%	7.7%	7.2%	6.8%	6.4%	6.5%	7.4%	WACC fixed by Commerce Commission from 2007 onwards
Post tax Capital Charge	C = A x B	18.7	20.9	22.2	20.5	21.0	22.6	28.2	
Operating expenses									
Maintenance total - comprised of:	D	8.4	8.5	11.1	8.9	18.2	7.5	6.9	
Transmission lines		1.3	0.9	0.8	0.8	0.8	0.8	1.0	Maintenance costs associated with the HVDC transmission line which goes from Benmore to Haywards
AC Substations		-	-	-	-	-	-	-	
DC Substations / Cables		7.1	7.6	10.3	8.1	17.4	6.7	5.9	Maintenance costs associated with the HVDC link, including the submarine cables. 2005 includes DC cable repair
IT+Comms		-	-	-	-	-	-	-	
Investigations		-	-	-		-	-	-	
Other operating expenses - comprised of:	E	34.3	21.8	8.0	10.4	16.7	10.8	8.7	
Intercompany		5.4	5.7	6.0	1.6	1.7	1.9	2.1	Insurance Charges primarily relating to the submarine cables
Administration and General		0.3	0.3	0.3	8.0	13.9	5.1	5.0	2006/7 onwards; staff not on capital projects who work to support HVDC transmission services, Pre 2006/7 based on maintenance spend
Ancillary Services		28.6	15.8	1.7	0.8	1.1	3.8	1.6	Primarily Reserves but also Black Start and Over frequency Arming
Actual operating expenses - pre cap adjustment	F = D + E	42.7	30.3	19.1	19.3	34.9	18.3	15.6	
Commerce Commission Opex cap (HVAC and HVDC)		211.5	207.8	199.6					
Opex cap re-apportionment - DC allocation	G	(5.9)	(1.1)	1.3	Pre adminstrative settlement				Reallocation of actual opex back to the Commerce Commission Opex Cap - apportionment based on actual spend.
Adjusted opex to comply with Opex Cap	H = F + G	36.8	29.2	20.4					Commerce Commisison opex cap defined in Transpower's threshold gazette notice from 2006/07
Pass through costs (eg. local authority rates)	I	0.1	-	0.1	Pre adminstrative settlement				Local authority rates - Pass through items defined by the Commerce Commission
Total Operating Expenses - inc pass throughs	J = H + I	36.9	29.2	20.5	19.3	34.9	18.3	15.6	
									Removal from service of Pole 1 Mercury Arc Valves
Depreciation and Write-offs	K	24.1	24.4	31.1	29.2	30.7	29.1	27.7	Depreciation on the HVDC assets and any asset write-offs (including dismantling costs of Mercury Arc Valves).
Tax Charge (Including interest tax shield)	L	7.3	14.8	13.0	7.0	1.2	4.7	4.1	Based on notional tax calculation, on a tax paid (rather than deferred tax) basis.
DC Revenue Requirement - per settlement terms	M=C+J+K+L	87.1	89.4	86.8	76.0	87.8	74.6	75.6	
Actual Revenue Received	N	82.9	92.8	65.5	66.0	66.1	59.5	56.5	
EV Gain / (Loss)	O = N - M	(4.2)	3.4	(21.3)	(10.0)	(21.6)	(15.1)	(19.0)	

Customer Account	Key	Actual 2009 $m DC	2008 $m DC	2007 $m DC	2006 $m DC	2005 $m DC	2004 $m DC	2003 $m DC	Notes
EV Opening Balance		(91.5)	(88.1)	(62.3)	(47.9)	(14.9)	(2.3)	0.8	
Adjustment		-	-	-	-	-	-	20.7	2002/3 relates to a reversal for DC provisions following the Meridian dispute (reversed from the AC customer account).
Adjustment		-	-	-	-	0.4	-	-	2005/6 relates to a correction for transition rebates under a pricing methodology change, originally charged to customers.
EV Opening Balance (post Adjustment)	P	(91.5)	(88.1)	(62.3)	(47.9)	(14.5)	(2.3)	21.5	
Interest at cost of equity pre 2006/07 / WACC from 2006/7	Q	(7.1)	(6.8)	(4.5)	(3.9)	(1.1)	(0.2)	2.1	Interest is charged/credited on the EV balance based on Transpower's WACC (cost of equity pre administrative settlement)
Replacement cost revaluations					(17.6)	(22.0)	2.7	(5.9)	Replacement cost revaluation under ODV where changes in HVDC asset replacement costs changed the assets net book value (NBV)
Minimum life extension					8.6	8.5	-	-	Minimum life adjustment occurred under ODV - an assets remaining life was reset to a three year minimum, this increased the NBV
Revaluations to customer	R		End of ODV		(9.2)	(13.5)	2.7	(5.9)	
Opening Balance plus customer revaluations+interest	S = P+Q+R	(98.6)	(94.9)	(66.8)	(51.0)	(29.1)	0.2	16.7	
Plus EV Gain / (Loss) - above	O	(4.2)	3.4	(21.3)	(10.0)	(21.6)	(15.1)	(19.0)	
Less Commercial Adjustment (post tax)	T	-	-	-	8.6	2.9	-	-	Transpower board decision to reduce HVDC revenue as a commercial adjustment was made to make it a shareholder charge
Customer Balance Closing	U=S+O+T	(102.8)	(91.5)	(88.1)	(52.3)	(47.9)	(14.9)	(2.3)	

APPENDIX D: TABLE OF ANNUAL INCREASES IN OPEX

Table 3: Actual Operating Costs, Allocated Capped Operating Costs, and CPI Indexed Operating Costs

	HVAC			HVDC			Total		
	2007	2008	2009	2007	2008	2009	2007	2008	2009
Actual Operating Costs	168.1	185.0	202.5	19.1	30.3	42.7	187.2	215.3	245.2
Change from previous year		16.9	17.5		11.2	12.4		28.1	29.9
		10.1%	9.5%		58.6%	40.9%		15.0%	13.9%
Allocated Capped Operating Costs	179.2	178.4	174.7	20.4	29.2	36.8	199.6	207.6	211.5
Change from previous year		- 0.9	- 3.7		8.9	7.6		8.0	3.9
		-0.5%	-2.1%		43.5%	26.1%		4.0%	1.9%
CPI Indexed Operating Costs	179.2	186.4	189.9	20.4	21.2	21.6	199.6	207.6	211.5
Change from previous year		7.2	3.5		0.8	0.4		8.0	3.9
		4.0%	1.9%		4.0%	1.9%		4.0%	1.9%

Source: Table 1, Appendix C.

APPENDIX E: ALTERNATIVE EV BALANCE CALCULATIONS

125. This appendix provides four alternative calculations of the EV balances at the end of 2009. In all cases the calculations start in 2009 with the opening balance for the HVAC and HVDC EV accounts that existed at the start of the Adminstrative Settlement between Transpower and the Commerce Commission.

126. The four alternative calculations are:

126.1. Approach A, which sets Ancillary Services costs for 2008 and 2009 are set to the average of actual costs for 2003, 2004, 2005, 2006, and 2007. Transpower methodology used to allocate opex cap.

126.2. Approach B, which includes the increased Instantaneous Reserves costs in the calculation of total operating expenditure, but imposes a CPI cap on the allocation of allowed opex to each of the HVAC system and the HVDC sysem.

126.3. Approach C, which sets costs for the HVDC system equal to an estimate of stand-alone cost. To implement this the HVDC system is allocated admin and general costs equal to the amount that is assumed to be incurred if the HVDC was owned and operated by a separate regulated supplier. The increase in Instantaneous Reserves costs for the HVDC link is not passed through to customers.

126.4. Approach D, which sets costs for the HVDC system equal to an estimate of incremental costs. It is assumed that the HVDC system results in no additional (incremental) admin and general costs being incurred by Transpower, so there is no allocation of these costs to the HVDC. The increase in Instantaneous Reserves costs for the HVDC link is not passed through to customers.

E.1 APPROACH A: NO INCREASE IN INSTANTANEOUS RESERVES COSTS

127. Assumptions: Ancillary Services costs for 2008 and 2009 are set to the average of actual costs for 2003, 2004, 2005, 2006, and 2007. Transpower methodology used to allocate opex cap.

			2009	2009	2008	2008	2007	2007
	Note: Some rounding errors may occur		$m AC	$m DC	$m AC	$m DC	$m AC	$m DC
[a]	**Average Operating Capital**		**1,802.9**	**240.2**	**1,696.3**	**272.0**	**1,678.9**	**308.2**
[b]	Post Tax Wacc		7.8%	7.8%	7.7%	7.7%	7.2%	7.2%
[c=a x b]	Post tax Capital Charge	A	**140.6**	**18.7**	**130.6**	**20.9**	**120.9**	**22.2**
[d]	Maintenance		**135.8**	**8.4**	**126.4**	**8.5**	**110.9**	**11.1**
[e]	Intercompany		11.9	5.4	6.4	5.7	6.3	6.0
[f]	A+G		54.8	0.3	52.2	0.3	50.9	0.3
[g]	Ancillary Services		-	1.8	-	1.8	-	1.7
[h=d+e+f+g]	**Subtotal, subject to Opex Cap**		**202.5**	**15.9**	**185.0**	**16.3**	**168.1**	**19.1**
			9.5%	*-2.5%*	*10.1%*	*-14.7%*		
	Opex Cap		211.5		207.6		199.6	
			1.9%		*4.0%*			
[i]	Opex Cap Re-apportionment		**- 6.4**	**- 0.5**	**5.8**	**0.5**	**11.1**	**1.3**
[k=h+i]	**Total**		**196.1**	**15.4**	**190.8**	**16.8**	**179.2**	**20.4**
			2.8%	*-8.4%*	*6.4%*	*-17.5%*		
[m]	Pass through costs		13.2	0.1	17.8	-	11.2	0.1
[n=k+m]	**Total**		**209.3**	**15.5**	**208.6**	**16.8**	**190.4**	**20.5**
[D]	Depreciation and Write-offs		131.0	24.1	122.7	24.4	114.5	31.1
[T]	Tax Charge (Including interest tax shield)		48.9	7.3	48.3	14.8	47.1	13.0
[MAR=n+o+T]	**Total**		**658.8**	**66.0**	**613.0**	**76.4**	**561.5**	**85.4**
[R]	Actual Revenue		**511.3**	**82.9**	**460.6**	**92.8**	**433.8**	**65.5**
[EBIT=R-D-n]	Earnings Before Interest and Tax		**171.0**	**43.3**	**129.3**	**51.6**	**128.9**	**13.9**
	Lease Adjustment						-	-
[ROC=EBIT-T]	**Total Return on Operating Capital**	B	**122.1**	**36.0**	**81.0**	**36.8**	**81.8**	**0.9**
[EV= c - ROC]	**EV (Gain) / Loss**	A-B	**18.5**	**- 17.3**	**49.6**	**- 15.8**	**39.1**	**21.3**
	EV (Gain) / Loss - Pre Revaluation		**18.5**	**- 17.3**	**49.6**	**- 15.8**	**39.1**	**21.3**
Customer								
EV Opening Balance pre adjustments			**85.8**	**- 79.1**	**125.8**	**- 88.1**	**174.2**	**- 62.4**
Adjustment							- 20.4	
EV Opening Balance			**85.8**	**- 79.1**	**125.8**	**- 88.1**	**153.8**	**- 62.4**
Interest at cost of equity pre 2006/07 / WACC from 2006/7			6.7	- 6.2	9.7	- 6.8	11.1	- 4.5
Plus EV Loss			**- 18.5**	**17.3**	**- 49.6**	**15.8**	**- 39.1**	**- 21.3**
Less Commercial Adjustment (post tax)							-	
Customer Balance Closing			**74.0**	**- 68.0**	**85.8**	**- 79.1**	**125.8**	**- 88.1**

E.2 APPROACH B: CPI CAP ON ALLOCATED OPEX

128. Assumptions: Total allocated opex (row k) for HVAC and HVDC individually constrained to only increase by CPI.

			2009	2009	2008	2008	2007	2007
	Note: Some rounding errors may occur		$m AC	$m DC	$m AC	$m DC	$m AC	$m DC
[a]	**Average Operating Capital**		**1,802.9**	**240.2**	**1,696.3**	**272.0**	**1,678.9**	**308.2**
[b]	Post Tax Wacc		7.8%	7.8%	7.7%	7.7%	7.2%	7.2%
[c=a x b]	Post tax Capital Charge	A	**140.6**	**18.7**	**130.6**	**20.9**	**120.9**	**22.2**
[d]	Maintenance		**135.8**	**8.4**	**126.4**	**8.5**	**110.9**	**11.1**
[e]	Intercompany		11.9	5.4	6.4	5.7	6.3	6.0
[f]	A+G		54.8	0.3	52.2	0.3	50.9	0.3
[g]	Ancillary Services		-	28.6	-	15.8	-	1.7
[h=d+e+f+g]	**Subtotal, subject to Opex Cap**		**202.5**	**42.7**	**185.0**	**30.3**	**168.1**	**19.1**
	Change		*9.5%*	*40.9%*	*10.1%*	*58.6%*		
	Opex Cap		211.5		207.6		199.6	
	Change		*1.9%*		*4.0%*			
[i]	Opex Cap Re-apportionment		**- 12.6**	**- 21.1**	**1.4**	**- 9.1**	**11.1**	**1.3**
[k=h+i]	**Total**		**189.9**	**21.6**	**186.4**	**21.2**	**179.2**	**20.4**
	Change		*1.9%*	*1.9%*	*4.0%*	*4.0%*		
[m]	Pass through costs		13.2	0.1	17.8	-	11.2	0.1
[n=k+m]	**Total**		**203.1**	**21.7**	**204.2**	**21.2**	**190.4**	**20.5**
[D]	Depreciation and Write-offs		131.0	24.1	122.7	24.4	114.5	31.1
[T]	Tax Charge (Including interest tax shield)		48.9	7.3	48.3	14.8	47.1	13.0
[MAR=n+o+T]	**Total (= Maximum Allowable Revenue)**		**658.8**	**92.8**	**613.0**	**90.4**	**561.5**	**85.4**
[R]	Actual Revenue		**511.3**	**82.9**	**460.6**	**92.8**	**433.8**	**65.5**
[EBIT=R-D-n]	Earnings Before Interest and Tax		**177.2**	**37.1**	**133.7**	**47.2**	**128.9**	**13.9**
[ROC=EBIT-T]	**Total Return on Operating Capital**	B	**128.3**	**29.8**	**85.4**	**32.4**	**81.8**	**0.9**
[EV= c - ROC]	**EV (Gain) / Loss**	A-B	**12.3**	**- 11.1**	**45.2**	**- 11.5**	**39.1**	**21.3**
	EV (Gain) / Loss - Pre Revaluation		**12.3**	**- 11.1**	**45.2**	**- 11.5**	**39.1**	**21.3**
Customer								
EV Opening Balance pre adjustments			**90.2**	**- 83.5**	**125.8**	**- 88.1**	**174.2**	**- 62.4**
Adjustment							- 20.4	
EV Opening Balance			**90.2**	**- 83.5**	**125.8**	**- 88.1**	**153.8**	**- 62.4**
Interest at cost of equity pre 2006/07 / WACC from 2006/7			7.0	- 6.5	9.7	- 6.8	11.1	- 4.5
Plus EV Loss			**- 12.3**	**11.1**	**- 45.2**	**11.5**	**- 39.1**	**- 21.3**
Less Commercial Adjustment (post tax)							-	
Customer Balance Closing			**84.9**	**- 78.9**	**90.2**	**- 83.5**	**125.8**	**- 88.1**

E.3 APPROACH C: STAND ALONE COST FOR HVDC

129. Assumptions: the HVDC system is allocated admin and general costs equal to the amount that is assumed to be incurred if the HVDC was owned and operated by a separate regulated supplier. The increase in Instantaneous Reserves costs for the HVDC link is not passed through to customers.

			2009	2009	2008	2008	2007	2007
	Note: Some rounding errors may occur		$m AC	$m DC	$m AC	$m DC	$m AC	$m DC
[a]	**Average Operating Capital**		**1,802.9**	**240.2**	**1,696.3**	**272.0**	**1,678.9**	**308.2**
[b]	Post Tax Wacc		7.8%	7.8%	7.7%	7.7%	7.2%	7.2%
[c=a x b]	Post tax Capital Charge	A	**140.6**	**18.7**	**130.6**	**20.9**	**120.9**	**22.2**
[d]	Maintenance		**135.8**	**8.4**	**126.4**	**8.5**	**110.9**	**11.1**
[e]	Intercompany		11.9	5.4	6.4	5.7	6.3	6.0
[f]	A+G		52.1	3.0	49.5	3.0	48.2	3.0
[g]	Ancillary Services		-	1.8	-	1.8	-	1.7
[h=d+e+f+g]	**Subtotal, subject to Opex Cap**		**199.8**	**18.6**	**182.3**	**19.0**	**165.4**	**21.8**
			9.6%	*-2.1%*	*10.2%*	*-12.8%*		
	Opex Cap		211.5		207.6		199.6	
			1.9%		*4.0%*			
[i]	Opex Cap Re-apportionment		- **6.9**	-	**6.3**	-	**12.4**	-
[k=h+i]	**Total**		**192.9**	**18.6**	**188.6**	**19.0**	**177.8**	**21.8**
			2.3%	*-2.1%*	*6.1%*	*-12.8%*		
[m]	Pass through costs		13.2	0.1	17.8	-	11.2	0.1
[n=k+m]	**Total**		**206.1**	**18.7**	**206.4**	**19.0**	**189.0**	**21.9**
[D]	Depreciation and Write-offs		131.0	24.1	122.7	24.4	114.5	31.1
[T]	Tax Charge (Including interest tax shield)		48.9	7.3	48.3	14.8	47.1	13.0
[MAR=n+o+T]	**Total**		**656.1**	**68.7**	**610.3**	**79.1**	**558.8**	**88.1**
[R]	Actual Revenue		**511.3**	**82.9**	**460.6**	**92.8**	**433.8**	**65.5**
[EBIT=R-D-n]	Earnings Before Interest and Tax		**174.2**	**40.1**	**131.5**	**49.4**	**130.3**	**12.5**
	Lease Adjustment						-	-
[ROC=EBIT-T]	**Total Return on Operating Capital**	B	**125.3**	**32.8**	**83.2**	**34.6**	**83.2** -	**0.5**
[EV= c - ROC]	**EV (Gain) / Loss**	A-B	**15.3** -	**14.1**	**47.4** -	**13.7**	**37.7**	**22.7**
	EV (Gain) / Loss - Pre Revaluation		**15.3** -	**14.1**	**47.4** -	**13.7**	**37.7**	**22.7**
Customer								
EV Opening Balance pre adjustments			**89.6** -	**82.8**	**127.2** -	**89.6**	**174.2** -	**62.4**
Adjustment							- 20.4	
EV Opening Balance			**89.6** -	**82.8**	**127.2** -	**89.6**	**153.8** -	**62.4**
Interest at cost of equity pre 2006/07 / WACC from 2006/7			7.0 -	6.5	9.8 -	6.9	11.1 -	4.5
Plus EV Loss			- **15.3**	**14.1**	- **47.4**	**13.7**	- **37.7** -	**22.7**
Less Commercial Adjustment (post tax)							-	
Customer Balance Closing			**81.2** -	**75.2**	**89.6** -	**82.8**	**127.2** -	**89.6**

E.4 APPROACH D: INCREMENTAL COST FOR HVDC

130. Assumptions: the HVDC system is assumed to result in no additional (incremental) admin and general costs, so there is no allocation of these costs to the HVDC. The increase in Instantaneous Reserves costs for the HVDC link is not passed through to customers.

			2009	2009	2008	2008	2007	2007
	Note: Some rounding errors may occur		$m AC	$m DC	$m AC	$m DC	$m AC	$m DC
[a]	**Average Operating Capital**		**1,802.9**	**240.2**	**1,696.3**	**272.0**	**1,678.9**	**308.2**
[b]	Post Tax Wacc		7.8%	7.8%	7.7%	7.7%	7.2%	7.2%
[c=a x b]	Post tax Capital Charge	A	**140.6**	**18.7**	**130.6**	**20.9**	**120.9**	**22.2**
[d]	Maintenance		**135.8**	**8.4**	**126.4**	**8.5**	**110.9**	**11.1**
[e]	Intercompany		11.9	5.4	6.4	5.7	6.3	6.0
[f]	A+G		55.1	-	52.5	-	51.2	-
[g]	Ancillary Services		-	1.8	-	1.8	-	1.7
[h=d+e+f+g]	**Subtotal, subject to Opex Cap**		**202.8**	**15.6**	**185.3**	**16.0**	**168.4**	**18.8**
			9.4%	*-2.5%*	*10.0%*	*-14.9%*		
	Opex Cap		211.5		207.6		199.6	
			1.9%		*4.0%*			
[i]	Opex Cap Re-apportionment		**- 6.9**	**-**	**6.3**	**-**	**12.4**	**-**
[k=h+i]	**Total**		**195.9**	**15.6**	**191.6**	**16.0**	**180.8**	**18.8**
			2.2%	*-2.5%*	*6.0%*	*-14.9%*		
[m]	Pass through costs		13.2	0.1	17.8	-	11.2	0.1
[n=k+m]	**Total**		**209.1**	**15.7**	**209.4**	**16.0**	**192.0**	**18.9**
[D]	Depreciation and Write-offs		131.0	24.1	122.7	24.4	114.5	31.1
[T]	Tax Charge (Including interest tax shield)		48.9	7.3	48.3	14.8	47.1	13.0
[MAR=n+o+T]	**Total**		**659.1**	**65.7**	**613.3**	**76.1**	**561.8**	**85.1**
[R]	Actual Revenue		**511.3**	**82.9**	**460.6**	**92.8**	**433.8**	**65.5**
[EBIT=R-D-n]	Earnings Before Interest and Tax		**171.2**	**43.1**	**128.5**	**52.4**	**127.3**	**15.5**
	Lease Adjustment						-	-
[ROC=EBIT-T]	**Total Return on Operating Capital**	B	**122.3**	**35.8**	**80.2**	**37.6**	**80.2**	**2.5**
[EV= c - ROC]	**EV (Gain) / Loss**	A-B	**18.3**	**- 17.1**	**50.4**	**- 16.7**	**40.7**	**19.7**
	EV (Gain) / Loss - Pre Revaluation		**18.3**	**- 17.1**	**50.4**	**- 16.7**	**40.7**	**19.7**
Customer								
EV Opening Balance pre adjustments			**83.3**	**- 76.6**	**124.2**	**- 86.6**	**174.2**	**- 62.4**
Adjustment							- 20.4	
EV Opening Balance			**83.3**	**- 76.6**	**124.2**	**- 86.6**	**153.8**	**- 62.4**
Interest at cost of equity pre 2006/07 / WACC from 2006/7			6.5	- 6.0	9.6	- 6.7	11.1	- 4.5
Plus EV Loss			**- 18.3**	**17.1**	**- 50.4**	**16.7**	**- 40.7**	**- 19.7**
Less Commercial Adjustment (post tax)							-	
Customer Balance Closing			**71.5**	**- 65.5**	**83.3**	**- 76.6**	**124.2**	**- 86.6**