



COMMERCE COMMISSION

FURTHER INFORMATION ON THE COST-BENEFIT MODEL

14 OCTOBER 2003

BACKGROUND

Introduction

In this note and attachments, the Commerce Commission is providing interested parties with further information on the cost-benefit report and model which accompanies its draft report on unbundling. It is also providing amendments to certain aspects of the cost-benefit report and results.

This note was originally published on 8 October 2003. A further set of amendments has been identified by the Commerce Commission and this note replaces that originally published on 8 October 2003. Any changes from the previous note of 8 October 2003 have been highlighted in the text of this note.

The cost-benefit model comprises:

- The report in Appendix 2 to the Commission's draft report on unbundling, published on 18 September 2003 with an amended version published on 14 October 2003 (the OXERA CBA report); and
- An underlying Excel spreadsheet model of the cost-benefit calculations.

The references to the OXERA report 'Modelling the Impact of Unbundling the Local Loop and fixed Public Data Network' contained in Appendix 2 to the Commission's draft report is referred to throughout this note as the 'OXERA CBA report.' This report was published again on 14 October 2003 to take account of the amendments set out in this note. References are to page numbers in the public version of the OXERA CBA report at:

<http://www.comcom.govt.nz/telecommunications/localloop.cfm>

The OXERA CBA report in Appendix 2 of the draft report on unbundling sets out the assumptions used in the model to derive the results. In particular, interested parties' attention is drawn to:

- Section 4 of the OXERA CBA report which discusses the model structure e.g. how the number of technically upgradeable lines is calculated, how consumer welfare is calculated.
- Section 5 of the OXERA CBA report which discusses the data employed in the model e.g. the number of subscribers, the derivation of prices and the costs used.

Each cost and revenue item in the OXERA CBA report is referenced as to the source of the information e.g. whether it is from Telecom New Zealand (TCNZ), TelstraClear, international experience, ICC (OXERA's technical consultants), international benchmarking, or the COVEC report in Appendix 3 of the draft report. This data is provided mostly in section 5 of the OXERA CBA report. To understand the Excel model in greater depth, sections 4 and 5 of the report should be read in conjunction with the Excel model.

Further information

To assist interested parties in making submissions on the cost-benefit analysis, this note provides some further guidance and clarification on the Excel model which underlies the OXERA CBA report. There are 4 parts to this note:

- Part 1 provides a overview of the model and a flow chart as to how it operates in summary form which has been supplied by OXERA.
- Part 2 provides responses to questions that may arise in examining the model. Changes to the note published on 8 October 2003 have been underlined. In addition, two questions have been added at the end to provide further clarifications to interested parties.
- Part 3a provides some worked examples of the application of the various assumptions used in the model in order to demonstrate how the final prices are derived. In each case, the spreadsheet shows how the prices under the factuials have been constructed, based on the description in the OXERA CBA report. For example in the case of full LLU, it is intended to show how the prices in Tables 5.5 and 5.6 (specification) and Table 5.7 (designation) of the OXERA CBA report were derived. The spreadsheet should be read in conjunction with the amendments that are being notified to parties within this note. These examples contain Telecom-designated Restricted Information and Commission-designated Restricted Information and will therefore only be supplied to those amongst interested parties who have (a) signed the relevant deeds of undertaking and (b) have access to these categories of information. The spreadsheet has been updated in the light of the current amendments identified in this note.
- The spreadsheet in Part 3b summarises cost information from the Excel model and has been provided by OXERA. Part 3b contains Telecom-designated Restricted Information and Commission-designated Restricted Information and similar access conditions apply as to access to Part 3a. The spreadsheet has been updated in the light of the current amendments identified in this note.
- Part 3c sets out the data estimates on regulatory costs used in OXERA's cost-benefit analysis. The note provides assumptions for the purposes of cost-benefit modelling. Part 3c is a new section and contains Commission-designated Restricted Information and similar conditions apply as to access to Part 3a.
- Part 4 contains the spreadsheet referred to on page 25 of COVEC report in Appendix 3 to the Commission's draft report. Please note that OXERA used the data reported directly in COVEC's report (see below).

Amendments

The Commission has discovered some numerical errors in the inputs to the cost-benefit model, which fed into the results that were reported in the Commission's draft report and in OXERA's CBA report of 18 September 2003. There was also an error in the text of the OXERA CBA report.

The amendments are listed below, divided between those published on 8 October 2003 and the additional amendments of 14 October 2003. All of these changes are included in the amended draft report of 14 October 2003. Please note that none of the amendments alter the fundamental structure and logic of the Excel model.

Amendments of 8 October 2003

- The prices in the draft report need to be updated to reflect the final COVEC price figures published in Appendix 3 to the draft report. The prices in the first row of Table 1 show the prices which should replace those used in the draft report and in the model.¹ They reflect the application of an amended set of exchange rates in the final COVEC report.

Table 1: COVEC prices NZ\$, excluding GST

	Full unbundling		Shared unbundling/ line sharing		Source
	Monthly rental (Annual rental)	Connection	Monthly rental (Annual rental)	Connection	
Final Average COVEC price	23.85 (286.2)	172.46	11.21 (134.52)	203.68	Table 6 of COVEC report, Appendix 3 of Commission's draft report
Draft Average price (used in OXERA CBA report)	21.72 (260.64)	154.32	10.60 (127.2)	182.78	Pages 42 and 55 of OXERA CBA, based on previous draft of COVEC report of 22 August

- The competitive price P_2 for voice and data services for business customers under full unbundling was incorrectly set in the central case at \$733 instead of \$743.² This has a knock on effect to the prices of the entrant (P_1^E) and of Telecom (P_1^T) in table 5.7 of the OXERA CBA report. This change is, however, not relevant to the revised results as these prices are replaced by the final COVEC figures.³

¹ The previous COVEC prices in the modelling are reported on pages 42 and 55 of the OXERA CBA report of 18 September 2003.

² See P_2 in 'Voice and data' column for business customers in table 5.7 on page 42 of the OXERA CBA report of 18 September 2003.

³ For reference, the corrected numbers would be as follows in table 5.7 of the OXERA CBA report of 18 September 2003. In the column 'Voice and data services' for business customers, price P_2 should correctly read \$743 in place of \$733, P_1^E should correctly read \$817 in place of \$733 and P_1^T should correctly read \$940 in place of \$843.

- The sentence at the bottom of page 41 of the OXERA CBA report of 18 September 2003 reading “Furthermore, TCNZ’s competitive response price (P_1^T) is assumed to be equal to P_1^E ” should correctly read “Furthermore, TCNZ’s competitive response price (P_1^T) is assumed to be 15% above P_1^E , as in the case of specification of full unbundling.” The correct 15% competitive response factor for designation of full unbundling was incorporated into the model, but was not reflected in the text.

Amendments of 14 October 2003

- ***Internet Service Provider (ISP) charges for residential customers:*** There was an inconsistency in the treatment of ISP charges between the scenarios of designation and specification:
 - In the case of specification of full unbundling, the P_0 residential price included an element for ISP charges. All the residential prices under specification (P_2 , P_1^T and P_1^E) therefore included the ISP charge since they are calculated on a retail–minus basis. Designated prices, on the other hand, are built on a bottom–up basis and no explicit allowance had been made for the cost the consumer faces from paying an ISP charge in the prices P_2 , P_1^T and P_1^E .
 - Under the Option of specification of line sharing and bitstream access an ISP charge of NZ\$32 per month has now been included in building up the retail price (P_0), compared with NZ\$20 per month used in the remaining prices (P_2 , P_1^T and P_1^E) and entrant costs. The \$32 per month figure is based on TCNZ’s current ISP charges for residential JetStream and JetStream Starter packages weighted by the number of customers taking each package.
 - The rationale for using a weighted average price is that P_0 represents the starting point for the data only product. Hence it is based on the *existing* customer profile across TCNZ’s retail data products and the ISP charges, which (generally) varies between NZ\$35 for the starter ‘broadband’ product (JetStream Starter), to NZ\$20 for the other broadband products (see the table in Part 2 of this note under the heading ‘Specification prices’ below) to produce a weighted retail price for a representative product.
 - In identifying the charge to be used in the forward-looking scenarios, it is necessary to determine how much consumers are likely to pay in the future. Analysis of the current market prices for ISPs in New Zealand suggests that many ISPs charge in the region of NZ\$20 for their broadband products, and that, as customers’ familiarity with broadband increases, they will migrate to the more expensive product bundles which include a charge of approximately NZ\$20 across ISPs (see the table in Part 2 of this note under the heading ‘Specification prices’ below).
 - Therefore, in terms of a forward-looking ISP cost, NZ\$20 is deemed an appropriate level to be included in the model for both prices and entrant costs.

- The net effect is that in options 1, 2 and 3 (full unbundling, line sharing and bitstream access) under designation, \$240 has now been added to P_2 for the residential data product to account for the annual cost of an ISP charge. This feeds through to P_1^T and P_1^E given the way in which the figures are calculated as explained in the OXERA CBA report.
- The supply side costs of providing ISP services had also been omitted under both specification and designation within the calculation of the NPV entry decision. Therefore \$240 has been added to the residential variable data charge on the cost side to correct for this.
- **ISP charges for business customers:** In the original version of the model, ISP charges were not included for the business sector. The underlying rationale was that businesses would be using broadband connections for purposes in addition to accessing the internet, and therefore may not necessarily incur ISP costs. For example, high speed links can be used for the transfer of large data files. However, when making the correction for residential ISP charges as outlined above, a conservative correction has been made for business customers to reflect the fact that many businesses will in fact use the internet regularly. The impact of this amendment is broadly neutral as the ISP charges have been added to both costs and revenues for the entrant. Therefore:
 - P_0 (business data) has been increased by \$214 per annum (based on the \$17.78 monthly charge to business customers by Xtra, excluding GST) for options 1, 2 and 3;
 - For business customers in options 1, 2 and 3, \$214 has been added to P_2 to account for the annual cost of an ISP. This feeds through to P_1^T and P_1^E ; and
 - On the cost side, \$214 has been added to the business variable data charge.
 - The impact of these symmetrical ISP changes for business customers is broadly neutral.
- **Regulatory costs under specification set too high.** In the original version of the model, ongoing costs, from which regulatory costs are recovered, had been set at equivalent levels under both designation and specification. Given there would be no costs associated with a pricing decision under specification, this is likely to overstate costs and has been corrected.
- To take account of this, in all 4 options, the ongoing costs under specification have been adjusted down by NZ\$[X] **COMMISSION DESIGNATED RESTRICTED INFORMATION (CDR)** per subscriber (judged to be the amount allowed for regulatory submission costs: NZ\$[X] [CDR] amortised over 5 years and 50,000 subscribers). These costs are set out in Parts 3b and 3c to this note. Parts 3b and 3c contain Commission–designated and Telecom–designated Restricted Information.
- **Over-recovery of regulatory costs under specification retail prices.** Following on from the previous point, specified prices also allowed an element for the recovery of regulatory submission costs that would only be likely to occur under designation. This has now been removed, so in options 1, 2 and 3 the allowance for such costs in

the construction of the specification price has been reduced by \$[X] CDR (from \$[X] CDR in the original version of the model to \$[X] CDR). This is also the case for voice services.

- **Regulatory and OSS costs under PDN:** These costs had been omitted in the original version. NZ\$[X] CDR was added to the specification prices to cover OSS costs, and NZ\$[X] CDR was added to designation to cover both OSS and regulatory costs (NB: the figures in the previous three bullet points are available from the Commission. See contact details below.)
- **Non-LLU costs:** Two categories of non-LLU costs have been assumed: core network operating costs and marketing and customer services operating costs.
- For *core network operating costs*, the headline per-connection cost used is NZ\$83 in Option 1, derived by dividing the total network operating costs figure by the number of TCNZ access lines at end of June 2002, estimated at 1.7m. This figure is used for Option 1, or full unbundling.
- However, a correction has been made under options 2 and 3 (line sharing and bitstream access) in the cost-stack for designated prices to a lower figure of NZ\$70 in place of \$83. As neither of these options includes voice services, the original costs were over-estimated. Hence the allocated operating costs have been reduced in the corrected version.
- For *marketing and customer services costs*, the correction to include the ISP charge has had a knock-on effect on these costs. As a result of including the retail ISP charges, the marketing element of the cost stack used in building up designated prices is likely to have been overestimated as there would be economies of scope across the marketing customer service functions of providing a broadband connection and ISP services. Accordingly, the costs of marketing associated with voice and data services under option 1, and data services under options 2 and 3 have been reduced from NZ\$100 (residential) to NZ\$50 per connection per year. Business marketing costs remain at a 30% mark-up over the \$50 cost;
- **Bundled voice and data product price:** A revised price for the bundled voice and data product for residential customers under full unbundling has been used which is the sum of the stand-alone voice and data components, given that a bundled voice and data product is no longer available from TCNZ. Previously, a weighted average price had been used which included Telecom's Jetline product, which is no longer available.
- **One-off fall in profitability:** The net effect of these amendments has been to change the cost stacks under the various options. The resulting competitive price (P_2) under designation is higher than under specification under Options 2 and 3, line sharing and bitstream access. This is unlikely to be correct as the prices under designation are a second best proxy for competitive prices. *A priori* one would expect higher prices to result under specification, where prices are the result of commercial negotiation between parties with differing amounts of market power compared with designation, where the Commission can act, if parties request intervention, to set competitive prices by proxy. This suggests that the original 15% reduction in TCNZ's profitability was set at too high a point in the range. To correct for this, the one-off reduction in TCNZ's profitability that would be expected given full competition has been adjusted downwards in the range

from 15% in the original model to 10% in the amended model. This is still within the range of estimates in the study quoted in footnote 28 of the OXERA CBA report.

Net impact of amendments of 8 October 2003 and 14 October 2003

The results from re-running the model for Options 1, 2, 3 and 4 making the above amendments are presented in Table 2 below. For comparison, the original central case values reported in table 3.1 of the OXERA CBA report and in the Commission's draft report of 18 September 2003 are shown in parenthesis.

This section differs from the section called 'Net impact of corrections' as advised on 8 October 2003. It includes the overall net impact of the changes advised on 8 October 2003 as well as those on 14 October 2003.

Table 2: Present value of consumer surplus, 2005–10 (NZ\$m)—re-estimated central case

Option	Specification			Designation		
	Price effect	Take-up effect	Total	Price effect	Take-up effect	Total
1: Full LLU	6.1 (9.0)	0.3 (0.7)	6.4 (9.8)	133.7 (188.8)	46.9 (74.7)	180.6 (263.5)
2: Line sharing	11.2 (7.5)	1.0 (0.8)	12.2 (8.3)	27.9 (33.1)	10.2 (12.6)	38.1 (45.8)
3: Bitstream	49.9 (32.5)	5.3 (4.0)	55.2 (36.5)	111.8 (117.1)	40.1 (42.4)	151.9 (159.5)
4. PDN	92.6 (104.7)	0.0 (0.0)	92.6 (104.7)	287.2 (305.2)	0.0 (0.0)	287.2 (305.2)

The following points are noted in respect of Table 2:

- Substantial net consumer surplus benefits remain under each option. However, the overall level of the net benefits has fallen under each Option. In percentage terms, the change in net benefits under designation ranges from a 5% fall under bitstream access to a 31% fall under full LLU.
- The ranking of the three local loop unbundling results remains as previously (Option 1 first, Option 3 second and Option 2 last), but the relative magnitude of the difference between the options has changed.
- Separately, the net consumer surplus benefits from unbundling the PDN have fallen by \$18m, but remain substantial.
- The net benefits from specification have fallen under full unbundling and PDN unbundling, but have increased under line sharing and bitstream access compared with the original results. However, in each Option the benefits under designation are substantially in excess of those under specification.

It has not been possible to provide separate estimates of the allocative, productive and dynamic efficiency benefits from the above options. However, the take-up effect can be taken as a broad estimate of allocative and productive efficiency benefits and the price effect as a broad proxy of dynamic efficiency benefits (though the price effect is a mix of all three types of efficiency).

In the draft report, the Commission conducted a sensitivity on the results of the cost-benefit analysis to remove metropolitan areas, which it found to be competitive (page 21 of the Executive Summary). The results from making this adjustment to the results in Table 2 are reported in Table 3.

The overall net benefits from full unbundling (option 1) have fallen from \$112.7m in the draft report to \$67.5m. Once competitive ESAs are removed, the net benefits from bitstream access are equivalent to those under full unbundling. Benefits for line sharing occur under specification, but fall to zero when the competitive areas are removed under designation.

The Commission's conclusion to recommend full unbundling remains unchanged. The Commission's preliminary view is not to recommend regulation of bitstream access and line sharing, both more limited forms of unbundling.

The overall net benefits from unbundling of the PDN have fallen from \$91.5m under designation in the draft report to \$83m. As in the case of full unbundling, the Commission's recommendation to unbundle the fixed PDN remains unchanged.

Table 3: Total Net Benefits adjusting for competitive areas and potential indirect costs or regulatory error/risk (NZ \$m)

	Removing Competitive ESAs		Applying a 25% discount factor	
	Specification	Designation	Specification	Designation
1. Full unbundling	-	90.0	-	67.5
2. Line sharing	4.1	-	3.1	-
3. Bitstream access	36.9	90.0	27.7	67.5
4. PDN unbundling	7.4	110.6	5.6	83.0

The impact of the amendments flows through to the sensitivities and to certain tables and text in OXERA's CBA report and to certain paragraphs and tables in the Commission's draft report. The Commission issued an amended version of the OXERA CBA report and an amended version of its draft report to reflect these amendments on 14 October 2003. Where necessary, the Commission will supply any further amendments or information to assist those making submissions via its website.

Access to Excel Model

The report of the cost-benefit analysis contained in Appendix 2 to the amended draft report provides information on the cost-benefit analysis for parties to make submissions, along with this note. Other parties ma

y seek access to the Excel model itself.

Paragraphs 85 to 88 of the Commission's amended draft report contain guidance on gaining access to the underlying Excel model. The model contains Telecom-designated Restricted Information. Since releasing the draft report, the Commission has confirmed that the model also contains a small amount of Commission-designated Restricted Information. The Excel model can only be accessed by those who have signed the relevant deeds of undertaking as to confidentiality, and by interested parties' internal counsel and by external counsel and external experts. Certain further conditions apply to access to the model. These have been notified to the Nominated Counsel of interested parties. If you would like to seek access to the Excel model, please contact Alex Cheetham at the Commerce Commission on 04 924 3686 or at alex.cheetham@comcom.govt.nz or Chris Abbott on 04 924 3673 or at chris.abbott@comcom.govt.nz

PART 1: OVERVIEW AND FLOW CHART OF THE COST-BENEFIT MODEL: MEMO FROM OXERA

|O|X|E|R|A|

This memo provides a flow chart of the model developed for the cost-benefit analysis, together with a *generic* description of how the model is intended to work. This description does not cover the differences between the different options analysed, where these options are:

- Option 1: full unbundling;
- Option 2: line sharing;
- Option 3: bitstream access; and
- Option 4: unbundling of, and interconnection to, the fixed PDN

Generic description of the CBA model

The model output is a quantitative estimate (in NZ dollars) of the gain to consumers under regulation. This output is an incremental gain over what would happen in the absence of regulation (ie, the counterfactual) and is calculated by subtracting what could be expected to happen in the counterfactual from what could be expected to happen under regulation.

The gain to consumers is made up of the gain to existing customers from any price fall that is forecast (the ‘price effect’), plus the gain to *new* customers who are able to enter the market and benefit from the service as a result of the price fall (the ‘take-up effect’).

The model output is derived from two main calculations that occur at the level of the ESA:

- an NPV calculation; and
- a welfare calculation.

NPV calculation

The NPV calculation is used to determine *where* entry will occur ie, in which ESAs; firms will take a profit-oriented approach and only enter where they perceive that it would be profitable to do so. This will depend on the number of customers they estimate that they can get, what revenues they can expect and what it will cost them to provide services.

Revenues are forecast using the number of customers that new entrants may expect to attract multiplied by the price that these customers may be expected to pay. This is compared to the level of costs that varies both according to location of the exchange (ie, whether urban, rural, metro or suburban) and according to the forecast number of subscribers.

The forecast revenues and costs are discounted back (using a discount rate of 13%⁴) to give a net figure in today’s money. Where this figure is greater than zero entry is profitable, and it is assumed that it occurs.

⁴ This variable may be changed.

There are several points worth highlighting:

- the total forecast number of customers is calculated taking into account expected take-up rates of new technologies over time; the feasibility of delivering DSL (ie, taking into account distance from the exchange); and customers who may want broadband but access it using a competing technology;
- the total forecast number of broadband customers is itself a result of the price drop resulting from regulation—the forecast penetration rate in the counterfactual is *augmented* by the estimated effect of the price fall (ie, using the price elasticity of demand);
- the take-up profile (ie, by end-consumers) takes into account the DSL exchange upgrade date;
- the number of subscribers that new entrants can expect to attract from the total market is derived using a churn rate (ie, customers that switch from the incumbent) plus a new customer acquisition rate;⁵ and
- the NPV calculation occurs twice. The first run assumes a price (P_1) that is above the competitive price since there is assumed to be only one new entrant. The second run assumes that the competitive price (P_2) is achieved as there are two new entrants. The price fall is therefore less in the first run than in the second, so there would be fewer forecast subscribers than in the second run.

Welfare calculation

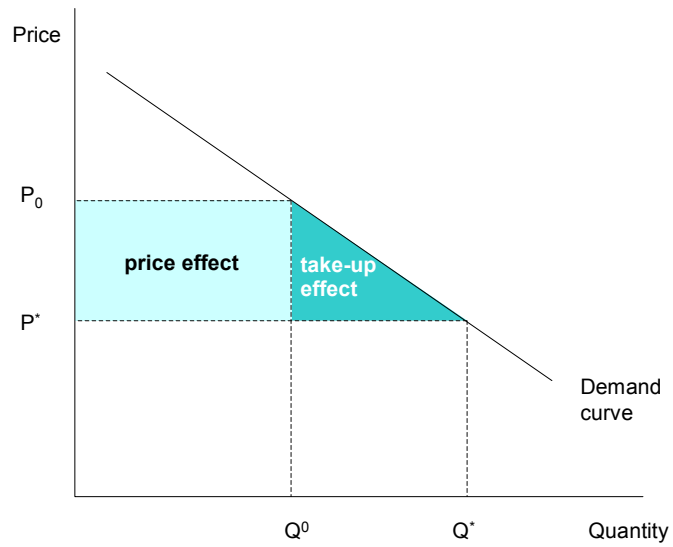
The welfare calculation is only made with respect to ESAs where entry occurs. It calculates the gain relative to the counterfactual, using the price at which entry occurred (depending on whether there are one or two entrants).

Figure 1 illustrates the price effect and take-up effect that constitute the total welfare gain to consumers. P_0 is the price in the counterfactual (ie, with no regulatory intervention); P^* is a representative (lower) price, following regulation.⁶ Q_0 is the number of subscribers in the counterfactual (ie, with no regulatory intervention); Q^* represents the (increased) number of subscribers following intervention.

⁵ Both variables may be changed.

⁶ This figure is purely illustrative. It is not drawn to scale, and should not be taken to represent the actual results.

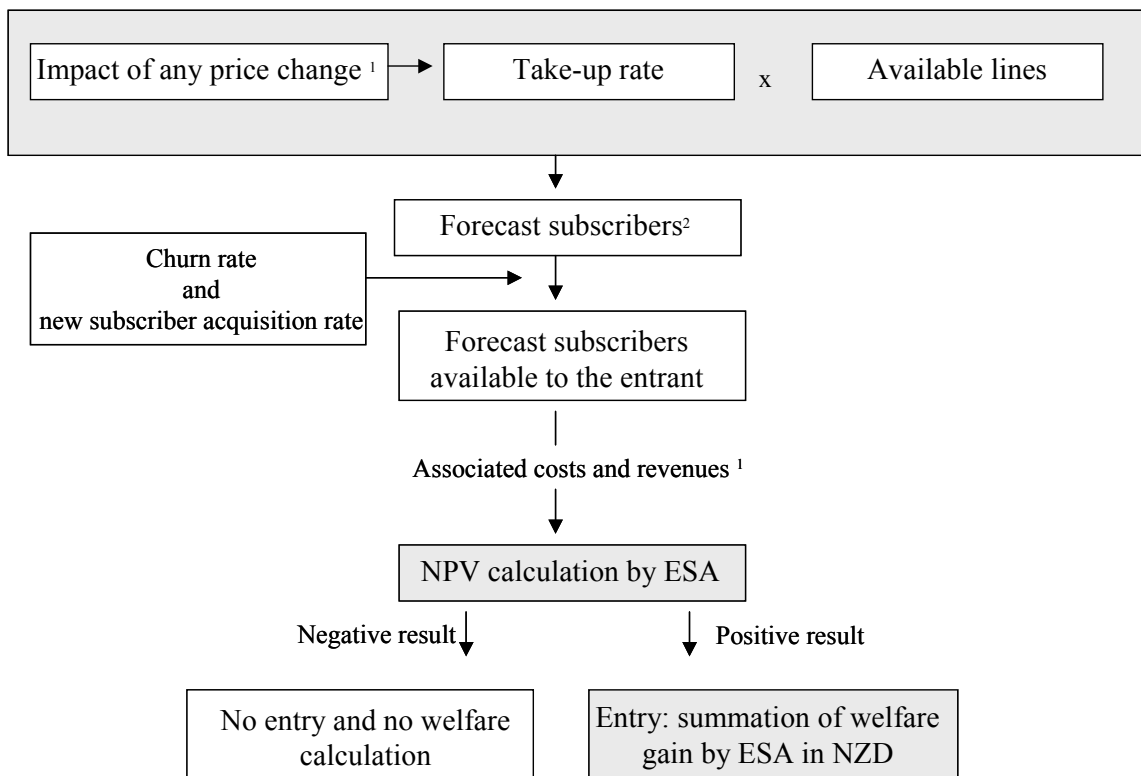
Figure 1: Representation of the benefits to consumers



The forecast quantification of the gains is discounted back using a rate of 6%.⁷ The gains in each ESA are then summed to give the final output figure.

⁷ This variable may be changed.

CBA flowchart



¹ The price used for the take-up rate and the price used for the NPV calculation is the same

² Adjusted to reflect broadband subscribers who take a different technological solution

PART 2: QUESTIONS AND ANSWERS

Since the version of this note published on 8 October 2003, the following changes have been made to Part 2 of this note:

- Any changes to the responses below have been underlined:
- Page number references have been revised to refer to the OXERA CBA report published on 14 October 2003, rather than the original report published on 18 September 2003;
- Two questions have been added at the end to provide further clarifications to interested parties.

Cost Data

1. *How are costs used in the model? What are the cost and volume assumptions used to calculate the per connection cost?*

For full unbundling, the OXERA CBA report sets out the costs used in the case of specified services on page 41 (see the indented section ‘LLU costs’) and from pages 42 to 48 in the case of designated services. These sections of the OXERA CBA report step through the derivation and use of costs in the model. For example, in deriving prices:

- Specification: The \$X annual per connection figure (‘LLU costs’ on page 41) is, as stated in the text of the report, based on TCNZ’s IS system set-up costs.⁸ For specification, prices are calculated on a retail-minus basis and therefore the individual cost categories (e.g. co-location, backhaul and tie cables) are not included as relevant cost categories in the calculation of retail prices. Rather, prices are derived using the \$X annual per connection figure. For a worked demonstration of this, see the ‘LLU spec’ spreadsheet in Part 3a to this note.
- Designation: Prices under designation have been estimated using a bottom-up approach, where the different relevant cost categories have been considered in order to construct the retail price. These cost categories include the cost of DSLAMs, backhaul, co-location, tie cables, switch and infrastructure connectivity, ISP costs core network costs and marketing and customer service costs. For a worked demonstration of this, see the ‘LLU desig’ spreadsheet in Part 3a to this note.

Entry decision: Separately, cost data are also used in the NPV calculation to determine whether entry occurs. Under LLU, data set-up costs include co-location costs, backhaul costs, and tie cable costs. Voice set-up costs under LLU include the costs of backhaul, tie cables, and switch and infrastructure connectivity. For example, the costs to establish LLU telehousing space in an existing exchange include provision of seismic frames and cable trays, fire protection, air conditioning, power, project management and contingency allowance, as advised by TCNZ.

⁸ NB. This no longer includes the “the costs of regulatory submissions.”

In addition to set-up costs, there are also ongoing costs. Ongoing costs refer to core network operating costs and in the case of designation include regulatory costs. As explained on page 47 of the OXERA CBA report, these costs have been estimated using British Telecommunications (BT's) proportion of network OPEX over total OPEX of BT's wireline business, which was then applied to TCNZ's total OPEX for the wireline business. Hence there is no further breakdown of this cost category. In determining BT's proportion of network OPEX the following cost categories have been considered: main and digital junction switch; local to remote transmission; local to tandem transmission; tandem to tandem transmission; product management, interconnect connections, and data services.

In the NPV entry calculations, IS system set-up costs are assumed to be included in the wholesale connection charge, where the charge assumptions are based on the COVEC data. The rationale for this is that the COVEC estimates result from a benchmarking regression analysis of access rental and access connection charges across countries that have mandated LLU. In a number of cases, such as the UK, the wholesale connection charges make an allowance to recover system set-up costs incurred by the incumbent operator.

Cost-volume assumptions: Pages 41 to 47 of the OXERA CBA report also describe the cost and volume relationships. For example, the middle part of page 45 sets out how co-location set up costs have been varied depending on the size of the exchange. The middle of page 44 describes that in the central case the model assumes that the backhaul costs of providing voice in addition to data services would be around 5% higher.

For an overview of costing, see also Part 1 to this note.

The spreadsheet in Part 3b to this note summarises cost information taken from the Excel model. Part 3b contains Telecom-designated Restricted Information and Commission-designated Restricted Information.

- 2. What are the average number of connections per exchange that are used to scale these costs for the set-up cost calculation, and are these LLU connections per exchange or total connections per exchange?*

In the central case, the model assumes 1,000 connections per exchange. This is set out in section 5.2.3 on page 43 and in a number of places on page 44 in the OXERA CBA report. The figure of 1,000 connections per exchange has been used as a common denominator in order to derive a per connection cost across different variables.

This 1,000 connections per exchange information in the central case was recently re-classified as public information by the Commission on 26 September 2003. See the entry 'Re-designation of certain Restricted Information to Public Information, 26 September 2003' on the Commission's website at:

http://www.comcom.govt.nz/telecommunications/llu/Re-designation_Restricted%20Information.PDF

Specific scenarios

Full Unbundling

- 3. The calculation allocates joint costs (such as copper pair lease) between voice and data services. Do both the voice and data services include the cost of the copper pair lease? How does the model account for copper pair lease costs for customers that take both voice and data service from the entrant?*

Joint costs presented in the model are constructed are follows:

Specification

The prices under specification are the result of a top-down retail-minus approach. The current TCNZ weighted average price for data services is calculated (the existing prices of the services are weighted by the proportion of subscribers taking each service) as the starting point (the base price). It is then assumed that, as a result of entry, TCNZ will increase its productive efficiency and face a lower profit level. This results in a profit and efficiency reduction to the base price. In addition, certain costs of LLU are incurred by both TCNZ and the entrant(s), such as the set-up of TCNZ's Information Systems.⁹

Designation

In the case of designation, a bottom-up approach is used to derive retail prices.

The regulated wholesale prices were based on recommendations by COVEC who estimated wholesale access and line-rental charges for LLU data services. The overall retail prices were derived by summing the wholesale cost with the costs of regulatory submissions, ISP charges, backhaul, co-location and general operating expenditure. See the OXERA CBA report, section 4.2.3, page 26.

The voice only costs under designation have been assumed to be the same as those under specification on the grounds that mandating LLU would not produce any impact on the wholesale (and hence retail) costs of voice only services.

For further details see:

- The OXERA CBA report, 5.2.3, pages 39 to 48;
- The spreadsheet in Part 3a to this note; and
- Appendix 3 of the draft report 'Pricing of unbundled access'– Report by COVEC.

Bitstream access

- 4. Further description of where the entrant interconnects to the Telecom network under bitstream access. What backhaul costs and co-location costs are included?*

⁹ The following text has been deleted from the end of this sentence "and the costs of regulatory submissions."

Figure 3.10 in the Commission's draft report provides the network architecture underlying the bitstream access option. As stated on page 31 of the OXERA CBA report, the access seeker buys a complete service for a high speed e.g. 2 Mbit/s link to the consumer and the service includes delivery to a data switch in Telecom's network. The access seeker would need to arrange backhaul to its own network from this point.

Therefore under the bitstream NPV decision, the costs of co-location and tie cables are not included (the access seeker buys a complete service), but the costs of backhaul are included. The level of backhaul costs is assumed to be same as under full LLU. It is therefore assumed that backhaul is required from TCNZ's local exchange to the access seeker's point of interconnection.

As for each of the other options, core network costs (ongoing costs) are incurred under bitstream access.

These costs are discussed in section 5.4.4 on page 57 of the OXERA CBA report.

For further details, see the spreadsheet in Part 3b to this note.

PDN Unbundling

5. *Further description of the PDN unbundling scenario that includes a description of where the entrant would interconnect to the Telecom network? Are backhaul and co-location costs included?*

The connection is at the Digital Distribution Frame (DDF).

As described in section 4.5.2 of the OXERA CBA report on page 33, only two products have been considered in PDN unbundling: Frame Relay and Digital Data Services.

In the case of the PDN entry decision, set-up costs include:

- Co-location costs (assumed to be the same as those incurred in the case of line sharing);
- Backhaul costs (assumed to be 40% higher than those incurred under line sharing); and
- Connectivity from the DSLAM to the DDF (tie cable costs – assumed to be equivalent to 3% of the sum of co-location set-up and backhaul costs).

As for each of the other options, core network costs (ongoing costs) are incurred under PDN unbundling. These costs are assumed to be the same as those incurred under line sharing

The above assumptions are set out on page 59 to 60 of the OXERA CBA report.

Price Data

Designation prices

6. *Worked examples of the quantification of designation prices?*

Part 3a of this note provides a spreadsheet which shows the derivation of prices under each of the options.

Please note that this spreadsheet contains restricted information.

Under designation of full LLU ('LLU desig' worksheet) the 'voice' only prices under designation have been assumed to be the same as those under specification on the grounds that designating LLU would not produce any further impact on the wholesale (and hence retail) costs of voice only services. Therefore, the voice only prices in table 5.7 of the OXERA CBA report are taken directly from the prices that apply under specification – see the prices for voice only in tables 5.5 and 5.6 of the OXERA CBA report.

7. *The COVEC Excel spreadsheet model for wholesale prices referred to on page 25 of the COVEC report?*

The spreadsheet model is attached in part 4 to this note. Please see the introduction to this note on the use of the COVEC prices in the report.

8. *Annualisation factor formulas, including depreciation type, tax rate, the discount rate, any tilting factors?*

Fixed one-off costs have been annualised over the estimated economic life of the asset using a straight-line depreciation profile. The estimated economic life of the asset varies by asset type and is set out in the relevant places in the OXERA CBA report. For example, connections to DSLAMs have been amortised over an expected economic life of 10 years (page 43 of the OXERA CBA report). Asset lives are also shown in the relevant part of the worked examples in the spreadsheet in Part 3a to this note.

Calculations are on a pre-tax basis. For residential customers only, where prices include GST, e.g. annual charge to residential customers in table 5.4 of the OXERA CBA report on page 39, this is noted in the text.

In central case, the Weighted Average Cost of Capital (WACC) is 13%, the return on sales is 15% and the discount rate is 6%. The application of the WACC and the discount rate is discussed in Part 1 of this note.

9. *Further details on the calculation allocating the first entrant's fixed costs for the purpose of determining the per-connection cost adjustment to the price? Details of averaging assumptions, the make up of the cost and volumes used to calculate the costs on a per-connection basis.*

The spreadsheet in Part 3a of this note demonstrates the derivation of prices under designation of each of the options. This also demonstrates the per connection costs by dividing the costs outlined above by the relevant number of connections.

Please note that this spreadsheet contains restricted information.

10. *Calculation of the LLU onset cost for the purpose of determining the price?*

See the responses to question 1 above for designated services and the spreadsheet in Part 3a and Part 3b of this note.

Please note that these spreadsheets contain restricted information.

Specification Prices

In terms of the counterfactual under both specification and designation, please note that the prices for residential customers in table 5.4 of the OXERA CBA report (page 39) include the corresponding Telecom ISP charges. These are based on the following figures:

TCNZ package	ISP monthly charge (NZ\$)
Jetstream Home 1000	20
Jetstream Home 500	20
Jetstream Starter	34.95

Please see the discussion under ‘Amendments of 14 October 2003’ of this note for an explanation of how these ISP charges are used in the model.

Part 3a of this note provides a spreadsheet which shows the derivation of prices under each of the options.

Please note that this spreadsheet contains restricted information.

If interested parties wish to run sensitivities on price and cost figures the following cells in the Excel model may need amending:

Work sheet input 1:

- Cells D: 58, 59, 61, 62, 170, 171, 173, 178, 179, & 181.
- Cells E: 58, 59, 61, & 62.

Work sheet input 2:

- Cells D: 66, 67, 170, 171, 173, 178, 179, & 181.
- Cells E: 66, & 67.

Work sheet input 3:

- Cells D: 66, 67, 170, 171, 173, 178, 179, & 181.
- Cells E: 66, & 67.

Work sheet input 4:

- Cells D: 58, 66, 170, 171, 173, 178, 179, & 181.
- Cells E: 58, & 66.

11. At p. 39, OXERA states that “costs of NZ\$[X] are allowed per connection,” which will recover both Telecom’s and entrants IS costs, etc. Please provide the inputs into the calculation of these costs.

See also table 1 in part 3b to this note, which gives the IS costs and regulatory costs (Commission-designated restricted information). Please note that the text on page 39 says “certain costs are incurred by both TCNZ and the entrants, including the set-up of TCNZ’s IS system and the costs of regulatory submissions”. The text does not refer to entrants’ IS costs.

Page 41 of the OXERA CBA report sets out the assumptions on how these on-set costs would be re-covered in the case of specification, i.e. they would be shared equally by the access seeker and the access provider and recovered from consumers over a 5 year period. An additional question below has been added to explain the calculation of regulatory costs in more detail.

12. Telecom has provided OXERA with a range of set-up costs to cover IS systems, etc. What is the reason for the selection of costs and the details of how are these fixed costs are converted to a variable cost for inclusion in retail prices? Please provide these calculations.

The data on IS costs come from Table 1 of Telecom's response to question 8.3 by the Commission provided by Telecom on 8th August 2003 in the file 'Outline of IS and Process Costs in response to Question 8.3'. The figures in the 'Low' column in table 1 have been used, as set out at the top of page 41 of the OXERA CBA report (i.e. "the lower bound of the table corresponds to the case of LLU.") This is Telecom designated Restricted information.

The detail of the calculation is provided in table 1 of Part 3b to this note.

13. Analysis of the LLU costs component of the P_2 calculation reveals what appears to be a non-constant value for LLU per connection. This is at odds with OXERA's statement on p. 39 that "costs of NZ\$[xx] are allowed per connection." Please provide the background calculations.

The same value is allowed per connection. Please see the responses to the previous questions and worked examples in Part 3a of this note. Please also see table 1 in Part 3b to this note.

Please note that these spreadsheets contain restricted information.

14. At p. 39 of OXERA it is claimed that "a reduction of 15% [now 10% in the corrected version] of the pre-entry price P_0 is assumed in the central case. This occurs in the first year of specification." However, the model shows a price reduction of only 5.5% occurs in the first year for most products. Is there some other factor not mentioned by OXERA?

The one-off reduction of 15% (now 10% in the corrected model) only occurs in the first year of specification. However, the final prices reflect a combination of factors and not just the 10% one-off reduction. See the spreadsheet demonstrating derivation of specified prices in Part 3a of this note. This demonstrates how the parameters are applied to reach the price falls reported by the end of the 5 year period. For example, in the first year for specification under full LLU for voice and data services, P_2 is 4.1% below P_0 for the previous year for residential customers and 4.3% below for business customers.

Note that page 40 of the OXERA CBA report points out that prices follow a glide path to reach P_2 over a 5 year period. Therefore the full amount of the price fall is not felt in the first year.

The glide path for broadband prices occurs over 5 years when the final price (P_1 or P_2) can be expected to have been reached. This path is an estimate, with slightly more of the price drop occurring in years 1 and 2 relative to years 3, 4 and 5. The glide path is taken from the Excel model and its effect is demonstrated in the spreadsheets in Part 3a of this note.

Further information on the application of the take-up rates is provided below:

The counterfactual

- In the cost-benefit analysis of the case without regulation (the counterfactual) it is assumed that, in a given ESA, up to 20% of *internet households* will take broadband. This is set out in table 2.1 in the OXERA CBA report (called the ‘base percentage’).
- The percentage of internet households is multiplied by the base percentage (20%) to produce the broadband penetration rate for the base case of no regulation (i.e. the counterfactual). For example, in metro areas this is $20\% \times 48\% = 9.6\%$. This is the maximum take-up rate of broadband in any ESA under the counterfactual. The actual take-up rate at an ESA will depend on factors such as the point at which the ESA is DSL enabled.
- To reach this level of 9.6% penetration of broadband under the counterfactual, a glide path of take-up of broadband in ESAs is applied based on the historical take-up rate of PCs in New Zealand. For example, if a metro ESA has a take up rate of broadband of less than 9.6%, it is assumed that take-up of broadband in that ESA will increase, from the point in time the ESA is enabled, at same rate as the historical take-up rate of PCs until a maximum level of 9.6% is reached.
- Under the counterfactual, no real price changes are assumed.

Factual

- In the case of regulation (the factuals), the take-up rates are adjusted to reflect price falls and the impact of increased demand as a result of the price falls. This gives moderated take-up rates for broadband. The results of this are reported in the final column in table 2.1 in the OXERA CBA report. For example, by 2010 the penetration rate of broadband in metro areas reaches a maximum of 20% (as against 9.6% in the counterfactual).
- To reach this level of 20% penetration of broadband under the factual, a glide path of take-up of broadband in ESAs is applied based on the historical take-up rate of PCs in New Zealand. This affects the *rate* at which broadband penetration increases.

Business sector

- The same process as the above is applied in the case of the business sector. It is assumed that internet penetration amongst businesses is 85% (this is the equivalent to the 48% figure in the case of metro residential customers; no geographical split is available for business customers).
- Of these 85%, it is assumed that up to 35% of businesses will take broadband (the equivalent of the 20% figure in the case of residential customers).
- The equivalent figures for unbundling of the Public Data Network are not relevant as no increase in take-up is assumed.

15. *What is the calculation for quantifying the benefits of dynamic efficiency in the prices?*

The effects of dynamic efficiency are not separately identified in the model. Please see the discussion in section 2.3 on pages 12 to 14 of the OXERA CBA report.

Changes since publication of note of 8 October 2003

Two additional questions have been added

16. Has the cost of line splitters at the exchange been included under line sharing?

The cost of line splitters has not been explicitly included. It was assumed that this would be a cost borne by TCNZ and recovered through the wholesale access charge, or through other LLU set-up charges.

17. Further details on regulatory costs

Part 3c to this note sets out the data on regulatory costs used in OXERA's cost-benefit analysis. The note provides assumptions for the purposes of cost-benefit modelling. It contains Commission-designated Restricted Information and can only be accessed by those with appropriate access rights.

PART 3a: WORKED EXAMPLES

The spreadsheet in Part 3a contains restricted information. Please contact Alex Cheetham on 04 924 3686 or at alex.cheetham@comcom.govt.nz if you require access to this spreadsheet and if you have signed the relevant deeds of undertaking and can access Telecom designated restricted and Commission designated restricted information.

Part 3a provides some worked examples of the application of the various assumptions used in the model in order to demonstrate how the final prices are derived. In each case, the spreadsheet shows how the prices under each factual have been constructed, based on the description in the OXERA CBA report. For example, in the case of full LLU it is intended to show how the prices in Tables 5.5 and 5.6 (specification) and Table 5.7 (designation) of the OXERA CBA report were derived. The spreadsheet should be read in conjunction with the amendments that are being notified to parties within this note.

The spreadsheet has been updated from the original version in the light of the further amendments identified in this note.

PART 3b: SUMMARY OF COSTS

The OXERA spreadsheet in Part 3b contains restricted information. Please contact Alex Cheetham on 04 924 3686 or at alex.cheetham@comcom.govt.nz if you require access to this spreadsheet and if you have signed the relevant deeds of undertaking and can access Telecom designated restricted and Commission designated restricted information.

The spreadsheet has been updated from the original version in the light of the further amendments identified in this note.

PART 3c: ESTIMATES OF REGULATORY COSTS

This note sets out the data on regulatory costs used in OXERA's cost-benefit analysis. It does not provide a guide to, nor should not be taken to indicate how, the Commission may act were a change to Schedule 1 of the Act to occur as a result of the section 64 and Schedule 3 investigations. The note provides assumptions for the purposes of OXERA's cost-benefit modelling.

Part 3c is a new section. The note in Part 3c contains restricted information. Please contact Alex Cheetham on 04 924 3686 or at alex.cheetham@comcom.govt.nz if you require access to this spreadsheet and if you have signed the relevant deeds of undertaking and can access Commission designated restricted information.

PART 4: COVEC SPREADHSEET

See attached COVEC spreadsheet. Please note that COVEC did not have the weightings of Telecom customers by product type available to it in constructing this spreadsheet (i.e. the weightings in table 5.3 of OXERA's CBA report).