FINAL REPORT

Product Stewardship Case Study
Cell Phones

Source: Nokia

Prepared for

Ministry for the Environment
Manatū Mō Te Taiao

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Disclaimer

The opinions expressed in this report are those of the author and sector representatives only and do not represent those of the Ministry for the Environment or the Government.

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URS New Zealand has been contracted by the Ministry for the Environment to carry out this End-of-life Cell Phones Product Stewardship study. The study is designed to assist policy development in regards to product stewardship and has the following objectives.

- Under guidance of a sector group, study the issues associated with the recovery of end-of-life cell phones, case study any existing product stewardship schemes to address this and establish what assistance a national product stewardship policy could offer.
- Develop a process that results in a policy well matched to the needs of industry and assists industry groups in understanding what the implications are, if any, of that policy proposal for existing scheme

A fully-fledged product stewardship scheme for cell phones would be directed at improving environmental performance across all components of the cell phone life-cycle – manufacture, distribution, use, collection and disposal. Manufacturers would be encouraged to investigate better Design for Environment options (such as increasing lifespan and more effective disassembly) and there would be some evaluation on means to minimise distribution distances. Consumers would be educated regarding the most environmentally responsible use of cell phones (such as increasing lifespan and reducing energy consumption). The focus of this evaluation, however, is only on issues arising from the disposal of cell phones.

Internationally, disposal of old cell phones is rapidly becoming a significant environmental and social issue. Approximately 1.7 billion people use cell phones as their main form of communication. Every second, 23 mobile phones are manufactured. Globally, in 2003, 470 million cell phones, equating to 61,000 tonnes, were discarded. Based on research in Australia, New Zealand and the United Kingdom only about 10–15% of "discarded" cell phones are sent to landfill. The remainder are either passed on to friends and family or stored in drawers.

Initial information collection for this study has been completed through research and one-on-one discussions with sector group members, such as network providers Vodafone and Telecom and broader stakeholder groups. An evaluation framework was then developed to help with analysis. An initial evaluation report was prepared and circulated to the two Cell Phone Sector Group participants – Vodafone and Telecom – to obtain their input and feedback. The report was also reviewed by the Ministry for the Environment and our independent peer reviewer for the project – Susie Wood.

The key findings from our review of the cell phone sector in New Zealand, and specifically the currently proposed phone take-back scheme, are listed as follows.

- It is not possible to evaluate effectiveness and stability of the proposed schemes until they been fully functional for a period of time.
- The proposed schemes should significantly increase the numbers of end-of-life cell phones being recovered by Telecom and Vodafone – and hence contribute to an environmentally related objective of resource recovery and diversion of waste from landfill. The schemes do not, however, fulfil the government policy objectives of transparency, communication and education. This was anticipated as they have not been specifically designed to fulfil central government requirements.

- The proposed schemes are being put in place to improve the environmental and social performance of Vodafone and Telecom. Indirect benefits are closely linked to customer service and company reputation.
- The proposed schemes would not be affected by the Ministry for the Environment's preferred product stewardship policy mix, assuming that neither a formal product stewardship agreement nor regulatory intervention was applied to the cell phone sector. On the basis of overseas initiatives, an e-waste accord could however be developed, and this could potentially enhance the currently proposed schemes.

The issues and barriers associated with recovering more end-of-life cell phones are not considered insurmountable and have been used as a basis for recommendations. The issues that have been addressed include:

- the costs of educating consumers to bring back cell phones;
- cell phone waste volume as a proportion of the overall e-waste;
- available markets for refurbished phones;
- the need to adjust the Secondhand Dealers and Pawnbrokers Act;
- the implications of EU initiatives;
- the potential role of manufacturers and service providers;
- the need for target setting in New Zealand.

Our recommendations do not include any regulatory or fiscal intervention by the Ministry for the Environment into the existing or proposed cell phone product stewardship initiatives. The results of this evaluation clearly show that the industry (in this case Vodafone and Telecom) are working through and resolving issues and barriers to effective phone take-back schemes without the need for fiscal or regulatory intervention from government (with the exception of some specific changes to the Secondhand Dealers and Pawnbrokers Act).

It is difficult to envisage how this type of regulation would operate in this sector as the phone tack-back rates have, to date, been very low and are highly dependent on the existence of significant awareness programmes educating consumers about the need to return phones. Some form of financial incentive would be required and this money would need to be built into the price of the phone. The only "upside" would be ensuring all operators within the cell phone market, including parallel importers, would take responsibility for phone tack-back. This is not considered a significant gain as both Vodafone and Telecom have no specific concerns regarding parallel importers as "free-riders" in the sector.

We do not recommend any proposal to investigate a joint Vodafone/Telecom phone take-back scheme. Both organisations are proceeding with well-designed, individual schemes and there are unique properties in each of their markets (for example different network technologies) that will hinder the effectiveness of any joint proposal.

We believe that this situation will not change significantly in the future. Even if the return from refurbished phones decreases and the economics of the business case alter, the fundamental driver behind the existing schemes is to do with company environmental and social responsibility and customer service. Neither of these two drivers are expected to be affected by relatively minor changes in the cost dynamics of the specific schemes.

The analysis carried out during this case study supports the conclusion that cell phones do not constitute a significant waste management issue in New Zealand at this point. This situation could change, however, as a growing number of cell phones are disposed of at landfills.

There are significant "costs" associated with developing and implementing sector-specific targets. These include consultation to agree on the target and ongoing monitoring and enforcement. These costs need to be balanced against the benefits of such a target – not only in terms of perhaps diverting more cell phones from landfills but, probably more importantly, raising general awareness of the issue and providing an opportunity for the private sector to "celebrate" as targets are reached.

Given the fledgling nature of the current Vodafone and Telecom phone take-back schemes and the current relatively small volume of cell phones going to landfills, we do not believe specific targets should be developed for cell phones. The tentative business case model for these schemes (that is tangible costs and non-tangible, though nevertheless worthwhile, benefits) mean that a prescriptive government approach to targets could detract from, rather than assist, responsible waste management for cell phones. This recommendation should be revisited in a year's time, once the existing proposed take-back schemes are established.

The volume of e-waste, of which cell phones form a component, does constitute an issue for landfill space and the generation of hazardous leachate. We believe that, at this stage, any initiative to develop targets (for example diversion from landfills) should therefore apply to all of the e-waste products and not specifically to cell phones. The recommendation to set targets for minimising electronic waste per household (as opposed to specific cell phone targets) is consistent with the trends overseas for electronic waste.

If a target for e-waste is developed in the first instance, the situation for cell phones specifically could be continually monitored. If there is a growing concern that cell phones are creating unacceptable impacts at landfills, either from a space or a leachate contamination perspective, the need for a specific cell phone target could be revisited.

Any further developments on plans for target setting should refer to the lessons being learnt from the Packaging Accord where different organisations and sectors are contributing to the successful development and implementation of targets.

Our recommendations are as follows.

1. The Ministry for the Environment, regional councils and local councils support Vodafone and Telecom in their efforts to educate consumers regarding the benefits of bringing back cell phones.

2. The Ministry for the Environment establish a multi-disciplinary, cross-sector Product Responsibility Authority – potentially as an extension to Environmental Choice – to act as a facilitator and educator regarding potential product stewardship related initiatives.

3. The Ministry for the Environment should consider a requirement for both Vodafone and Telecom to report back to government on scheme performance.

4. The Ministry for the Environment work with the entire e-waste sector to investigate the potential for an e-waste product stewardship scheme or accord, including targets and mechanisms for diversion of e-waste from landfills in line with overseas practices.

5. The Ministry for the Environment continue with work on revising the Secondhand Dealers and Pawnbrokers Act to ensure that it is not a barrier to cost-effective product recovery schemes, such as that proposed by Vodafone.

6. The Ministry for the Environment support the business case for environmentally responsible practices, such as phone take-back schemes, by including these in considerations for government procurement through the Govt^3 programme.

7. The Ministry for the Environment work actively with both Telecom and Vodafone to promote phone take-back schemes through charities, youth groups and schools.

8. The Ministry for the Environment work with youth groups, Telecom and Vodafone to further develop initiatives targeted at the youth market and encouraging youth to return phones.

9. The Ministry for the Environment encourage local councils to consider implementing collection points for phones, for example covered bins at refuse transfer stations.

10. Vodafone, through its international market size and influence, continues to encourage manufacturers to increasingly consider environmental considerations in product design. (Note that this recommendation relates more directly to the manufacturers themselves but these have not been involved in this study.)

11. Vodafone and Telecom investigate the feasibility of lease options for cell phones that would ensure much greater phone return figures.

12. Further consideration is given (for example through the proposed Producer Responsibility Authority or an expanded Environmental Choice programme) to the role of retailers in take-back schemes for cell phones and other products.

13. The Ministry for the Environment consider a further evaluation of both the proposed Telecom and Vodafone schemes in approximately 12 months' time, once the schemes have been functional for a period.

1.1 Background and study scope

URS New Zealand has been contracted by the Ministry for the Environment to carry out this End-of-life Cell Phones Product Stewardship Study.

This study is expected to assist policy development in regards to product stewardship. It follows from the discussion paper on product stewardship released in August 2005. The document looked at ways of improving the effectiveness, stability and uptake of existing and future schemes. In particular, it is proposed that light-handed legislation is introduced to back-up voluntary arrangements when needed. A number of specific case studies have been commissioned to examine the interaction of a product stewardship policy with the sector. The five case studies that have been commissioned are cell phones, whiteware, paints, used agricultural chemical containers and tyres.

In New Zealand, and for the purposes of this survey, product stewardship is defined[1] as "an approach whereby producers, importers, brand owners, retailers, customers and other parties involved in the life-cycle of a product accept a responsibility for the environmental impacts of the product through their life-cycle".

A fully-fledged product stewardship scheme for cell phones would be directed at improving environmental performance across all components of the cell phone life-cycle – manufacture, distribution, use, collection and disposal. Manufacturers would be encouraged to investigate better Design for Environment (DfE) options (such as increasing lifespan and more effective disassembly) and there would be some evaluation on means to minimise distribution distances. Consumers would be educated regarding the most environmentally responsible use of cell phones (such as increasing lifespan and reducing energy consumption). The focus of this evaluation, however, is only on issues arising from the disposal of cell phones. The manufacture, distribution and to a certain extent, use, components of the cell phone lifecycle are not able to be significantly influenced in New Zealand – primarily because of the small size of our market. Product stewardship, as applied to cell phones in New Zealand therefore becomes environmentally responsible reuse, recycle and disposal options.

Internationally, disposal of old cell phones is rapidly becoming a significant environmental and social issue. Approximately 1.7 billion people use cell phones as their main form of communication. Every second, 23 mobile phones are manufactured. Globally, in 2003, 470 million cell phones, equating to 61,000 tonnes,[2] were discarded.[3] Based on research in Australia, New Zealand and the United Kingdom only about 10-15% of "discarded" cell phones are sent to landfill. The remainder are either passed on to friends and family or stored in drawers.

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1 Ministry for the Environment. 2005. *Product Stewardship and Water Efficiency Labelling: New Tools to Reduce Waste. Discussion Document.*

2 Assuming an average cell phone weigh of 130 gms.

3 Statistics obtained from Motorola website.

According to latest figures released by the Ministry for the Environment, discarded electronic equipment (e-waste) currently generates up to 80,000 tonnes of landfill waste a year. Consumers increasingly expect companies and retailers to have initiatives in place that allow the responsible return, recycling and reuse of used electronic goods, and most companies in the telecommunications industry, both manufacturers and network providers, have now recognised this and have adopted internal environmental policies for recycling their products. Cell phones are a small, but important component of the overall e-waste generated.

1.2 Objectives

The key objective of these case studies is to assist in the development of a central government position on product stewardship policy in New Zealand (including non-regulatory mechanisms) that is well matched to the needs of the industry. The agreed approaches is to 'case study' or thoroughly evaluate existing schemes and their potential interaction with the Ministry's proposed policy, and to use this as a basis for recommendations on an appropriate policy framework and further scheme development.

The Ministry wants this project to:[4]

- under guidance of a sector group, study the issues associated with the recovery of end-of-life cell phones, case study any existing product stewardship schemes to address this and establish what assistance a national product stewardship policy could offer;
- develop a process that results in a policy well matched to the needs of industry and assists industry groups in understanding what the implications are, if any, of that policy proposal for existing schemes.

The specific terms of reference for the study are to:

- describe the end-of-life cell phone problem and the stakeholders involved;
- describe current schemes;
- evaluate how the current schemes perform and their on-going stability;
- estimate potential performance and environmental and economic benefits of achieving this;
- assess, design and cost tools needed to achieve the scheme's potential;
- assess whether the availability of regulatory tools could further increase scheme potential, and if so, justify timing and intervention.

[4] Ministry for Environment. February 2006. Used Cell Phone Recovery Product Stewardship Study Brief.

1.3 Case study approach

Both the existing private sector cell phone product stewardship schemes and the central government product stewardship policy are in early stages, and are therefore being developed in parallel. Although both Telecom's and Vodafone's scheme have been running for a number of years, they are currently being significantly expanded upon and relaunched as the existing schemes were deemed to be ineffective. At the time of writing this report (April 2006) the Vodafone scheme was about to be launched and the Telecom scheme was in advanced stages of planning. As a result, we have adopted the approach of evaluating the proposed schemes (as opposed to existing schemes) for this case study.

We believe that this approach provides a more robust input to the potential for government, through potential policy, regulatory or financial intervention, to promote and support the proposed schemes. Experience with the previous schemes has, however, also been taken into account as a means of establishing the barriers to success – essentially what works and what doesn't. This process of evaluating existing schemes has obviously already been carried out by both Vodafone and Telecom to inform development of their new schemes.

Initial information collection has been completed through research and one-on-one discussions with sector group members, such as network providers Vodafone and Telecom and broader stakeholder groups. An evaluation framework was then developed to help with analysis. An initial evaluation report was prepared and circulated to the two cell phone sector group participants, Vodafone and Telecom, to obtain their input and feedback. The report was also reviewed by the Ministry for the Environment and our independent peer reviewer for the project, Susie Wood. A list of the stakeholders that were consulted during this case study evaluation is provided in Appendix A.

1.4 Currently preferred product stewardship policy

In the recently released discussion document[5] the preferred product stewardship policy mix was described as having two main features:

- Product stewardship agreements – to be negotiated and signed by industry sector, either collectively or by individual firms.
- A regulatory safety net – enabled by new legislation to allow regulation of free-riders (defined as organisations benefiting commercially by not adopting product stewardship practices and therefore saving on operational costs) and allow for mandatory schemes, where necessary.

Under this approach, the government would focus on high priority wastes – defined as those with significant problems with disposal.

[5] Ministry for the Environment. 2005. *Product Stewardship and Water Efficiency Labelling: New Tools to Reduce Waste. Discussion Document*.

The effects of this preferred policy mix on the current initiatives within the cell phone sectors will be assessed as part of this report. The assumption is made that the cell phone sector will not be identified (in their own right, as opposed to being part of the electronic or e-waste mix) as a high priority sector and therefore will not be a candidate for the second feature that is the regulatory safety net.

2.1 Product life-cycle and technologies

The cell phone life-cycle includes design, manufacture, distribution, use and disposal (or, alternatively, refurbishment or recycling components.). There are a number of international studies evaluating the life-cycle environmental costs and benefits for cell phones. Vodafone, for example, recently commissioned a report by Forum for the Future[6] which investigated a "whole of life" approach to environmentally and socially responsible management of cell phones. The report concludes that the responsibility for responsible reuse of phones, or recycling of handsets should be ascribed to everyone involved:

- operators and retailers run handset return schemes that lead to reconditioning or recycling of handsets;
- handset manufacturers can contribute by designing handsets that are easier to disassemble and recondition.

From our discussions to date, this "whole of life" approach to cell phones is similarly supported by Telecom.

As discussed in Section 1.1, this particular case study is focused on the disposal phase of the cell phone – what benefits can be realised by diverting cell phones from the spare drawer or the landfill, and what government support is needed in this endeavour. In this regard, it is more a cell phone waste management study, as opposed to an evaluation of potential product stewardship initiatives applied to other components of the cell phone life-cycle such as manufacture and distribution.

Technologies for cell phones are evolving rapidly and this has some implications for product stewardship. As cell phones become mobile "life managers", with built-in access to the internet, email functions, video-calling and other features, there are some security concerns arising from re-sale of phones. Significant amounts of personal information may be contained within the phone memory and passed on to a second user. The rapidly evolving technology does, however, allow for greater use of second hand phones. It creates a market where some customers will continue to purchase the latest technology and others will purchase a second hand product with older, less sophisticated technology features but at significantly less cost. The rapidly evolving technology therefore reduces manufacturer concerns regarding "cannibalising the market", which is discussed further in Section 5.3.

[6] Goodman J. 2004. *Return to Vendor: How second hand mobile phones improve access to telephone services*, report prepared by Forum for the Future for Vodafone, November 2004.

2.2 Responsibility for phone take-back

All of the existing and proposed New Zealand initiatives with respect to responsible phone reuse and recycling have been, and continue to be, put forward by New Zealand's two main service providers – Telecom and Vodafone. Our study has therefore focused on these schemes, and the extent to which they can be supported by government. It is interesting, however, to evaluate the "drivers" for this responsible approach to end-of-life cell phone management and why, thus far, it has been carried out by the service providers as opposed to the manufacturers.

In New Zealand, as is discussed in detail in this report, there are sound customer service reasons for the service providers to initiate cell phone take-back schemes. Additionally, the service providers are directly involved in the retail market and there is therefore a strong, direct relationship with the consumer that is returning the phone – in a sense many consumers regard their phone units as "Vodafone" or "Telecom", as opposed to the manufacturer. This situation differs from the situation overseas, for example in Europe where, as a result of the European Union (EU) Waste Electronic and Electrical Equipment (WEEE) initiative, there is a mandatory requirement for manufacturers to take-back their phones. In New Zealand, with the responsibility for this function being taken on by the service providers, the manufacturers are in essence "free-riders" in the scheme and are not being asked to shoulder any costs for responsible end uses for their project.

We believe that, for the purposes of this study, the most effective approach is to proceed on the basis that the service providers are well placed to act as "custodians" for responsible phone end uses. The very presence of the existing and proposed schemes support the business case for this situation. Adoption of responsibility by the service providers is particularly valid for the New Zealand situation where the market is small and therefore, from the manufacturers perspective, would not warrant the investment in infrastructure required to collect individual brands of phones. It is also much simpler for consumers and retailers to be returning phones to one or two "points", as opposed to different manufacturers.

Having established this starting point, however, it should also be borne in mind that the role of the service providers in the responsible management of used phones may not be inherently stable. The stability of the schemes is directly linked to the continued motivation of both Vodafone and Telecom – which will be determined by the ongoing cost/benefit analysis from each of their individual company's perspective.

To mitigate this risk we are recommending that the potential role of the manufacturing organisation in these schemes is evaluated in the New Zealand context in further detail. There are some inherent barriers from the manufacturers' perspective to full support of phone take-back schemes. These are discussed further in Section 5.3 and relate to "cannibalising" the markets. The manufacturers may, in some cases, be reluctant to support increased proportions of "second hand" cell phones in a market where they sell new phones. Despite these constraints, there are a number of current international joint initiatives evaluating options for more cell phone product stewardship. In Europe, for example, Vodafone are involved in a joint initiative with Nokia and a raft of other network service providers

and manufacturing companies (including Epson, France Telecom, Intel, Motorola and Panasonic) evaluating the potential for DfE for cell phones.[7] DfE options are numerous and include:

- reducing the use of halogen containing polymers in the plastics used for product packaging;
- eliminating the use of chlorinated and brominated flame retardants in moulds;
- eliminating the use of heavy metals and softeners (for example, phthalates) in plastics;
- reducing the standby power consumption of phone chargers;
- increasing the amount of recycled materials in product components;
- analysing optimum cell phone life span;
- implementing a system for selecting suppliers whose components have the lowest life-cycle environmental impacts.

In addition to this initiative there are a number of related manufacturing/service provider projects being completed overseas – many of which Vodafone is an active participant in. These include the Mobile Phone Partnership Initiative and the Mobile Phone Working Group.

These projects are critically important but not fundamental to charting the way forward for New Zealand in terms of government role and proposed private sector schemes. We have assumed for this study that the manufacturing driven design improvements will be built into the phones coming into New Zealand. The recommendation is therefore to further evaluate potential joint initiatives, in the New Zealand context, with the manufacturers and to track the work occurring overseas in this area.

Also, in terms of success and stability of New Zealand phone take-back schemes, there may be more to be learnt from overseas examples, in particular concerning the EU directive. There must be an extensive analysis completed to support the step of introducing mandatory take-back schemes across the entire e-waste sector, including cell phones. The need for mandatory requirements may be linked back to the reluctance of manufacturers. As a result we are also recommending that the "drivers" and "risks" associated with greater manufacturer responsibility, in the New Zealand context, is further evaluated with reference back to the differences between the situation here, and overseas.

[7] Nokia, September 2005. *Integrated Policy Pilot Project. Stage III Draft report. Analysis of Improvement Options.*

2.3 The New Zealand cell phone sector

The following provides an overview of the components of the cell phone product life-cycle in New Zealand relevant to this case study.

Service providers

Telecom New Zealand and Vodafone are the two main service providers for mobile phone networks in New Zealand. Each company has approximately 50% of the market share. Approximately 20% of Vodafone customers are "on account" – which means they are likely to be workplace phones versus the 80% pre-paid individual customers ("prepay"). In comparison, approximately 40% of Telecom's customers are "on account" and 60% are on prepay. Both organisations are keen to increase their market shares in both customer sectors, but in particular the "on account" customers as these require lower transaction and customer support resources.

Cell phone penetration into the New Zealand market is 93%. Neither Telecom nor Vodafone[8] are concerned about additional service providers taking up significant market share in the near future. Telstra Clear have some customers in New Zealand and Econet have been discussing plans to enter the market, primarily at the lower end, for some time.

Phones imported by service providers

Vodafone offers a large range of Motorola and Nokia phones and a smaller range of HP, Panasonic, Sharp, Palm Treo and Sony Ericsson. Telecom, on the other hand, specialises in Sanyo and Nokia branded phones, with a smaller range from Samsung, LG, Palm Treo, HTC and Pantech.

Parallel importers

Parallel Imported Ltd has been operating for four years and now has three mega stores around New Zealand. Companies such as this are able to offer a wide range of "021" (Vodafone) phones. As they buy and sell direct and sell only handsets, their prices are very competitive. There is little information available about the market share that parallel importers have control over, despite repeated attempts to contact Parallel Importers Group. The Ministry for the Environment may wish to obtain further information from parallel importers to find out how they operate and the impact they have on the market.

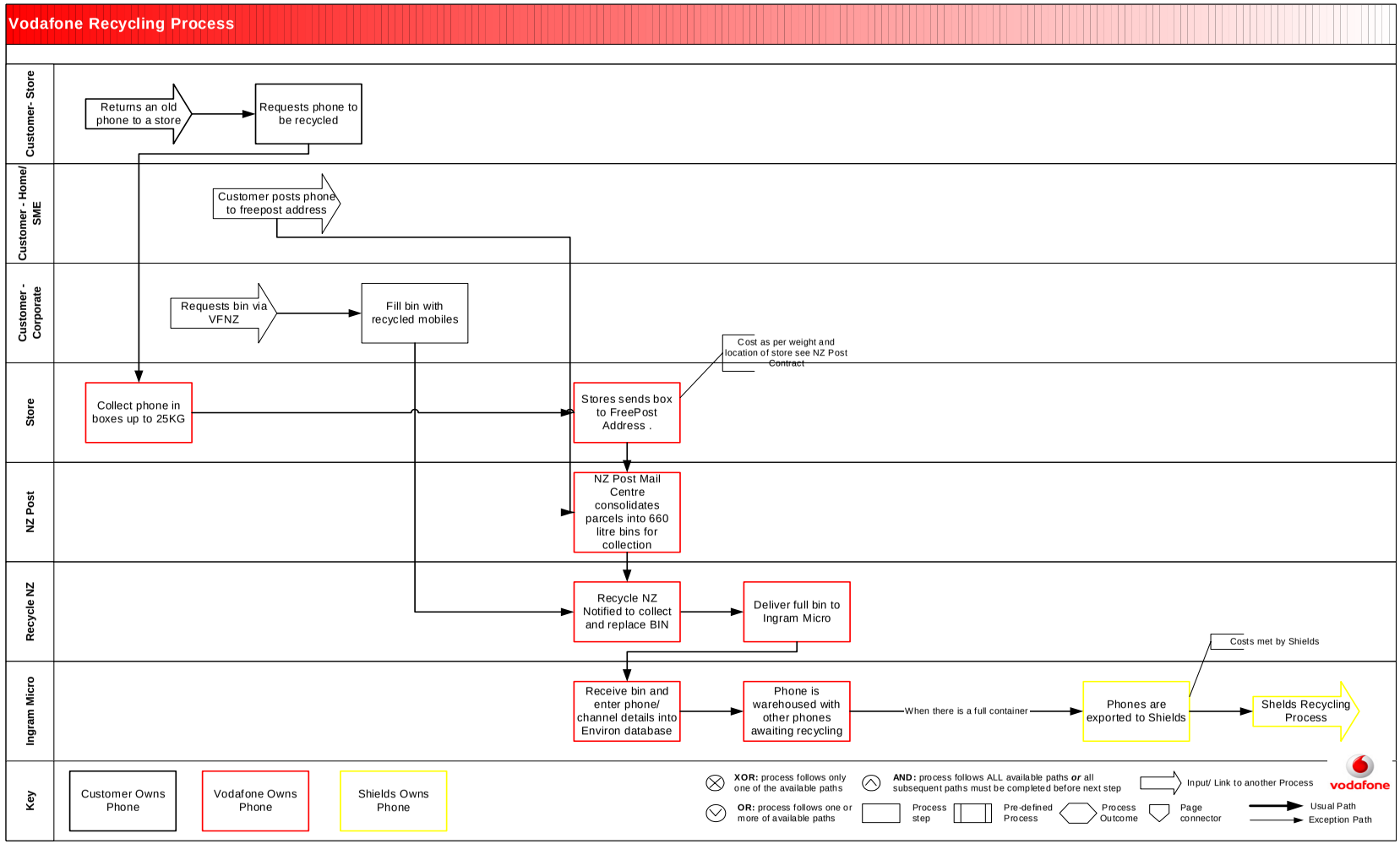
[8] Personal comments received during sector group meeting – Wednesday 29 March.

Retailers

Vodafone and Telecom have stores situated throughout the country. Vodafone own and operate approximately 20 stores and the remainder are franchised. Both Vodafone and Telecom also sell products and services from a range of dealers and electrical stores. Vodafone retailers include 100% Your Electric Store, Bond and Bond, Noel Leeming, First Mobile, Digital Mobile, Mobilefone Solutions, DS Wireless, Vodafone Rentals, Hill & Stewart, Harvey Norman, Smith City/Powerstore, Dick Smith Electronics, Retravision and Farmers. Telecom products are available from a similar range of stores, with the addition of The Warehouse.

Figure 2–1 illustrates the waste disposal stages for the cell phone life-cycle in New Zealand and the key stakeholders involved. Please note that the figure has been provided by Vodafone but with relatively minor modifications could also be applied to Telecom.

Figure 2-1: Vodafone recycling process



Source: Vodafone NZ.

The following is a brief précis of the environmental and social issues arising from disposal of cell phones. It does not cover issues applicable to other sections of the cell phone life-cycle – for example, packaging or Electro-magnetic Frequency (EMF). As described in Section 1.1, this study focuses on cell phone disposal – either at landfill, being discarded, or being collected for refurbishment or recycling.

Phones going to landfills

In New Zealand, approximately 3.5 million people now have a cell phone and they upgrade these, on average, once every 18 months.[9] On this basis, 2.3 million cell phones per year could become obsolete or no longer in use in New Zealand.

Cell phone are part of a growing waste stream. On the basis of anecdotal evidence from Telecom and Vodafone and initial results of some recent market survey work,[10] the most common disposal for mobile phones are "gave it to a friend or family member" or "stored it". Approximately 14% of phones were actually discarded – presumably to a waste bin and therefore landfill. On this basis, 14% of 2.3 million cell phones, or approximately 320,000 phones, are going to landfill every year.

Recent consumer research in Australia[11] suggests that less than 10% of all old mobile phones are actually discarded. This situation reflects the value placed on the mobile phone (and similarly other electronic equipment such as laptops) and the consumer's resistance to dispose of the item. This is likely to be a transitory situation. As mobile phones become more regularly replaced and cheaper, consumers will become increasingly comfortable with the idea of disposing of their old phone.

The numbers of cell phones that could potentially be disposed of at landfills is a significant environmental concern internationally. In New Zealand, the estimated volumes of cell phones currently being disposed of in landfills (320,000 phones per annum or, at 130 grams per phone, about 50 tonnes) is not considered by the sector as a significant environmental concern from a volume perspective. This could, however, grow as more and more phones are considered as disposal items.

Although disposed cell phone volume is not great enough to constitute an issue in terms of landfill space, there is the potential for groundwater contamination issues arising from leachate of chemicals from cell phones and their batteries. In early 2004, the University of Florida conducted a study of the toxicity of cell phone leachate characteristics.[12] The study showed that cell phones (dismantled and exposed directly to leachate producing solutions in accordance with the standard Environmental Protection Authority Toxicity Characteristic Leaching Procedure (TCLP)) did generate leachate lead concentrations higher than acceptable levels.

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9 Ministry for the Environment/UMR Research. January 2006. *Electronic and Electrical Equipment Survey. A quantitative report*.

10 Ibid.

11 Vodafone New Zealand. *Corporate Responsibility Report 2004–2005*.

12 RCRA Toxicity Characterisation of Computer CPUs and other Discarded Electronic Devices. August 2004.

Fortunately, the potentially toxic components of batteries such as cadmium and lead are being increasingly phased out. Sony Ericsson was the first manufacturer to phase out nickel-cadmium batteries in all its mobile phones, and has been working to eliminate lead, halogenated flame retardants and hexavalent chromium as well.

Loose batteries also represent a potential fire risk at landfills.

Phones being refurbished and on-sold

In Europe approximately three quarters of all returned handsets are reconditioned and exported for sale in less developed mobile phone markets. There is thus a definite demand for take-back schemes and facilities to recondition and recycle phones. Significant markets identified by Telecom for their phones are China and India, both of which have significant populations with limited access to income for the purchase of new handsets.

Any proposed refurbishment and on-selling of phones would need to take account of the proposed disposal practices within the country receiving the product. Otherwise, there is a risk of transferring the landfill disposal environmental issues from one country to another. Landfill guidelines and controls in developing countries, for example, may not be as stringent as New Zealand (such as not including requirements for liners and leachate treatment).

Vodafone recently launched a project to assess the socioeconomic impact of mobiles (SIM) in poor countries. The project found second hand phones to be highly beneficial to low-income countries. In Tanzania, for example, only 28% of people in the community survey said they could access a fixed line somewhere in the community, compared with 97% who could access a mobile phone. Mobile networks are easier, cheaper and more flexible to deploy than fixed line communications, and mobile coverage delivers a basic infrastructure of communication to communities that may otherwise be isolated.

Phones to recycling

There are a growing number of facilities internationally that will sort, dissemble and recycle phone components. These include Shields MRI in Australia, AER internationally and Shields in the United Kingdom.

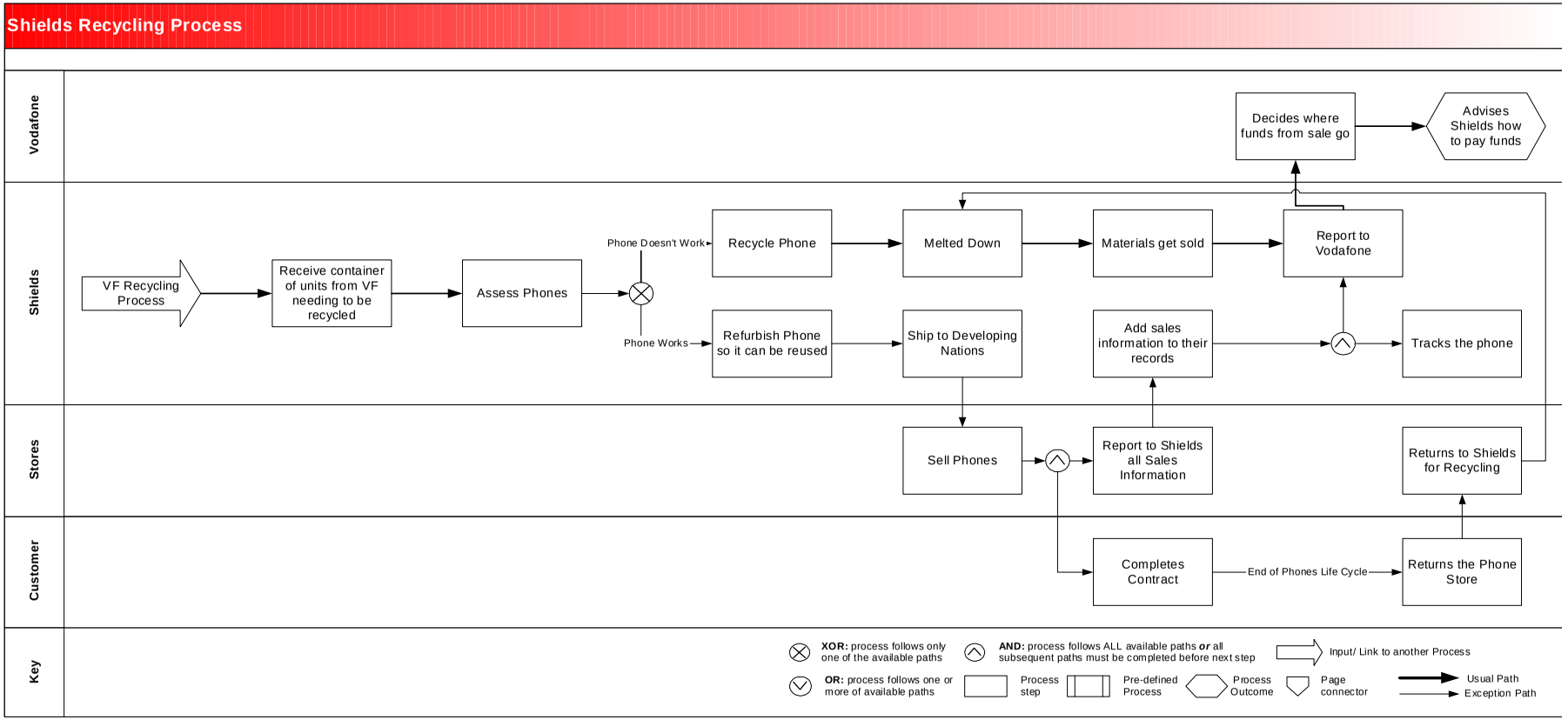
MRI Australia offers end-of-life and end-of-use solutions for computer and telecommunications equipment through environmentally innovative refurbishment, remarketing and recycling. MRI are responsible for recycling all phones collected through the Australian Mobile telecommunications network (AMTA), which is fully explained in Section 5.

AER Worldwide is a leading de-manufacturer with a focus on the redistribution of components and electronic waste stream recycling, providing close-to-source material sorting and destruction services by eliminating unnecessary shipping cost of low value, highly recyclable materials such as steel, base metals, paper and cardboard for customers around the world. The company also tracks, audits and reports downstream material flows on a lot by lot basis.

Shields Environmental is a UK-based company which provides the telecommunications industry with environmental management solutions and recycling support for all types of network equipment and mobile phones globally. Fonebak is a phone take-back scheme developed by Shields Environmental. It is the world's first mobile phone recycling scheme to comply with all current and forthcoming environmental legislation. Phones are refurbished to provide affordable communication in developing countries where the cost of new handsets is prohibitively expensive.

A summary flow chart of the Shields recycling processes is included below.

Figure 3-1: Shields recycling process



Telecom

Telecom was the first company in New Zealand to successfully implement a cell phone recycling programme, by engaging a third party to collect handsets from various store drop-off points. This scheme formally began in 2002, and within the first six months 18,700 phones were received.[13] This costs Telecom very little, as the third party (initially Citiraya, but now likely to be MRI or AER) then sorts the handsets into those that are suitable for refurbishment and those that have no further potential for re-use, due to damage or the age of handset leading to incompatibility with current networks in operation.

Currently the collected phones are being stored in Auckland as Telecom is in negotiations with potential recyclers. A decision on which recycler will be contracted – either MRI (based in Australia) or AER (facilities in California and Malaysia but found worldwide) – is expected by the end of the month. MRI is a sorting house for phones only.

Within the next few months, Telecom proposes to launch an expanded cell phone take-back and reuse/recycle scheme. Telecom is currently developing an expanded educational programme (to encourage phone return), finalising audits of recycling partners and estimating the potential numbers of phones to be recycled.

The proposed scheme is to be added to the existing Telegistics programme, set up recently by Telecom to better manage phone repairs. The collected phones will be earmarked for either recycling or refurbishment. Phones coming in for repair will (depending on repair costs to the consumer compared to a new phone purchase) be either repaired and returned to the consumer or forwarded on to the recycling and refurbishment schemes. Handsets that are earmarked for refurbishment will be sold into developing countries across the Pacific Island region to enable lower income communities to have access to mobile technology.

Vodafone

Vodafone encourages customers to dispose of handsets and accessories in a safe and responsible way, by 1) advertising their return programmes, 2) providing incentives to customers and 3) making it easy for customers to return unwanted phones through pre-paid envelopes or prominent recycling points in retail outlets.

[13] If we assume that the number of discarded phones in New Zealand is approximately 2.5 million per year, and Telecom provided network coverage for approximately half of these and took back approximately 40,000 phones per year, then this equates to a recovery rate of about 0.4%.

In response to concerns about the number of phones being returned (primarily due to lack of customer awareness of this as an option and the resistance to discarding phones discussed earlier in this report), from September 2003 to September 2004 Vodafone undertook a phone return campaign entitled "The Good, the Bad and the Ugly". Under this scheme, for every person who returned their mobile phone for recycling, the Vodafone New Zealand Foundation donated $5 to the Zero Waste New Zealand Trust. In the year to 31 March 2005, customers returned a total of just over 40,000 mobile phones to Vodafone,[14] producing a similar cell phone recovery rate to that of Telecom. Although the scheme was successful, significant awareness and promotion support was required to maintain the scheme profile. Also, there was some abuse as customers returned different components of phones (battery, handset, charger) separately and argued for the $5 fee for each of these. Vodafone made a decision to taper off support for this programme and focus on a new improved programme to be launched in April or May 2006.

Vodafone's future plans to encourage greater tack-back of phones through 2006 and 2007 are three-fold:

- to operate proactive recycling programmes at government, corporate and community level, on request and at no cost to the customer;
- to actively offer consumers and small business a trade-in incentive for old phones when upgrading to a new one;
- to provide a freepost address for customers to send unwanted phones, chargers and accessories back to Vodafone at no cost to the customer.

Vodafone are currently finalising the launch of a major phone recycling initiative for 2006–2007. Details of the scheme are not currently in the public domain.

Based on discussions with Vodafone during this project, the proposed scheme will be implemented in partnership with Recycle New Zealand (an operating division of Waste Management). The new scheme will separately target larger account customers (corporate and government departments) and individual pre-pay customers. Tailor-made literature is being developed to educate staff within the corporate and government departments. There will be trade-in promotion for small businesses. Special bins are to be supplied by Recycle New Zealand on calendar rotation to "low hanging" collection points, i.e. larger public and private sector customers. Vodafone has a target of recovering 50,000 cell phones for the 2006 financial year is 50,000.

Vodafone is currently working on a sales contract with customers to sign, and therefore commit, to "best endeavours" to bring phones back.

The collected phones will be shipped to Shields UK for recycling or refurbishment. Vodafone have arranged a contract with Shields to pay for the phone collection up to the point that they are loaded onto ship. Shields UK will then pay for all transport, recycling and refurbishment costs.

[14] Vodafone New Zealand. *Corporate Responsibility Report 2004–2005.*

Vodafone have agreed on minimum of zero return and possible dividend from Shields, depending on profit margin for recycled components and refurbished phones. However, Vodafone is not currently able to receive a refund due to regulatory issues (see discussion in Section 4: Secondhand Dealers and Pawnbrokers Act). Shields UK are confident they can return a profit, despite much greater transport costs than for UK or European phones.

Vodafone are also offering fixed-line substitution, to encourage completely mobile telecommunications for firms, and are comfortable with the concept of collecting used, fixed-line phones. The business case for this approach is primarily customer service and brand management, i.e. increasing "touchpoints" with the customer.

This approach is aligned with the corporate social responsibility commitments of Vodafone.

Local council initiatives

In 2004, Vodafone was involved in a joint phone take-back scheme with the Auckland Regional Council (ARC) using the council's hazardous waste collection programme – Hazmobile. Approximately 400 phones were collected. Discussions are currently under way between Vodafone and ARC, to extend the service to other parts of Auckland.

A phone recovery scheme has been trialled by SmartManukau, a division of Manukau City Council. A recycling box was located at the Council's Citizen and Customer Centre at Kotuku House. The returned phones were being shipped to Singapore and the components broken down for reuse instead of sending them to landfill. We understand that this initiative is no longer operational.

5.1 Manufacturing companies

Almost every cell phone manufacturing company has some form of recycling or take-back system in place. Below are three examples: Motorola, Nokia and Sony Ericsson.

Motorola

Motorola have recently launched their "Calling all schools! Race to Recycle" programme. It is being promoted as the first-of-its-kind, fund-raising programme for all accredited K-12 schools in the United States. Schools register for the scheme and receive postage prepaid packages for the cell phones. The scheme is a fund raising opportunity for the schools as Motorola buys back the collected used phones (currently USD 3 per phone). The collected phones are sorted and tested for either refurbishment of recycling.

Nokia

Nokia has a stated strategic intent to be a leading company in environmental performance. They have four key focus areas.

- **Design for environment**, where environmental efficiency is taken into account when designing products.
- **Supplier network management**, which aims to reduce the environmental impact of Nokia suppliers' activities.
- **Environmental management systems (EMS)**, a set of ISO 14001-certified environmental management systems for managing the environmental impacts of Nokia's own activities at production sites and facilities.
- **End-of-life practices**, the take-back of equipment at the end of its service life so that materials and energy can be recovered and harmful substances properly disposed of.

At the moment, Nokia phones can be returned to Nokia's own service points or care centres, collection points for the industry sector's take-back schemes, or to municipal collection. Also, operators are organising campaigns for take-back. The mixture of take-back channels varies from country to country depending on the infrastructure and recycling culture.

Since 1999 Nokia has offered its customers a take-back service of its cell phones through Nokia centres globally, from which collected phones are forwarded to approved recyclers. In May 2001 Nokia launched its New Zealand recycling scheme, "The Future is in Your Hands". The scheme encourages customers to dispose of their used or old mobile phones, batteries and accessories (any make or model) at designated Nokia recycling bins, to ensure that these obsolete products are properly recycled and disposed of.

Recycling arrangements are offered as part of commercial contracts with network operators and other organisations.

Working consistently and proactively with its suppliers, Nokia is well on its way to full compliance with the materials restrictions of the EU's directive on the Restriction of the use of certain Hazardous Substances (RoHS), which will apply to electric and electronic equipment put on the market from 1 July 2006. Nokia is actively following the preparation of similar restrictions in other markets.

Sony Ericsson

Activities in the field of environmental protection at Sony Ericsson are based on a life-cycle approach that takes into consideration design, manufacturing, product use (operation), and end-of-life treatment. A Banned & Restricted Substances List has been developed to ensure that only the best and most environmentally friendly materials are used for manufacture. Sony Ericsson has phased out nickel-cadmium batteries from its cell phone range and is also working to eliminate lead, halogenated flame retardants and hexavalent chromium. Product information includes environmental product declarations (which provide information on the most relevant environmental aspects of each product such as material content, energy consumption, batteries, packaging and recycling). Sony Ericsson participates in a range of industry-led phone recycling and take-back schemes.

5.2 Recycling schemes

Fonebak

Fonebak is the world's first and largest mobile phone recycling scheme, and operates with the backing of network service providers and the four major retail chains. Created by Shields Environmental and first launched in the UK in 2001, phones collected from the 10,000 collection points set up across Europe are sent to Fonebak's recycling centre, where they are either repaired, refurbished and packaged for resale in emerging markets, or broken down into core materials such as gold, copper, nickel, cadmium, lithium and plastic for recycling. Fonebak's target is to recycle up to 15 million phones per year.

Giveback

Giveback is a UK initiative whereby end-of-life cell phones are recycled to raise money for charities and community groups. The scheme is run by Corporate Mobile Recycling Ltd (CMR) who have been in operation since 2000 and now recycle more than 50,000 phones every month (600,000 per year).

The Giveback scheme provides community groups such as schools, sports clubs, universities and rotary clubs the opportunity to hand in cell phones that are no longer used in exchange for funding (on average, £6.50 for every handset received). The founders of CMR have developed a number of innovative environmental schemes to encourage companies and individuals to support the scheme.

Australian Mobile Telecommunications Association (AMTA) – Mobile Muster

The Australian Mobile Telecommunications Association (AMTA) launched its national mobile phone recycling campaign, MobileMuster, in December 2005, with its aim to treble the annual collection of mobile phones, batteries and accessories over the next three years from 60 tonnes (approximately 200,000 handsets with batteries) to 180 tonnes per year by 2008.

It is estimated there are currently more than 12 million disused mobile phones cluttering people's homes and offices around Australia.

The Mobile Muster is a voluntary scheme where the participating members provide the necessary funding by paying a levy on each handset sold into the Australian market.

Participating industry members represent over 90% of the market and include handset manufacturers LG, Mitsubishi, Motorola, Nokia, NEC, Panasonic, Sagem, Samsung, Sharp, Sony Ericsson and RF Industries; carriers Hutchinson Telecommunications (3 and Orange), Optus, Telstra and Vodafone and service providers AAPT and Virgin Mobile.

Mobile phone handsets, batteries and accessories are collected through a network of over 1000 mobile phone retail outlets, government agencies and businesses.

The phones are then sent to MRI for sorting and recycling.

RIPMobile (United States)

RIPMobile (Recycle Inactive Phones) is an innovative scheme aimed at young people in the United States. A "customer" logs into the website and identifies their phone type and mobile. They are then sent a postage paid envelope and number of points that accumulate in an awards system. Points can then be exchanged for a range of new products for example, DVD players and iPods.

RIPMobile is a division of CollectiveGood Inc who operate a range of different charity orientated phone recycling schemes. A proportion of the funds received for the collected phones (which are on-sold to sorting, recycling and refurbishment operations) are directed towards charities.

Founded five years ago, CollectiveGood claims to be the United State's premier mobile phone recycling company.

CTIA

The United States-based CTIA (Cellular Telecommunications and Internet Association) is an international organisation that has just launched a new programme entitled Wireless ... the New Recyclable™. Through this new initiative customers are directed to a central website that provides information to common questions in regards to product stewardship from both consumers and product manufacturers of cell phones. It recommends that manufacturers encourage customers to recycle their products by directing them to the programme website. A large number of CTIA members have signed up to the "Wireless – the New Recyclable™" protocols and have schemes in place for recycling mobile phones. The protocol is a set of agreed commitments, listed as follows.

1. Promoting continued product and market innovations that provide consumers with more value and choice while minimising environmental impacts.
2. Promoting the recyclability of products and packaging.
3. Fostering responsible product stewardship practices among customers, suppliers, stakeholders and employees.
4. Informing customers of ways in which they can help ensure the environmentally sound disposal of used wireless devices.
5. Encouraging the collection and, where appropriate, reuse of wireless devices in accordance with applicable CTIA Guidelines.
6. Adhering to the CTIA Guidelines for Recycling and Materials Recovery from End-of-Life Wireless Devices in the selection of recyclers of wireless devices.
7. Striving for continued improvement in environmental performance related to the collection and disposal of used wireless devices.
8. Making publicly available information on the management of used wireless devices through Wireless ... the New Recyclable™.
9. Complying with all applicable regulatory and environmental requirements.
10. Integrating the CTIA environmental principles into business operations.

Key success factors

On the basis of the initial international review work carried out for this study, the key success factors for different phone take-back schemes are:

- investing in high profile consumer awareness programmes;
- providing a clear monetary incentive for customers to bring back phones;
- targeting educational and incentive programmes to youth;
- establishing sound commercial arrangements with phone end-users – that is the recycling or refurbishment companies.

5.3 Related overseas legislative developments

WEEE

New legislation comes into effect in the UK in 2006 called the WEEE (Waste Electrical and Electronic Equipment) Directive. Directives 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment and 2002/96/EC on waste electrical and electronic equipment are designed to tackle the rapidly increasing waste stream of electrical and electronic equipment.

From August 2005, producers hold responsibility for taking back and recycling electrical and electronic equipment. Consumers can return their equipment "free of charge", though the cost of the scheme is presumably built in to the purchase price. This directive will provide the incentive to design electrical and electronic equipment in a more environmentally efficient way, by taking waste management aspects into account. Increased recycling of electrical and electronic equipment will limit the total quantity of waste going to landfill.

RoHS directive

The RoHS Directive stands for the *Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment*. This Directive complements WEEE and will ban the placing of new electrical and electronic equipment on the EU market containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants from 1 July 2006. It is important that manufacturers understand the requirements of the RoHS Directive to ensure that their products, and their components, comply.

The RoHS directive will potentially divert non-compliant phones (for example, end-of-line product) out of Europe and into Australia or New Zealand. This is not an issue for Vodafone as phones are purchased globally and the company expects the same international manufacturing standard for all of its phones. It may not be a significant issue for Telecom as some US states are already producing RoHS-compliant phones.

5.4 Overseas ecolabelling schemes

There are a large number of overseas ecolabelling schemes and many of these have developed labels for telephones. Two of the better known labels are Sweden's TCO and Germany's Blue Angel.

Swedish TCO label

At the end of 2001 TCO Development launched TCO '01 mobile phones, a quality and environmental labelling system for mobile phones covering emitted radiation, usability and environmental factors. There are also ergonomics requirements concerning the design of the keypad, display and user manual as well as the external surface characteristics (allergy risk). Ecological considerations include restrictions concerning heavy metals and flame retarding agents, and certified environmental management systems for manufacturers. There is no specification for phone take-back.

Blue Angel scheme

Germany's Blue Angel scheme is a voluntary eco-labelling instrument introduced in 1977 to guide consumers in purchasing quality products with less impact on the environment, and to encourage manufacturers to develop such products. The programme has grown slowly but now includes more than 3500 products in 75 categories.

In order for the label to be awarded, the programme requires that products take into account all aspects of environmental protection, including the economical use of raw materials. Compliance with quality and safety standards is also required. Blue Angel products are thus characterised by a particularly high degree of environmental soundness when compared with other products. Criteria are re-examined by an independent panel every three years. According to an OECD Report on the Effects of Eco-labelling Programmes, the Blue Angel scheme is considered transparent and credible.

Blue Angel has developed an ecolabel for mobile phones. The label includes specifications for design and also product take-back (manufacturers to take-back at no charge to consumer). There are also specifications for batteries (no lead, cadmium or mercury).

5.5 Summary of overseas findings

In summary, there are a huge number of different mobile phone product stewardship initiatives occurring overseas. These range from:

- manufacturer-led initiatives for improved product design and also commitments for take-back;
- joint manufacturing/service provider/government initiatives covering all aspects of design, use and disposal;
- not-for-profit sector initiatives focused on cell phone take-back as a means of raising money for charities, schools etc;
- government-funded ecolabels for cell phones that include design and take-back criteria;
- government directives that specify mandatory take-back and minimal hazardous material components.

The issue then becomes – what will work best in New Zealand? Before addressing this question, the following provides a brief overview of the main findings from overseas initiatives.

Phone manufacture

Throughout the whole process of handset design and manufacture, manufacturing companies are increasingly taking environmental factors into account. Network providers and distributors often have little say over these issues. Manufacturers are in many cases designing cell phones that are easy to disassemble and have minimal impact to the environment. They are phasing out the use of cadmium and lead in batteries. Product stewardship schemes and joint initiatives are encouraging information exchange amongst manufacturers, and may lead to greater environmentally related research, technology development and demonstration.

Phone take-back

The key obstacle to successful phone take-back schemes is the low consumer take-up of current return programmes, which is thought to stem from low consumer awareness and reluctance from customers to discard old phones. Getting people interested in returning their old cell phones can only be achieved through public outreach, education and awareness.

There is a need for research to determine factors that encourage or deter handset return to improve recovery rates (e.g. charity donations as incentives), and a need for high profile marketing direct to the consumer as well as promotion of recycling in-store. If product stewardship and its value to the environment is well publicised, customers will be more likely to return unwanted phones.

Governance

There is an enormous range of governance structures depending on the initiative. All government-approved product stewardship schemes require specific arrangements for their administration and governance. Monitoring a scheme's compliance is usually the responsibility of the product stewardship organisation administrating the scheme and its governance body.

6.1 Encouraging customers to return phones

There are significant challenges and costs associated with educating and motivating customer to bring phones back. To date, in New Zealand, the two main service providers, Vodafone and Telecom, have adopted several initiatives to educate consumers. The ongoing viability for these initiatives hinges on the business case for their cell phone take-back schemes. Other alternatives for encouraging consumers include use of phone take-back as a fundraising initiative and also internet-based schemes.

Private sector phone take-back schemes

To date, there has been relatively limited success with cell phone handset recovery by both Vodafone and Telecom. Current schemes, at time of writing, are not running effectively. They have poor participation and the disposal of phones has been delayed by the loss of recycling facilities in Singapore.

The major obstacle identified by both Telecom and Vodafone is educating the consumers to return end-of-life handsets to them for refurbishment or recycling. It would seem that the majority of consumers perceive cell phone handsets to have continued value, even after they have finished using them, and prefer to hold onto them, rather than return them. This approach is partly because of the financial outlay associated with the cell phone and the logic that an old "back-up" phone may be useful if the replacement malfunctions. This leads to the issue of whether to incentivise any handset return programmes that are launched, to offset the perceived value of the handset to the consumer. Historically, this has been done by both Vodafone and Telecom by offering free air time per handset returned. This may be, for example, a $5 credit for each component returned, however, Vodafone have already found issues with unscrupulous owners returning their handsets in a broken down form, such as mobile charger, battery and handset separated, and claiming the $5 air time for each component.

Significant investment is required to educate and raise awareness amongst customers. Also there are additional costs (e.g. such as trade-in schemes and free air time) to incentivise customers to bring phones back.

Given the costs and resources required to sustain a successful phone take-back scheme, the scheme operators (in New Zealand's case, Telecom and Vodafone) must be able to establish a significant business "upside". Without this, the schemes could become nonviable commercially and potentially unsustainable.

It is more difficult to quantify the costs of a phone take-back scheme than the benefits. The benefits (put forward by both Vodafone and Telecom throughout this study) arise from the following:

- specifically implementing the organisations' commitments to acting in an environmentally and socially responsible manner;
- providing for more "touch points" with the customer and supporting the notion of an organisation with a "duty of care" to look after their customer and product;
- diverting cell phone from landfills;
- greater resource-use efficiency – either through reusing the whole phone or recycling its components;
- social benefits from being able to supply phones to individuals that may otherwise have been unable to afford one.

School and charity fundraising initiatives

There are a growing number of overseas examples of schools and charities working with either phone manufacturers or service providers to use phone take-back schemes as a means of raising money. These schemes are mostly being developed jointly by the schools/charities and the private sector. Essentially, the school or charity promotes the concept within their community. Individuals are encouraged to bring back used phones, previously stored, to a central collection point at the school. The central collection bin is supplied by the private sector partner, say Nokia, and once it is full it is exchanged for a cash refund.

These types of community/private sector fund raising initiatives provide an excellent way of obtaining used phones and also educating consumers that a phone is more valuable recycled than if stored or discarded. They also focus on young people, who are one of the main users of cell phones.

Internet-based recycling schemes

On the basis of research carried out during this study, there are a growing number of internet-based phone take-back schemes which could potentially be developed in New Zealand to promote phone take-back. The relationship between these initiatives and the currently proposed Vodafone and Telecom initiatives would need to be clearly established.

The internet-based schemes, such as RIPMobile (refer Section 5.0), are targeted at youth, potentially a large "source" of discarded phones.

6.2 The overall WEEE volume

As discussed earlier, the sector representatives involved in this report believe that cell phones do not in themselves constitute a significant waste management issue in New Zealand. The issue is part of a much broader one relating to all electrical and electronic goods.

The Ministry for the Environment considers e-waste a growing environment problem, and notes the following problem wastes in particular:

- information technology – laptops, PCs, printers;
- communications – mobile phones, phones, fax machines;
- whiteware – refrigerators, cookers, washing machines;
- lighting – fluorescent lamps;
- general consumer entertainment equipment – televisions, stereos, DVD players.

Collectively, this constitutes a large and growing component of our waste stream and also a number of hazardous materials. Overseas, the responsibility for the e-waste is being shifted towards the producers. For example, the EU WEEE Directive requires that all 25 EU member states have a system in place for take-back of these items. The financial costs of transporting and treating the collected waste is ascribed to the producers, who were also deemed responsible for taking back all products sold.

The trends in managing e-waste internationally are relevant to this case study, in the sense that they support the concept of any broader government initiative related to cell phone product stewardship to be applied to all e-products, and not restricted to cell phones.

6.3 Markets for refurbished phones

There are a number of separate issues arising from selling refurbished phones.

Cannibalising the market

Although companies such as Nokia and Sanyo have instigated new environmental policies, including product stewardship schemes within the Japanese marketplace, they are not keen to support any reuse schemes. This is based on the fact that any reuse schemes introduced will impact on the new mobile phone market and, as manufacturers, volume is the driving force behind their business. Also reuse schemes, as applied to the manufacturers, are restricted depending on whether the collected phones are CDMA (Telecom) or GSM (Vodafone).

Cannibalising the market should not be an issue for the New Zealand service providers, Telecom and Vodafone, except so far as it could influence their relationships with their suppliers. Findings from Vodafone's *Forum for the Future* study showed that second hand cell phone users are only slightly less lucrative customers for the network provider, spending almost the same on mobile services per month and using handsets to a similar degree. Interestingly, these customers are likely to go on to buy new phones in the future and to continue to use mobile services. It therefore makes commercial sense for operators to build customer loyalty and satisfaction from an early stage by supporting the use of second hand cell phones.

Despite this situation, both Vodafone and Telecom have existing relationship with phone manufacturers. As a result the service providers may have some concerns (not discussed during this study) about the adverse impact on their relationship with manufacturers if they were successfully promoting reuse of cell phones.

Security of data – reused phones

There are also some issues related to the security of data in reused phones, and whether the new owner could potentially have access to information related to the previous owner. This issue has received some media attention and is becoming of greater concern as phones become more widely used for a broader range of functions, for example, emails and internet browsing. A recent survey[15] in the United States found that although only 2% of cell phone users currently use their phones for these applications, up to 20% would like to and the numbers are predicted to grow. In particular, the younger generation are predicted to increasingly be using phones for a wide variety of functions that will require memory, and hence create a potential security issue for reused phones.

Size of market

Telecom has also identified a small potential market for mobile phone reuse within New Zealand, reducing the impact associated with having to ship handsets overseas. They envisage that this will be a very small proportion of returned handsets, due to age, compatibility with new networks and damage; however, this will still deliver benefits to New Zealanders of a lower income group and allow them access to technology otherwise unavailable to them.

Vodafone does not envisage a reuse market within New Zealand, due to the impact that second hand phones would have on their new phone market. They are, following initiatives handed down from Vodafone Global, now investigating opportunities in the UK for handset refurbishment and resale into countries such as Romania and recycling for the remaining phones.

[15] Pew Research Centre – Internet and American Life Project. March 2006.

Telecom use a specific handset technology (CDMA) that can only be used in New Zealand and some countries of the South Pacific. As a result their choice for endpoints for refurbished phones is more limited than for Vodafone.

Legislation

Telecom has found that a licence is now necessary in order to trade second hand cell phones within New Zealand, and chain of custody issues often arise as a result of this legislation. Vodafone are not required to obtain a licence as they plan to send phones overseas for resale.

6.4 Secondhand Dealers and Pawnbrokers Act

The New Zealand Secondhand Dealers and Pawnbrokers Act currently restricts revenues being generated by third parties in relation to used items. The intention of the Act is to restrict the illegal trading of high value items such as jewellery or electronics.

As it currently stands the Act prevents any refund from Shields to be paid to Vodafone. Under the Act, Vodafone cannot receive any dividend from used goods unless it becomes a licensed dealer. Vodafone has made decision not to apply to become a licensed dealer as it does not fit with its core business. Vodafone prefers to wait until current Ministry for the Environment work will help to resolve this issue for product stewardship initiatives. In the meantime, Vodafone propose to receive no funds from Shields. One other alternative (not currently proposed) would be for Vodafone to put refunds into the Vodafone Foundation or possibly "ringfence" the refund for advertising for phone take-back scheme only.

6.5 Parallel importers as free-riders

An effectively operating phone recycling scheme could affect competition as Vodafone handsets may be purchased from a range of suppliers and hence Vodafone is subject to competition from parallel importers. Telecom handsets must be imported from a specific US based supplier and so Telecom does not face any competition from parallel importers.

Potentially, having to support a phone take-back scheme while parallel importers did not would affect Vodafone's competitiveness with the parallel importers. Additionally, the cost of subsidising competitor handsets could make it less competitive with Telecom.

Although this is a potential issue for Vodafone, it must be assumed that this scenario has been included in the development of their business case for increasing phone take-back. That is, the benefits (customer contact, reputation, environmentally and socially responsible business practices) must outweigh the costs (of supporting the scheme) and risks (of losing market share to parallel importers). During the course of this study, Vodafone have not expressed any concerns regarding impact of their proposed scheme on their competitiveness with parallel importers.

6.6 Target setting

The analysis carried out during this case study supports the conclusion that cell phones do not constitute a significant waste management issue in New Zealand at this point. This situation could change, however, as a growing number of cell phones are disposed of at landfills.

There are significant "costs" associated with developing and implementing sector-specific targets. These include consultation to agree on a specified "value" and ongoing monitoring and enforcement. These costs need to be balanced against the benefits of such a target – not only in terms of diverting cell phones from landfills but, probably more importantly, raising general awareness of the issue and providing an opportunity for the private sector to "celebrate" as targets are reached.

Given the fledgling nature of the current Vodafone and Telecom phone take-back schemes and the current, relatively small volume of cell phones going to landfills, we do not believe specific targets should be developed for cell phones Given the tentative business case model for these schemes (that is tangible costs and non-tangible, though nevertheless worthwhile benefits), a prescriptive government approach to targets could detract from, rather than assist, responsible waste management for cell phones. This recommendation should be revisited in a year's time once the existing proposed take-back schemes are established.

The volume of e-waste, of which cell phones form a component, does constitute an issue for landfill space and generation of hazardous leachate. We believe that, at this stage, any initiative to develop targets (for example, diversion from landfills) should therefore apply to all of the e-waste products and not specifically to cell phones. The recommendation to set targets for minimising electronic waste per household (as opposed to specific cell phone targets) is consistent with the trends overseas for electronic waste, as described earlier.

If a target for e-waste is developed in the first instance, the situation for cell phones specifically could be continually monitored. If there is a growing concern that cell phones are creating unacceptable impacts at landfills, either from a space or a leachate contamination perspective, the need for a specific cell phone target could be revisited.

Any further developments on plans for target setting should refer to the lessons being learnt from the Packaging Accord where different organisations and sectors are contributing to the successful development and implementation of targets.

7.1 Evaluation of schemes against government policy objectives

An evaluation framework has been developed for this project to provide a comprehensive set of criteria against which the Vodafone and Telecom End-of-life Cell Phone schemes can be evaluated. The process of this evaluation will generate specific insights and recommendations into how existing schemes could be improved and how government policy can best support these improvements.

Both Vodafone and Telecom are in the process of launching new phone take-back schemes. As a result, the existing arrangements will be superseded. Enough information on the proposed schemes has been obtained to apply the evaluation framework to these, rather than the existing, but soon-to-be-outdated, schemes.

Evaluation criteria

The Ministry for the Environment have requested that the current schemes be evaluated against government policy objectives, environmental and cost benefits (refer to the Ministry for the Environment Used Cell Phone Recovery Product Stewardship Study, Project Brief).

We propose that the existing schemes be evaluated against a set of criteria falling within three broad perspectives: meeting government policy objectives; enhancing environmental and social outcomes (externalities); and stakeholder opportunities and risks.

Our proposed evaluation criteria for each of these three different perspectives are described in more detail in Appendix B.

Evaluation

The following table evaluates the current cell phone schemes based on the criteria outlined above. Where applicable, resultant recommendations arising from the evaluation are highlighted.

Table 7-1: Evaluation of proposed schemes

Criteria	Evaluation
Government policy	
Environmental gains	Note – "environmental gains" is discussed under environmental and social criteria.
Effective and efficient – stable, widespread uptake, minimal risks, benefits outweigh costs, company and public participation	The current schemes could not be defined as "efficient". Firstly, consumers are not motivated to return phones and hence there is no widespread uptake. Secondly, there is no current recycling option available. The limited number of phones that are returned are therefore being stockpiled so the benefits will not be outweighing the costs. This situation is not sustainable. The proposed new Telecom and Vodafone schemes may be efficient, effective and stable but it is too early to draw any conclusions on this as they are not yet launched. There is also the risk, discussed in Section 2.1, that the stability of the service-provider led phone take-back schemes will be dependent on the ongoing business case to continue (benefits vs costs).
Publicly reported performance measures	The schemes do not contain publicly reported performance measures. There may be some public reporting of performance through both Telecom and Vodafone's annual reports. *The Ministry for the Environment should therefore consider a requirement for both service providers to report back to government on scheme performance.*
Transparent	The schemes are not transparent. Details of each scheme are held within the respective organisations. Again there may be some public reporting on the schemes within the Vodafone and Telecom public reports. *The Ministry for the Environment should therefore consider a requirement for both service providers to report back to government on scheme performance.*
Do not reduce market competition	The schemes do not currently influence market competition. If consumer environmental awareness increases, there is a possibility that an effectively running and widely promoted recycle scheme, which positively reflects either Vodafone or Telecom's commitment to environmental performance, may increase their market share. If this was the case, the schemes would enhance, rather than reduce, market competition. An effectively operating phone recycling scheme could affect competition as Vodafone handsets may be purchased from a range of suppliers and hence Vodafone is subject to competition from parallel importers. Telecom handsets must be imported from a specific US based supplier and Telecom does not face any competition from parallel importers.
Safe standards for collection and handling	No details on standards for collection and handling have been provided to URS. We anticipate that given the challenges of gaining consumer buy-in and identifying an economically viable end-use option, the issue of safe handling and collection will not yet have been addressed.
Provides a forum for communication	The existing schemes are very internal to Vodafone and Telecom, and there is limited opportunity for industry-wide communication. *The Ministry for the Environment should consider the development of an across-sector product responsibility organisation that could act as a disseminator of information regarding phone and other product take-back schemes.*
Includes public information and education	There is some educational component in both schemes. Both Telecom and Vodafone are seeking to raise public awareness and therefore encourage people to recycle their phones. *The Ministry for the Environment should consider the development of an across-sector product responsibility organisation that could act as a disseminator of information regarding phone and other product take-back schemes.*
Includes monitoring and reporting on effectiveness	Both schemes will have a monitoring component so the individual organisations can track the scheme performance. These exist within the organisation and there is no public reporting of the scheme effectiveness.
Compares favourably with international best practice	Both schemes are initial attempts to introduce phone recycling and have not been resourced to the extent occurring overseas.
Is compliant with international trade agreements	Both schemes are being designed to be compliant with trade agreements and also international conventions, for example, the Basel Conventions on Transboundary Movement of Hazardous Materials.
Costs of enforcement and management of free-riders	Not applicable at this stage – both schemes are fully private sector independent initiatives. There are, however, significant costs in supporting the schemes and these do generate a risk for ongoing viability of the schemes.
Internalises waste management costs	Both schemes are based on full funding internally. There is no cost being explicitly passed on to the consumer.

Criteria	Evaluation
Environmental and social outcomes	
More efficient use of resources and increased resources recovered	Not currently being achieved, as phones are stockpiled. Proposed schemes will allow for more efficient use of resources.
Effects on biodiversity	Not applicable.
Transport costs	Transport costs are relatively high and are not offset by financial or environmental gains.
Human health effects	Human health impacts have not been evaluated.
Soil resources and water quality	The small volumes of phones being diverted from landfill will not be sufficient to significantly impact on landfill leachate quality.
Relationship with Maori	Unknown, but probably not applicable. There is some evidence[16] that Maori may have a lower awareness of opportunities for the return of electronic goods, including cell phones.
Community benefits through reuse of product	Proposed schemes provide a significant opportunity in supplying refurbished phones to those that may not otherwise be able to afford a phone.
Community business opportunities	Potential, but not being realised as schemes are internal to Vodafone and Telecom only.
User support and buy-in	Currently very poor.
Local and regional economic wellbeing	Potential but not being realised.
Economic security implications	Not applicable.
Stakeholder opportunities	
Branding and reputation	Significant potential to enhance brand and reputation through an effectively operating scheme.
Enhanced product design	Potential for Vodafone globally to influence product design (including easy disassembly, minimal packaging). Less potential for Telecom who are not a large enough customer to influence product design.
Competitiveness/market differentiation	Discussed above (Government policy section).
Business support – company participation	Both schemes have full internal support. There is a significant cost to maintaining internal awareness and buy-in from staff to support the schemes.
Business risks	Risks arise from significant investment required (in particular both community and internal education) to operate an effective scheme. The return on this investment must offset the cost. There is also risk of significant technological advances capable of rendering the returned phones obsolete. The incentive for refurbishing and on-selling would therefore be affected. There may also be risks in other network providers entering the New Zealand market.
Administration costs	Administration costs are high, as phones need to be collected from a large number of points. Tracking systems need to be developed.
Impact on imports	Current schemes could decrease Vodafone competitiveness and therefore increase number of phones being imported by parallel importers.
Implications for trade agreements	Proposed schemes are being developed to be fully compliant.
Safe collection	Discussed above (environmental and social section)

[16] Ministry for the Environment/UMR Research. January 2006. *Electronic and Electrical equipment Survey. A quantitative report*.

7.2 Evaluation of impacts of preferred product stewardship policy on proposed schemes

The currently preferred government product stewardship policy, as described in Section 1, consists of:

- product stewardship agreements – to be negotiated and signed by the industry sector either collectively or by individual firms
- a regulatory safety net – enabled by new legislation to allow regulation of free-riders (defined as organisations benefiting commercially by not adopting product stewardship practices and therefore saving on operational costs) and allow for mandatory schemes, where necessary.

The following evaluation of the effect of this policy mix on the currently proposed Vodafone and Telecom cell phone take-back schemes assumes that cell phones will not be defined as a high priority waste and a regulatory safety net will not be developed. This is consistent with feedback received from stakeholders during this evaluation, and also our recommendations (refer Section 8.0).

The impacts of adopting and implementing the currently preferred product stewardship policy are therefore based on whether or not an official agreement needs to be developed and signed by the industry (working either individually or collectively) and the Government. We believe that, given the previous discussion on the need for target setting for all e-waste as opposed to only cell phones, that any such formal product stewardship scheme would be best developed and applied across the entire e-waste sector.

In summary, the specifics of the currently preferred product stewardship policy, in terms of formally signed scheme agreements or regulatory intervention, should not be applied to the cell phone sector. The more general supporting mechanisms, in particular raising consumer awareness, will, however, be very useful and will serve to support the currently proposed private sector take-back schemes.

Our recommendations arising from review of international practices and the current/proposed cell phone take-back schemes in New Zealand are listed as follows. These recommendations do not include any regulatory or fiscal intervention by the Ministry for the Environment into the existing or proposed cell phone product stewardship initiatives. The results of this evaluation clearly show that the industry (in this case, Vodafone and Telecom) are working through and resolving issues and barriers to effective phone take-back schemes and no fiscal or regulatory intervention is required from government (with the exception of some specific changes to the Secondhand Dealers and Pawnbrokers Act).

We do not recommend any proposal to investigate a joint Vodafone and Telecom phone take-back scheme. Both organisations are proceeding with well designed individual schemes and there are unique properties in each of their markets (for example the GSM vs CDMA technologies) that will hinder the effectiveness of any joint proposal.

We believe that this situation will not change significantly in the future. Even if the return from refurbished phones decreases and details of the commercial "case" alter, the fundamental driver behind the existing schemes is to do with company environmental and social responsibility and also customer service. Neither of these two drivers are expected to change with relatively minor changes in the cost dynamics of the specific schemes.

Any formal government, either fiscal or regulatory, intervention into the currently proposed or future schemes, for example mandatory scheme development or targets for phones to be diverted from landfills, would impact adversely on the schemes. Administrative costs would increase and the organisations could be tied to unachievable performance targets. This situation bears the risk of impacting on what we assume is still a very early, and potentially vulnerable, high-level support for these schemes within both Vodafone and Telecom.

1. The Ministry for the Environment and also the regional and local councils support Vodafone and Telecom in their efforts to educate consumers regarding the benefits of bring back cell phones.

   Education of the public is an important factor and one of the biggest challenges to product stewardship. A key focus of the Government's programme should therefore be appropriate advertising and publicity aimed at educating the public and raising the profile of the options for taking back phones so that consumers recognise its importance and companies in the industry are not left to carry this cost individually.

2. The Ministry for the Environment establish a multi-disciplinary cross-sector Product Responsibility Authority, potentially as an extension to Environmental Choice, to act as a facilitator and educator regarding potential product stewardship related initiatives.

   There is significant "common ground" between the issues and lessons learnt within the cell phone sector product stewardship schemes and other sector schemes. An "umbrella" type product responsibility authority could:

- identify and, where appropriate, implement product-related environmental objectives (for example, overall targets to divert e-waste from landfills);
- act as an exchange of information/learning/experiences that will foster and promote best practice in terms of overall product stewardship initiatives and more specific waste management schemes;
- potentially implement and enforce any proposed sector-specific regulatory or fiscal interventions (not required for the cell phone sector).

Before forming a separate entity, the Ministry for the Environment should seriously investigate the possibility of expanding the existing Environmental Choice organisation to fulfil the requirements of this organisation.

3. The Ministry for the Environment should consider a requirement for both Vodafone and Telecom to report back to government on scheme performance.

4. The Ministry for the Environment work with the overall e-waste sector to investigate the potential for an e-waste product stewardship scheme or accord, including targets and mechanisms for diversion of e-waste from landfills in line with overseas practices.

   As described in this report, we believe that cell phones do not, at this stage, constitute a significant environmental waste disposal issue in New Zealand. Across the entire electrical and electronic equipment sector, however, there is a significant issue. The Ministry for the Environment are well placed to work consultatively (potentially through the product responsibility authority or expanded Environmental Choice described in recommendation 2) with this sector to develop targets and mechanisms to achieve these.

5. The Ministry for the Environment continue with work on revising the Secondhand Dealers and Pawnbrokers Act to ensure that it is not a barrier to cost-effective product recovery schemes, such as that proposed by Vodafone.

   As described in this evaluation, the Ministry for the Environment is currently and we understand, will continue, to work to ensure that the existing and proposed product responsibility schemes (for cell phones and other products) are not hindered unnecessarily by this legislation.

6. The Ministry for the Environment support the business case for environmentally responsible practices, such as phone take-back schemes, by including these in considerations for government procurement through the Govt[3] programme.

7. The Ministry for the Environment work actively with both Telecom and Vodafone to promote phone take-back schemes through charities, youth groups and schools.

On the basis of our initial research into what is happening overseas, some of the most successful cell phone take back schemes are those which are set up as charity fundraising initiatives. We understand that Vodafone are considering trialling this approach with a number of pilot schools. Such a scheme would not need to be developed separate to the existing service provider-led schemes but could be fully integrated within these, primarily as a way of increasing the number of phones being returned.

8. The Ministry for the Environment work with youth groups, Telecom and Vodafone to further develop ideas and initiatives targeted at the youth market and encouraging youth to return phones.

   On the basis of our initial overseas research, successful phone take-back schemes are targeted at youth. There is scope for the Ministry for the Environment and the service providers to work with different youth groups to develop schemes, such as RIPMobile in the United States, that are targeted at youth and encourage phone return. Again these schemes could be built on existing initiatives by Vodafone and Telecom.

9. The Ministry for the Environment encourage local councils to consider implementing collection points for phones, for example covered bins at refuse transfer stations.

10. Vodafone, through its international market size and influence, continues to encourage manufacturers to increasingly consider environmental considerations in product design. (Note that this recommendation relates more directly to the manufacturers themselves but these have not been involved in this study.)

    For environmental reasons, it could be argued that handset manufacturers have an ongoing responsibility to manufacture long lasting products.

    However, the nature of the telecommunications market and the ever-advancing technology in this industry means that many consumers choose to upgrade their phone before the end of its life. As a result, there is currently little consumer-driver (and therefore business case) for long lasting cell phone products. This situation may change as communities and governments recognise that the volume of discarded cell phones (as consumers upgrade every 1.5 years) is not sustainable. The German Blue Angel Ecolabel for cell phones, for example, includes specifications for longevity and these are implemented through consumer guarantee provisions.

    In addition to longevity there is still scope for some design improvement, for example to ensure that components are easily disassembled, batteries are cadmium free and there is as little packaging as possible.

11. Vodafone and Telecom investigate the feasibility of lease options for cell phones that would ensure much greater phone return figures.

    The option of leasing arrangements was discussed during this study. On the positive side, a leasing arrangement will ensure that old phones are returned to be replaced by a newer model. The leasing business model is, however, problematic for high turnaround consumer items such as cell phones. The problem lies in the significant additional administrative costs for Vodafone or Telecom to manage their phone stock as compared with the existing business model where the phones are sold, and some responsibility for take-back is being initiated.

12. Further consideration is given (for example through the proposed Producer Responsibility Authority or an expanded Environmental Choice programme) to the role of retailers in take-back schemes for cell phones and other products.

13. That the Ministry for the Environment consider a further evaluation of both the proposed Telecom and Vodafone schemes in approximately 12 months' time, once the schemes have been functional for a period.

Appendix A
List of People Contacted During Study

Name	Company name
Sera Flint	Vodafone
Nat Garvin	Vodafone
Raphael Hilbron	Vodafone
Andy MacLean	Vodafone
Karl Mischewski	Vodafone
Dean Roscherr	Vodafone
Josh Butterfield	Telecom
Phil Love	Telecom

Appendix B:
Evaluation Criteria for Cell Phones

Government policy objectives

As stated in the project brief issued by the Ministry for the Environment and the product stewardship discussion document, the policy objectives are to ensure that any product stewardship scheme:

- leads to environmental gains;
- is effective and efficient;
- contains publicly reported, challenging, performance measures, quantifiable where possible;
- is transparent;
- does not reduce market competition;
- sets safe standards for collection and handling;
- provides a forum for communication and industry-wide discussion to address any issues;
- includes public information and education components;
- includes provision for monitoring and reporting on effectiveness;
- compares favourably with international best practice;
- is compliant with international trade agreements;
- includes the costs of enforcement and management of "free-riders";
- internalises waste management costs.

In addition to the above, the benefits of any regulatory aspects supporting the schemes should outweigh the costs.

As part of the requirement for schemes to be "effective and efficient", the Government needs to ensure:

- the schemes are stable and there is widespread uptake by the private sector;
- the risks are minimised;
- the scheme benefits outweigh the cost, considering a raft of dimensions including: the nature of the waste (how much, geographical spread) and how it is currently managed (waste tracking mechanisms, other waste minimisation programmes); and other major impacts arising from product manufacture, use and disposal (ie, is waste a significant issue for the product?);
- there is potential for scheme improvement (considering, for example, potential for improved waste minimisation, green design or alternative waste uses);
- requirements for company and public participation.

Administrative costs (from assumed government input) must also be taken into account, including costs of enforcement and management of free-riders.

Environmental and social outcomes

The product stewardship schemes have the potential to affect the following environmental and social outcomes (externalities) including:

- more efficient use of resources;
- increased resources recovered;
- effects on biodiversity and ecosystems;
- transport costs;
- human health effects arising from disposal of hazardous components from the phone;
- soil resources and water quality – landfill leachate through phone contaminants;
- relationship with Maori;
- community benefits through reuse of product;
- community business opportunities;
- user support and buy-in (for example teenage cell phone users);
- local and regional economic wellbeing;
- economic security implications.

Stakeholder opportunities/risks

In addition to environmental and social outcomes (externalities), the product stewardship schemes have the potential to impact on a range of stakeholder groups. These include manufacturers, brand owners, wholesalers, importers, distributors, retailers, service providers, as well as local and regional government.

Potential internal stakeholder opportunities and risks include:

- branding and reputation;
- enhanced product design;
- competitiveness and market differentiation;
- business support, including company participation, maintenance requirements and staff education (which can be compounded if there is a high turnover in a particularly important area, such as sales);
- business risks including changes in industry that could affect the scheme;
- administration costs;
- impact on imports;
- implications for trade agreements;
- safe collection and handling of recovered materials including processing (for example choice of recycler, transport, export issues, eventual fate of phone components).