EWASTE IN NEW ZEALAND: FIVE YEARS ON

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Ewaste in New Zealand: five years on

A report prepared by the eDay New Zealand Trust evaluating the success of eDay in the context of global trends and efforts in New Zealand and the Pacific during the last five years to address the growing challenge of electronic waste.

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This report follows – five years on – from e-Waste in New Zealand: taking responsibility for end-of-life computers and TVs. That publication is no longer in print but is available as a PDF file at www.eday.org.nz. A PDF version of this new report is also available at www.eday.org.nz.

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Contents

1 EXECUTIVE SUMMARY 9

2 RECOMMENDATIONS 14
2.1 Government 14
2.2 Suppliers 14
2.3 Recyclers 14
2.4 Local authorities 14

3 BACKGROUND 15
3.1 Five years on 15
3.2 Recommendations from 2006 16

4 EWASTE RECYCLING IN NEW ZEALAND (2006-2011) 18
4.1 Key points 18
4.2 Ewaste developments 2006-2011 18
4.3 eDay collection events 19
4.4 Local authority concerns 20
4.5 Decreasing price of computers 24
4.6 Falling price of printers 24
4.7 Decreasing price of flat screens 24
4.8 Going digital: the analogue TV switch-off 25
4.9 Prosecution of recycler 25
4.10 Interest in ewaste recycling 26
4.11 RCN e-Cycle scheme 27
4.12 International pressure 27

5 THE EWASTE PROBLEM – SIZE AND TRENDS 30
5.1 Key points 30
5.1.1 Television sets 30
5.1.2 Computer equipment 30
5.1.3 Estimated volume of desktop boxes, CRT monitors and CRT televisions 31
5.2 Television sets 32
5.2.1 CRT televisions 32
5.2.2 Television retail sales volumes and trends 32
5.2.3 Percentage shares of television sales volumes by type: 33
5.2.4 Prices for selected Flat Screen TV sizes, January 2005 – January 2011 33
5.2.5 Television sets – retailers and brands 34
5.2.6 Estimating the total number of CRT television sets 34
5.3 Television disposals 34
5.3.1 When will CRT television sets be dumped? 34
5.3.2 Passing-on option for old CRT TVs being eliminated 34
5.3.3 Approaching a disposal deluge 35
5.3.4 Disposing of flat screen and rear projection televisions 35
5.4 Computers 35
5.4.1 Home market (including some small business) 36
5.4.2 Commercial market (corporates, government, education) 36
5.4.3 Computer suppliers to New Zealand 36
5.4.4 Computer shipments in New Zealand, 2001-2010 37
5.4.5 Whitebox share of the desktop market 38
5.4.6 Computer monitors 38
5.5 Estimating upcoming computer ewaste 38
5.5.1 Desktop computer boxes 38
5.5.2 CRT monitors 38
5.6 Laptop computers 39
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.7</td>
<td>Computer peripherals</td>
<td>39</td>
</tr>
<tr>
<td>5.7.1</td>
<td>Printers</td>
<td>39</td>
</tr>
<tr>
<td>5.7.2</td>
<td>Other computer peripherals</td>
<td>40</td>
</tr>
<tr>
<td>5.8</td>
<td>Other consumer electronics</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>EWASTE RECYCLERS AND RECYCLING PRACTICES</td>
<td>41</td>
</tr>
<tr>
<td>6.1</td>
<td>Key points</td>
<td>41</td>
</tr>
<tr>
<td>6.2</td>
<td>Recycling electronic products</td>
<td>41</td>
</tr>
<tr>
<td>6.3</td>
<td>RCN e-Cycle initiative</td>
<td>41</td>
</tr>
<tr>
<td>6.4</td>
<td>Ewaste recyclers</td>
<td>43</td>
</tr>
<tr>
<td>7</td>
<td>EWASTE REGULATORY ENVIRONMENT IN NEW ZEALAND</td>
<td>46</td>
</tr>
<tr>
<td>7.1</td>
<td>Key points</td>
<td>46</td>
</tr>
<tr>
<td>7.2</td>
<td>Background</td>
<td>46</td>
</tr>
<tr>
<td>7.3</td>
<td>Waste Minimisation Act 2008</td>
<td>46</td>
</tr>
<tr>
<td>7.4</td>
<td>Product stewardship and the Waste Minimisation Act</td>
<td>46</td>
</tr>
<tr>
<td>7.5</td>
<td>A potential regulatory response</td>
<td>47</td>
</tr>
<tr>
<td>7.6</td>
<td>The Commerce Act 1986</td>
<td>49</td>
</tr>
<tr>
<td>7.7</td>
<td>Environmental Protection Authority Act 2011</td>
<td>50</td>
</tr>
<tr>
<td>7.8</td>
<td>Health and Safety in Employment Act 1992</td>
<td>50</td>
</tr>
<tr>
<td>7.9</td>
<td>International policies</td>
<td>51</td>
</tr>
<tr>
<td>7.9.1</td>
<td>Basel Convention</td>
<td>51</td>
</tr>
<tr>
<td>7.9.2</td>
<td>Waigani Convention</td>
<td>52</td>
</tr>
<tr>
<td>7.9.3</td>
<td>United Nations Mercury Programme</td>
<td>52</td>
</tr>
<tr>
<td>7.9.4</td>
<td>Stockholm Convention and brominated flame retardants</td>
<td>52</td>
</tr>
<tr>
<td>8</td>
<td>THE ECONOMICS OF EWASTE</td>
<td>54</td>
</tr>
<tr>
<td>8.1</td>
<td>Key points</td>
<td>54</td>
</tr>
<tr>
<td>8.2</td>
<td>Introduction</td>
<td>54</td>
</tr>
<tr>
<td>8.2.1</td>
<td>Economics and ewaste</td>
<td>54</td>
</tr>
<tr>
<td>8.2.2</td>
<td>What are we dealing with?</td>
<td>55</td>
</tr>
<tr>
<td>8.3</td>
<td>An economic approach to ewaste</td>
<td>55</td>
</tr>
<tr>
<td>8.3.1</td>
<td>Total economic value</td>
<td>55</td>
</tr>
<tr>
<td>8.3.2</td>
<td>What is ewaste?</td>
<td>56</td>
</tr>
<tr>
<td>8.3.3</td>
<td>The economics of reuse, recycling and disposal</td>
<td>57</td>
</tr>
<tr>
<td>8.3.4</td>
<td>What is the policy problem with ewaste in general?</td>
<td>57</td>
</tr>
<tr>
<td>8.3.5</td>
<td>The rationale for intervention</td>
<td>58</td>
</tr>
<tr>
<td>8.3.6</td>
<td>Product stewardship</td>
<td>59</td>
</tr>
<tr>
<td>8.3.7</td>
<td>Summary</td>
<td>60</td>
</tr>
<tr>
<td>8.4</td>
<td>A framework for ewaste management</td>
<td>60</td>
</tr>
<tr>
<td>8.5</td>
<td>Why should government intervene in ewaste management?</td>
<td>61</td>
</tr>
<tr>
<td>8.5.1</td>
<td>Environmental effectiveness</td>
<td>61</td>
</tr>
<tr>
<td>8.5.2</td>
<td>Economic efficiency</td>
<td>62</td>
</tr>
<tr>
<td>8.5.3</td>
<td>Administrative and compliance costs</td>
<td>64</td>
</tr>
<tr>
<td>8.5.4</td>
<td>Revenues collected</td>
<td>64</td>
</tr>
<tr>
<td>8.5.5</td>
<td>Wider economic effects</td>
<td>64</td>
</tr>
<tr>
<td>8.5.6</td>
<td>Non-market effects</td>
<td>64</td>
</tr>
<tr>
<td>8.5.7</td>
<td>Dynamic effects and innovation</td>
<td>64</td>
</tr>
<tr>
<td>8.5.8</td>
<td>Questions on intervention logic</td>
<td>64</td>
</tr>
<tr>
<td>8.6</td>
<td>Product characteristics</td>
<td>65</td>
</tr>
<tr>
<td>8.6.1</td>
<td>Structure of industry</td>
<td>66</td>
</tr>
<tr>
<td>8.6.2</td>
<td>Industry behaviour</td>
<td>67</td>
</tr>
<tr>
<td>8.6.3</td>
<td>Summary</td>
<td>68</td>
</tr>
<tr>
<td>8.7</td>
<td>High level guidance on approach</td>
<td>68</td>
</tr>
<tr>
<td>8.7.1</td>
<td>Looking at the options</td>
<td>68</td>
</tr>
</tbody>
</table>
EWASTE IN NEW ZEALAND — FIVE YEARS ON

17-6 Flow diagram of ewaste recycling in USA 155
17-7 Flowchart for recovery process of scrap metal 156

TABLES
4-1 eDay Results 2006-2010 19
5-1 Number of computers and CRT TVs in New Zealand 31
5-2 Television retail sales trends (2005-2010) 32
5-3 Television sales trends (percentages by equipment type) 33
5-4 Television set price trends (2005-2011) 33
5-5 TV sets: top selling brands (January 2011) 34
5-6 Computer shipments in New Zealand (2001-2010) 37
5-7 Laptop market share (2001 – 2010) 38
5-8 Computer monitor sales trends (2001-2010) 38
6-1 RCN e-Cycle charges (1 May 2011) 42
6-2 RCN e-Cycle recycling processes 43
6-3 ewaste recyclers in New Zealand (May 2011) 43
6-4 E-Scrap price list (1 April 2011) 44
7-1 Current (May 2011) Basel permits relevant to the export of ewaste from New Zealand 51
8-1 Approaches to product stewardship for ewaste: likely outcomes 69
10-1 Comparison of legislation/regulation and organisations involved in ewaste recycling 84
10-2 Participation of stakeholders in ewaste recycling systems 85
10-3 Comparison of ewaste collection and recycling approaches 87
10-4 Comparison of ewaste recycling standards 88
10-5 Comparison of ewaste funding responsibilities 88
10-6 Comparison of cost sharing amongst stakeholders 89
11-1 Customs tariff codes for printers (Australia – New Zealand) 100
11-2 Customs tariff codes for computers (Australia – New Zealand) 100
11-3 Customs tariff codes for televisions & monitors (Australia – New Zealand) 100
11-4 Sample e-Cycle take-back prices (May 2011) 102
12-1 Towards a single PSO in New Zealand 106
14-1 Potential environmental contaminants arising from ewaste disposal or recycling 117
14-2 CRT processing options 120
14-3 Ewaste-related guidance documents 128
17-1 Recycling schemes in different countries of EU 145
17-2 Responsibilities of different stakeholders in the Swiss ewaste management system 148
17-3 Responsibilities of stakeholders in the Irish ewaste management system 151
17-4 Composition of ewaste in Japan, 2009 151
1. Executive summary

E waste is the fastest growing type of waste in the world and is more toxic than normal household rubbish. Computers and other electronic devices can contain toxic heavy metals such as cadmium, lead and mercury. The plastic casing and wiring of computer equipment can also contain hazardous materials, such as brominated flame retardants.

The problem is that landfilling stores the waste rather than allowing for recovery and reuse of valuable materials such as gold. There’s also a risk that hazardous substances will pollute our environment by leaching from landfills into surrounding land and waterways.

eDay was created by the Computer Access New Zealand Trust (CANZ) in 2007 in response to a growing concern about the volume of ewaste being dumped in landfills around the country with a potentially toxic effect on the environment.

Through eDay, organisers aim to raise community awareness of the risks that ewaste poses for our environment. The event offers convenient collection points for consumers (households, schools, small businesses and community organisations) to drop off computer equipment and mobile phones that are no longer being used. End-of-life computer and communications equipment are then recycled in an environmentally sound manner. Since its inception, eDay has grown from 12 participating regions in 2007 to 60 regions across New Zealand in 2010, including a pilot Pacific Island programme in the Cook Islands. Over 3,300 tonnes of ewaste have been diverted from landfill.

In 2010, eDay was run by the eDay New Zealand (eDay NZ) Trust, a new independent community trust set up by CANZ members specifically to promote responsible recycling of electronic waste in New Zealand.

The eDay New Zealand Trust advocates for sustainable and responsible ewaste collection and recycling in New Zealand. To move towards this, the trust aims to raise public awareness of the issue, advocate for product stewardship, promote recycling best-practice and organise collection events to ensure that hazardous and scarce materials are not buried in our landfills, or exported to parts of the world where processing is unregulated and likely to result in harm to human and environmental health.

As Hon Dr Nick Smith, Minister for the Environment, noted in the quotation in the sidebar of this page, it’s time to move beyond eDay to a permanent solution for ewaste. We agree with the Minister in respect of the need for a permanent solution, but we believe it is too early to give up on eDay. Most communities still have no ewaste collection facilities and without eDay, we can expect much of the good work of the last five years to prevent the dumping of ewaste in landfills to be undone. The switch off of analogue television transmissions from September 2012 will create a dumping deluge unless acceptable alternatives are quickly put in place. We do not believe that the RCN e-Cycle scheme that relies on consumers paying $20 to drop off their television will meet this need.

To move beyond eDay, the suppliers of electronic equipment must make provision for the cost of recycling in pricing new equipment and the government must support their efforts with the necessary regulations to ensure a level playing field with all suppliers contributing equitably, especially when it comes to covering the cost of orphan and historic products.

The internationally accepted way to achieve this outcome is through product stewardship schemes. In this report we argue, as we did in 2006, that the only way forward in addressing New Zealand’s ewaste challenge is to progress the development of product stewardship schemes especially for computer equipment and televisions.

We believe a concerted and collaborative effort by all stakeholders is essential. eDay NZ aims to campaign to this effect, seeking collaboration between central and local government, manufacturers, green groups and recyclers to progress towards a long-term scheme suitable for New Zealand.

We will focus on television sets and computer equipment. While this equipment is not the only source of electronic waste in New Zealand, together they represent the greatest volumes and most urgent disposal issues.

**OUR GOAL**

Our goal is to build public, industry and political support for a co-regulatory national product stewardship ewaste recycling scheme in New Zealand. We believe this can be achieved by:

1. Forming an alliance of stakeholders (green groups, recyclers and local government) to support the call for urgent action on computer and TV recycling through a co-regulatory product stewardship approach.
2. Seeking a pledge from brand owners to publicly commit to the development of an industry-developed product stewardship scheme.
3. Seeking a commitment from Government...
to support an industry-developed product stewardship scheme with the necessary regulations to ensure compliance by all suppliers/importers.

The outcome we are seeking is to recover and recycle 80% of ewaste generated in New Zealand by 2020.

**EXTENT OF EWASTE PROBLEM**

The New Zealand Government estimates there are 80,000 tonnes of electrical and electronic waste disposed of into landfills in New Zealand per year; we estimate that 20,000 tonnes of this comes from televisions, computers and computer peripherals.

**Televisions**

- There are approximately 4 million TV sets in New Zealand in homes and hotels/motels. We estimate that 2.2 million of these use cathode ray tube (CRT) screen technology.
- Largely because of the changeover to digital television, most CRT televisions will become unusable and the present option of ‘passing on’ or selling older television sets will soon be effectively unavailable.
- The digital changeover begins in 2012 and ends in 2013. We believe most householders will dispose of their CRT TVs during this period.

**Computers**

- There are about 7.8 million desktop computers in New Zealand (3.0m in homes and 4.8m in business/government).
- It is impossible to accurately assess disposals of desktop boxes. 65,000 were dropped off at the four national eDays (2007-2010). We believe this is only about 5% of the total number of desktops reaching end-of-life. The remainder are either being stored, processed by a commercial or community recycler or being dumped in landfills.
- Computer sales are growing strongly and there is a strong trend to laptop computers.
- The estimated total number of CRT monitors in homes is around 1.9 million. We believe the great majority – say 80% or 1.5 million units – are no longer being used and are poised for final disposal. This represents 2,100 tonnes of lead.
- In 2006 the number of CRT monitors in businesses was approximately 4.4 million. Our best guess is that up to 30% of the CRT stock will have been disposed of, leaving say three million commercial monitors containing over 4000 tonnes of lead.

In summary, the issues are:

- Ewaste is toxic and can harm the environment and human health
- Space for landfills is scarce
- There is an opportunity to recover and re-use valuable materials
- There is an increasing amount of ewaste in the community
- Consumers do not know what to do with their ewaste.

**EWASTE AND THE INDUSTRY**

The major brand suppliers of electronic equipment have all made efforts to address the ewaste challenge; many offer take-back schemes for their own products. These work reasonably well for large corporate customers who are willing to pay the cost of responsible disposal, but are largely ineffective for individual consumers, community organisations or even small businesses.

Some suppliers have demonstrated their commitment to good recycling practices by supporting eDay either with funding or in-kind support, the latter typically being through staff volunteer teams who help out at the eDay collection sites.

There is close alignment between suppliers in the Australian and New Zealand markets and for most of the major brands environmental decisions, including those relating to ewaste, are made in Australia. It is not surprising then that the preference of the major brand suppliers in New Zealand is to align any product stewardship developments with those of their counterparts in Australia.

**CURRENT POLITICAL STATUS**

**Central government**

The Waste Minimisation Act (2008) encourages industries producing products that end up as waste to establish industry-led product stewardship organisations to take responsibility for recycling or otherwise safely disposing of the waste when the products reach end-of-life. The legislation provides a framework for voluntary schemes, or in the event that these are not established, for the nomination of priority products where the government can prepare regulations to enforce compliance.
Executive Summary

Our research has shown that ewaste product stewardship schemes that are voluntary are not durable and have not succeeded anywhere in the world; all permanent solutions which recover and recycle significant volumes have required some degree of government intervention through intelligent regulation.

The focused ‘co-regulatory’ approach to be adopted in Australia to ensure compliance and action by free-riders seems a positive way forward, avoiding the heavy-handed approach of initiatives such as the WEEE Directive in Europe, while at the same time giving importers and suppliers the freedom to innovate and share responsibility for handling all ewaste. This includes effectively dealing with historic and orphan products.

The Waste Minimisation Act (2008) created a legislative framework that provides an excellent opportunity to improve the management of ewaste in New Zealand.

A step forward would be for ewaste to be declared a priority product. The Minister can only do this if he/she is satisfied the product will either cause significant environmental harm when it becomes waste, or that there are significant benefits from the reduction, reuse, recycling, recovery or treatment of the product.

We believe that both criteria have already been met. The environmental harm is well documented and studies in other countries including Australia have demonstrated a net economic benefit from responsible recycling of ewaste.

Local government

Local authorities have an increasing awareness of the growing volumes of ewaste in their community and have limited disposal options to offer. They are naturally concerned that, without an agreed national ewaste scheme, the costs of ewaste disposal could end up as a new charge to ratepayers. Most local communities, especially in smaller and more remote areas, currently see no viable alternative to eDay.

A survey of local authorities involved in the eDay 2010 programme carried out in early 2011 sought their views on addressing the ewaste challenge. A total of 30 responses were received from 25 different cities/districts.

Our overall conclusion from the survey of local authorities is that most are seeking solutions for effective ewaste recycling and, even though some are setting up collection centres, most have serious concerns about the effectiveness of any solution that requires payment by the consumer on disposal.

There is also clear support for further eDays, at least until the success of any other scheme has been demonstrated.

Ewaste and the community

Sales data reports an increase in desktop computer sales and an increase in the sale of LCD and plasma televisions. The current rate of consumerism has led to ewaste becoming the fastest growing waste stream in the world.

However our eDay events have proven a strong willingness amongst New Zealanders to do the ‘right thing’ with end-of-life equipment.

A survey of local authorities involved in the eDay 2010 programme suggested that the majority of community members (90%) are willing to store their ewaste until the next eDay collection event.

An April 2011 NZIER report, The economics of ewaste (see Chapter 8 of this report) also found:

- There is a large overhang of ewaste in the community and this overhang is likely to grow;
- Currently, the costs of ewaste are borne by the community voluntarily. The costs are mostly hidden (non-market costs);
- Non-market costs revolve around the volunteer work associated with eDay activities, storage of ewaste by the community, environmental costs associated with landfills, and health costs;
- New Zealanders seem to value recycling highly, and the richer we get the more highly we value it. This factor needs to be counted as a benefit of a successful ewaste disposal scheme.

The international environment

There is a growing level of policy and regulation on ewaste globally. Developed countries, which consume most of the world’s electronic products and as a result generate most of the world’s ewaste, have been taking steps since the late 1990s to address this issue through a variety of legislative and regulatory approaches.

A common factor emerging in ewaste management schemes worldwide is that they must be free to the consumer at the time of disposal.

The voluntary approach advocated in New Zealand is rapidly becoming the exception to the norm, particularly among the OECD countries. Twenty-seven (27) of the 34 OECD member countries already have some form of ewaste product stewardship in place.

Increasing numbers of countries are implementing product stewardship, or extended producer responsibility, regulation that targets ewaste. There is ewaste product stewardship...
regulation enacted, or being enacted, in the following countries:

- European Union (27 member countries)
- Japan
- China
- South Korea
- 25 individual states of the USA

Australia is also close to implementing product stewardship legislation and supporting regulations for televisions and computer equipment.

In November 2009, all state, territory and federal environment ministers of the Environment Protection and Heritage Council (EPHC) agreed that TVs and computer products will be the first products to be regulated under the Product Stewardship Framework legislation which was introduced into Federal Parliament in March this year, approved by the Senate on 15 June and the House of Representatives on 22 June 2011. At the same time that the legislation was introduced into Federal Parliament in March 2011, the Federal Government released a consultation paper on the proposed regulations for ewaste, including suggested recycling targets and penalties for free-riders.

The objective is to have both the legislation and the regulations for the National TV and Computers Product Stewardship Scheme in place by the end of the winter sitting of Parliament (June/July 2011).

One of the strong incentives to ensure this timeframe is met is the digital switchover of TV broadcasts, which have already started in some areas of Australia.

It is noteworthy that the Australian Government is proceeding with both the legislation and regulations for ewaste in parallel, and that there is widespread acceptance by the TV and computer suppliers of the need to participate in a product stewardship scheme, including accepting financial responsibility.

THE PATH TO PRODUCT STEWARDSHIP IN NEW ZEALAND

In view of the above developments, the eDay New Zealand Trust advocates for a co-regulatory product stewardship scheme aligned with Australia. This would then apply to the whole electronics sector with the industry taking responsibility for the development and management of a sector-wide product stewardship scheme, and Government implementing the necessary regulations to ensure compliance by all suppliers/importers. This is supported by the NZIER report (chapter 8) which found:

- One way of dealing with the ewaste problem is through a product stewardship scheme. Product stewardship "calls on those in the product life cycle—manufacturers, retailers, users, and disposers—to share responsibility for reducing the environmental impacts of products"
- Product stewardship is about understanding, controlling, and communicating a product’s environmental, health, and safety related effects through its life cycle, from production to final disposal or reuse. It has emerged in response to the increasing concern that:
  - Potentially valuable and useable resource are being discarded; and
  - Waste disposal can have a detrimental impact on the environment and health.
- Voluntary approaches to solving the ewaste problem will not work because of the structural (i.e. large number of firms within the industry with frequent entry and exit) and behavioural (i.e. fierce price competition that exists between market participants) market characteristics of e-product retail markets;
- For these structural and behavioural reasons there is a high probability that a free rider problem will emerge under a voluntary scheme which will place an unfair cost burden on some industry participants while allowing all industry participants to take advantage of the benefits;
- A compulsory product stewardship scheme will solve the problem of an overhang of ewaste in the community, however costs of such a scheme are of concern;
- Because of the cost concern it more likely that a co-regulation model will be more successful (i.e. one that involves government and industry in partnership) rather than regulation by government only;
- The details of a co-regulation scheme matter because they will shape industry behaviour. The key determinant of success will be the responsiveness to incentives created. A lack of response is likely to have major detrimental impact on any ewaste disposal scheme.

ROADMAP

Given the current product stewardship developments in Australia, and the close relationship that
New Zealand suppliers of IT and TV equipment have with their Australian counterparts, we believe that New Zealand has a unique opportunity to coat-tail on Australia and solve the ewaste problem permanently.

There is no need to replicate the work of the IT/TV Product Stewardship Working Group from 2006-2008; the principles and outcomes are well understood. The Australians are doing the heavy lifting in terms of developing a workable set of regulations; our job in New Zealand should be to simply scale the Australian solution to fit our market.

As such, our proposed path to product stewardship is outlined below:

**STEP 1:** Form an alliance of stakeholders to support the call for urgent action on computer and TV recycling through co-regulatory product stewardship.

**STEP 2:** Secure a commitment from New Zealand TV and computer suppliers/importers to pursue a co-regulatory product stewardship approach for ewaste.

**STEP 3:** Secure a commitment from Government to support an industry-developed product stewardship scheme with the necessary regulations to ensure compliance by all suppliers/importers.

**STEP 4:** New Zealand TV and computer suppliers/importers agree to form a product stewardship organisation (PSO), the *New Zealand Electronics Suppliers PSO (NZES PSO)*, and commit the necessary resources to develop a product stewardship scheme and seek accreditation.

**STEP 5:** NZES PSO establishes a co-operative relationship with the Australian PSO.

**STEP 6:** The Government initiates a regulatory impact statement for ewaste, drawing on the recent work in Australia.

**STEP 7:** The Ministry of Economic Development commences work to align the Customs tariff codes used for televisions and computer equipment with the codes used in Australia.

**STEP 8:** NZES PSO recognises the interim industry standard for ewaste recycling presented to the joint Standards Australia – Standards New Zealand ewaste working group.

**STEP 9:** NZES PSO recognises and supports efforts in New Zealand to reduce the amount of ewaste being sent to landfills, including eDay and the RCN e-Cycle initiative, while a product stewardship scheme is being developed.

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2 NZIER, *The Economics of ewaste*, April 2011. This report was prepared for the eDay Trust as part of its final report on eDay 2010 and is included as a chapter later in this report.
3 The term ‘overhang’ refers to consumers storing ewaste themselves and bearing the cost of storage rather than dumping ewaste in landfills
This report has evolved into such a tome that we fear readers may never reach our conclusion and recommendations, so we have brought forward the recommendations:

2. Recommendations

2.1 GOVERNMENT
1. That the Minister instruct the Ministry for the Environment to commence a process for the development of ewaste regulations, either as a priority product or under section 23 of the Waste Minimisation Act (2008).
2. That wherever possible the development of a regulatory impact statement (RIS) draws on the ewaste RIS work carried out in Australia by PricewaterhouseCoopers and the analysis by NZIER, included as part of this report.
3. That the scope of the regulations should mirror those being discussed in Australia, including free-rider regulations, collection and recycling targets, obligations of industry, sharing of import data, any exclusion thresholds as well as responsibilities for monitoring and enforcing compliance.
4. That the Minister announce an indicative timeframe for the implementation of product stewardship schemes for computers and televisions.
5. That the Minister consider promulgating 1 July 2013 as the target implementation date.
6. That the Commerce Commission advise the industry on the development of the product stewardship scheme to ensure compliance with the Commerce Act or advise a course of action for the industry to secure the necessary authorisations.
7. That MED amend its ICT procurement strategy to exclude suppliers who are not part of an accredited product stewardship organisation (PSO) by this date.
8. That MED harmonise the Customs tariff classifications for electronic equipment with Australia.
9. That the new Environmental Protection Authority be assigned the task of compliance monitoring for recycling standards.
10. That the Minister continue to support eDay until such time that widespread accessible ewaste collection facilities are in place, where ewaste can be safely deposited at no charge.
11. That NZAID support eDay initiatives in Pacific Island countries through its SDF and SSDPF funding initiatives, or other aid budgets.

2.2 SUPPLIERS
1. That NZICT establish an environment special interest group (ESIG), including all members who are computer equipment brand suppliers or importers.
2. That NZICT-ESIG and CEANZ agree to form a single product stewardship organisation (PSO), the New Zealand electronics suppliers PSO (NZES PSO), mirroring developments in Australia.
3. That NZES PSO establish a working relationship with the new joint industry PSO in Australia.
4. That NZICT and CEANZ formally recognise the work of the joint Australia-New Zealand ewaste standards group (and adopt the Australian interim industry standard).
5. That brand owners and importers of IT and television equipment support the cost-sharing model for eDay as proposed by the eDay Trust as an interim measure until a PSO is established and regulations have been implemented.

2.3 RECYCLERS
1. That EXITO (Extractive Industries Training Organisation) develop unit standards specifically for ewaste.
2. That ewaste recyclers adopt the Australian interim industry standard for ewaste recycling until such time as a formal Australia – New Zealand standard is agreed.
3. That ewaste recyclers become accredited to recognised international standards for handling ewaste.
4. That in the meantime, ewaste recyclers agree an informal accreditation process and recycling procedures in order to increase transparency and build public confidence.

2.4 LOCAL AUTHORITIES
1. That local authorities unite in calling on government and industry to agree a co-regulatory approach to product stewardship to ensure a free ewaste drop-off service.
2. That local authorities support the establishment of permanent local ewaste collection centres where these are able to meet ewaste handling standards.
3. That local authorities continue to support ewaste awareness-raising events such as eDay until permanent free collection facilities are well established.
3. Background

3.1 FIVE YEARS ON

In July 2006, the Computer Access NZ (CANZ) Trust, with support from the Ministry for the Environment’s Sustainable Management Fund, published Ewaste in New Zealand: taking responsibility for end-of-life computers and TVs. This report recorded the results of an investigation by CANZ into the growing amount of electronic waste in New Zealand and the lack of any substantive recycling schemes. The report concluded by recommending a ‘whole-of-society’ approach to ewaste responsibility from the producer to the consumer – an approach termed ‘eResponsibility’. It was suggested that an ewaste supplier taskforce be established to develop a draft product stewardship scheme over a 6-month timeframe to be ready for industry consultation by 1 January 2007. Furthermore, it was recommended that an Industry Consultative Group be established to provide a forum for ongoing industry collaboration in addressing ewaste issues in New Zealand.

In September 2006, the Ministry for the Environment facilitated the establishment of the IT/TV Product Stewardship Scheme Working Group. The purpose of the working group was agreed as:

To propose an industry-supported, efficient, effective, nation-wide takeback solution that will minimise the environmental impact of end-of-life computers and home entertainment equipment.

Two years later, on 7 August 2008, the working group met for the sixteenth and last time. Two schemes, one for TVs and the other for computer products were tabled, but there was no agreed plan or timeframe to implement the schemes. Just over a month later, on 25 September 2008, the Waste Minimisation Act 2008 came into force, providing an excellent legislative framework for product stewardship.

In November 2008, a new National-led government was formed and even though the party had supported the passage of the Waste Minimisation Act, they were less inclined to intervene. Concerned about any actions that would increase the costs of compliance to business, the new government announced its support for voluntary product stewardship schemes and encouraged industries to simply get on and develop their own product stewardship schemes.

By mid 2011, almost three years later, not one voluntary product stewardship scheme for electronic goods has been accredited, although some efforts are being made by the telecommunication industry to develop a scheme for mobile phones.

This report investigates what has gone wrong during the last five years to help us understand why a country that promotes itself as a world leader in addressing environmental issues with an innovative legislative framework for waste has not been able to implement what seemed in 2006 to be a relatively straightforward solution for ewaste.

The focus for this report, like the 2006 report, is on two particular types of electronic waste – computer equipment and TV sets. The generally accepted definition of ewaste includes all equipment based strongly on electronics and this includes hi-fi stereo equipment such as tape recorders, CD and DVD players, digital cameras, mobile phones, video games, ebook readers etc. Domestic white electrical appliances, such as fridges, washing machines and microwaves also use electronic equipment, but these are generally covered under the broader definition of waste electrical and electronic equipment (WEEE).

The scope of our study is restricted to computer equipment and TVs as we believe these create the greatest challenge and any recycling solutions for these can easily be extended to cover other electronic equipment.

We review the expanding number of players in the ewaste sector, ranging from the small enthusiasts and community-driven recycling initiatives to the increasing influence of the large multinational recycling companies. The annual eDay collection event continues to make an important contribution in terms of community awareness while at the same time providing an environmentally responsible relief valve for people who simply cannot store their old equipment any longer. With collection totals approaching 1000 tonnes each year after four annual eDays, this still only represents 5% of the estimated new ewaste being created each year.

We update our statistics on the size and growth trends for TVs and computer equipment in New Zealand; perhaps not surprisingly given the increasing rate of technological change, the recycling challenge continues to grow at a rate much faster than eDay or any other community event can address.

We examine current ewaste recycling practices in New Zealand and identify the materials we are unable to process. We observe the absence of robust standards for ewaste recycling and report on efforts to address this gap. We also note the absence of industry-supported training qualifications and renew our call to progress this.
In an important departure from the 2006 report, we examine the economics of ewaste recycling in depth and argue the case for government intervention as a result of a clear market failure.

We provide an update on the legislative and regulatory environment. New Zealand has had an excellent legislative framework in place for nearly three years, unlike Australia which only this year is introducing product stewardship legislation at the federal level.

While the focus of our report is on developments in New Zealand and Australia our review of similar ewaste developments in other countries underlines the fact that New Zealand is seriously in danger of falling behind.

We also open the door to the Pacific Islands and the challenge they are also facing with ewaste. The Cook Islands pilot eDay held in December 2010 as part of the New Zealand eDay initiative provides a model for other Pacific Island countries.

We provide an in-depth coverage of recent and current developments in Australia. Since November 2009, there has been a strong political will to address the ewaste challenge, and this has been widely welcomed by the TV and IT suppliers. After a decade of frustration, the equipment suppliers who have led the ewaste charge are at last seeing the sort of regulatory support they have been seeking from the federal government.

We conclude with a roadmap towards a comprehensive ewaste product stewardship scheme in New Zealand and a set of recommendations that we hope will be not only listened to, but also acted on.

3.2 RECOMMENDATIONS FROM 2006

In 2006, the CANZ Trust concluded their report with 12 specific recommendations. We start this report by briefly reviewing these recommendations and conclude our report with a new set of recommendations.

2006 Recommendation 1: That computer refurbishers and other organisations involved in managing ewaste be encouraged to evolve their businesses towards sustainable and profitable enterprises, employing qualified staff.

Little if any progress has been made, but this is perhaps to be expected. It is hard to imagine how sustainability and profitability can be achieved within the recycling industry without fully funded product stewardship schemes in place.

2006 Recommendation 2: That refurbishers and recyclers should collaborate with Government, through Standards New Zealand, to develop an industry code of practice for recycling computers and TVs.

The very first step towards developing ewaste recycling standards was taken in March 2011 with the establishment of a joint Australia-New Zealand ewaste recycling standards committee under the auspices of Standards Australia and Standards New Zealand. A result is expected by the end of 2012.


No ewaste specific unit standards have been developed.

2006 Recommendation 4: That local authorities be encouraged to start developing plans for community-based drop-off points for unused computers and televisions.

The RCN/CRN e-Cycle initiative aims to establish 20 ewaste drop off centres by mid-2011, some of which may be operated by local authorities. This initiative received support from the Waste Minimisation Fund in 2010 and relies on a user-pays model at the time of disposal.

2006 Recommendation 5: That suppliers support initiatives such as eDay to help raise community consciousness about the safe disposal of ewaste.

The level of support for eDay from suppliers has not reflected the proportion of ewaste created by their brands. Support has been generally limited to relatively small funding grants to help with promotion or in-kind support with staff helping out on eDay at collection sites.


We have seen one very public demonstration of this enforcement process with the eDay 2009 recycling partner being prosecuted for attempting to export equipment for re-use but which the Ministry considered to be ewaste. The investigation and subsequent prosecution was carried out following
a complaint from a competitor. There has however been no increase in the resources available in MED for compliance monitoring. The transfer of these functions to the new Environmental Protection Authority will hopefully go some way to improving enforcement of the Basel Convention.

2006 Recommendation 7: That the major television and computer suppliers establish a taskforce to develop a product stewardship scheme in collaboration with government.

The Ministry for the Environment elected to support an industry working group, but accountability for developing and implementing a product stewardship scheme was unclear, especially when government indicated their preference for a wholly voluntary approach without government regulation. As a result the efforts of the working group have not progressed since 2008.

2006 Recommendation 8: That an industry consultative group be formed with representatives from all stakeholder groups.

The IT/TV Product Stewardship Working Group with representation from most stakeholders fulfilled this role between 2006 and 2008. But when the Working Group ceased to exist, there was no ongoing imperative for the industry representatives to keep meeting.

2006 Recommendation 9: That Government develop free-rider legislation to ensure industry-wide compliance to a product stewardship scheme.

The government has made no efforts to date to pursue free-rider regulations, even though the Waste Minimisation Act provides a clear roadmap for doing this. For the major suppliers this is the single biggest roadblock to progressing with the implementation of a nationwide product stewardship scheme.

2006 Recommendation 10: That the taskforce cooperate with Australia. This might include direct Australian representation on the taskforce and it could include information sharing with relevant Australian organisations.

Representatives from the major IT brands participated in the IT/TV Working Group between 2006 and 2008, but at the time, Australia was making even less progress than New Zealand towards a national scheme. This all changed in November 2009 with a strong shared vision coming from the Australian TV and IT suppliers in collaboration with the federal and state governments. To date, New Zealand has made no effort to leverage off this renewed interest in Australia.

2006 Recommendation 11: That the ewaste Task Force give priority to developing funding schemes for covering the cost of transport to overseas ewaste processing facilities as a quick-start option. This was never considered by the IT/TV Working Group.

2006 Recommendation 12: That the computer and television industries should collaborate with Government in encouraging investment in research into new markets and processing techniques for ewaste materials, and into more enviro-friendly materials for initial product manufacture.

There is no evidence of this happening.
4.1 KEY POINTS

- There is still a need for an annual eDay event because most New Zealand communities do not have access to free ewaste recycling services.
- There is widespread support from local authorities for the annual eDay collection event.
- The decreasing price of new computers is reducing the viability of computer refurbishment and leading to increasing volumes of ewaste.
- Some printer hardware now costs less than the price of replacement ink cartridges, suggesting that printer hardware has itself become a consumable item.
- CRT (Cathode Ray Tube) monitors, used for computer screens and television sets, are increasingly being replaced by low cost flat screen units even if the CRTs are still functioning satisfactorily.
- With the imminent Going Digital switch-off of analogue TV transmissions commencing in September 2012, there is an urgent need for a free and accessible recycling option for up to 2.2 million CRT televisions.
- It is increasingly difficult for New Zealand refurbishers and recyclers to export computer equipment for re-use, increasing the need for cost-effective recycling.
- A growing number of businesses and communities are trying to recycle ewaste, motivated by the opportunity to recover materials of value, e.g. copper, but few have robust processes for safely processing the residual waste.
- The RCN/CRN e-Cycle scheme to establish permanent ewaste collection facilities in 20 centres is a positive development, but until the scheme is adequately funded, it will contribute little in addressing New Zealand’s burgeoning ewaste challenge. (See Section 6.3 for more detail on this scheme.)
- There is increasing international pressure for countries to manage their own ewaste and this means New Zealand must process as much as possible in-country.

4.2 EWASTE DEVELOPMENTS 2006-2011

In 2006, we recognised the limited opportunities for ewaste recycling in New Zealand. While we were able to identify some community-based disassembly efforts to extract materials of value (e.g. copper) and some experimental projects to re-use CRT glass, most ewaste recycling relied on exporting equipment to Australia, Singapore or South Korea.

A number of businesses were also engaged in computer refurbishment, trying to extend the life of the equipment and delay the need to address the ewaste issue.

In 2006, the most common method of disposal of unwanted TV sets was to wait for the next inorganic kerbside collection (mainly in Auckland) or dump them in landfills. The relatively long working life of a TV set (20 years or more) also meant that most households, rather than disposing of their old TVs, have moved them to other rooms and children’s flats, given them to charity or sold them through TradeMe.

Five years on, there have been some significant developments that have had a direct impact on ewaste recycling in New Zealand:

1. There have been four national eDay collection events, following a successful pilot in Wellington in 2006, that have diverted over 3000 tonnes of ewaste from landfills;
2. Local authorities have an increasing awareness of the growing volumes of ewaste;
3. The decreasing price of new computers has reduced the viability of computer refurbishment;
4. The decreasing price of ink-jet printers with replacement ink cartridges costing almost as much or more than the price of the printer;
5. The decreasing price of flat screen computer monitors and TV sets has resulted in CRT equipment being replaced even if it is still functioning satisfactorily;
6. The government decision to switch off analogue TV transmissions, commencing in September 2012;
7. The prosecution of a computer recycler for attempting to export ewaste as working equipment for re-use;
8. An increase in the number of businesses and communities taking an interest in recycling ewaste;
9. Government support for the establishment of the RCN/CRN e-cycling scheme with ewaste collection facilities in 20 centres and 3 regional processing plants;
10. Increasing international pressure for countries to manage their own ewaste.

We now consider each of these developments and
are now starting to charge for equipment that has no residual value and in fact incurs direct costs in terms of transport and recycling.

Recycling partners have been carefully selected each year only after they have been able to demonstrate good recycling practices and a willingness to contribute in some way to the costs of the eDay event. Historically, there has been a rather fragile balance between the return a recycler can get from refurbishing equipment for re-use and from the recovery of component materials, and the costs of transport and recycling. This has relied heavily on attractive global prices for metals such as gold and copper that can be recovered from computer equipment that can offset the cost of disassembly and shipping.

In 2010, the eDay 2009 recycling partner, CRTNZ, was prosecuted by the Ministry of Economic Development for attempting to export ewaste without a valid Basel Permit. The recycler’s defence was that the equipment involved was intended for re-use, not for recycling and therefore did not require an export permit. This appears to be somewhat of a grey area in the absence of agreed standards for re-use equipment, but has nevertheless sent a strong signal to recyclers about the risks of attempting to export any equipment whether for re-use or recycling.

At the same time we are seeing a global downturn in the demand for refurbished computers. Many countries no longer welcome receiving older computer equipment, including CRT monitors; not only is the older equipment less energy efficient, it also reaches end-of-life more quickly and the recipient countries find themselves having to address the ewaste problem. A suggestion was made at a recent meeting of Pacific Island countries in Noumea that developing countries, including those in the Pacific should consider a ban on second-hand and used equipment unless the suppliers offer a guaranteed take-back programme.

The net result of these two developments has shifted the economic balance of equipment being dropped off at eDay events. In previous years, recyclers were able to balance the return they received from working equipment with the cost of recycling end-of-life units, but increasingly recyclers are unable to get any ‘re-use’ returns and must rely on the sale of recovered materials, which in turn can fluctuate quite wildly in response to global changes in commodity markets. This means that recyclers must assume all materials received from ewaste collection events is in fact ewaste and will incur a cost to recycle.

### Table 4-1: eDay Results 2006-2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of centres</th>
<th>Number of cars</th>
<th>Weight of ewaste</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>1</td>
<td>1,250</td>
<td>53 tonnes</td>
</tr>
<tr>
<td>2007</td>
<td>12</td>
<td>6,900</td>
<td>415 tonnes</td>
</tr>
<tr>
<td>2008</td>
<td>30</td>
<td>16,607</td>
<td>946 tonnes</td>
</tr>
<tr>
<td>2009</td>
<td>38*</td>
<td>16,432</td>
<td>976 tonnes</td>
</tr>
<tr>
<td>2010</td>
<td>60</td>
<td>18,274</td>
<td>869 tonnes</td>
</tr>
</tbody>
</table>

* plus 15 local community collections

At eDay 2010, 18,274 cars dropped off 869 tonnes of computer waste.
The one current exception is mobile phones. Mobile phones are being replaced so quickly that the units being returned are still in very good working order and there still is a good global market for refurbished phones. What this means is that recyclers are willing to purchase mobile phones and if people are able to get a direct financial return or know that by donating their mobile phones they are supporting a good cause, this helps in preventing them being dumped in landfills.

The Ministry for the Environment agreed to support eDay 2010 by taking responsibility for all the ewaste recycling, including selecting a recycler and covering all costs involved. Tenders were called towards the end of 2010 and eight expressions of interest received. The Ministry prepared a shortlist of two providers, both of whom they believed had sufficiently robust recycling and monitoring process to provide a trusted chain of custody for the eDay materials. In May 2011, Sims Recycling Solutions was awarded the contract.

As part of the eDay 2010 programme, a pilot Pacific eDay was supported in Rarotonga in the Cook Islands. There has been growing pressure amongst the Pacific Island Countries and Territories (PICTs) for governments to address the ewaste situation. 4.4 LOCAL AUTHORITY CONCERNS

A survey of local authorities involved in the eDay 2010 programme carried out in early 2011 sought their views on addressing the ewaste challenge. The survey was specifically aimed at identifying the options for recycling ewaste that are currently available in their areas and for determining the level of interest in participating in future eDays. A total of 30 responses were received from 25 different cities/districts. 60% of the respondents would like to participate in another eDay event; 38% were not sure:

It seems highly unlikely that any product stewardship schemes will now be in place in time for the analogue TV switch-off. This suggests that an expanded version of eDay to include TVs should be supported for at least another three years.
Only one respondent indicated they would not participate because they had been allocated funding to set up an e-Cycle collection centre in conjunction with RCN and the Community Recycling Network. Those who were not sure also indicated they were influenced by the evolving network of RCN/CRN permanent ewaste collection centres being established during 2011; they hoped these would provide a more sustainable ‘everyday’ model than the ‘one day a year’ eDay model. However, the majority of local communities, especially in the smaller and more remote areas saw no viable alternative to the eDay model:

“Currently this is the only method the community has to ‘recycle’ IT electronic waste.”

“The event is consistent with Council objectives to promote an environmentally sustainable district.”

“We field calls on a regular basis; the nearest ewaste collector is in a neighbouring district.”

The lack of readily accessible ewaste recycling facilities in most communities was also highlighted by the ways in which people currently dispose of their ewaste:

How do people in your community currently dispose of their electronic waste?

- Don’t know
- Store it for the next eDay
- Dispose as part of inorganic waste collections
- Take back to retailer
- Take to a local recycling centre
- Dump in landfill
- Put in household rubbish

Figure 4-2: Current ewaste disposal methods

Most local communities, especially in the smaller and more remote areas see no viable alternative to the eDay model.
The high percentage of communities (90%) that are willing to store their ewaste until the next eDay collection event is testament to the success of eDay. However some critics view this as a problem in that communities have become dependent on an annual free collection event and may therefore be reluctant to support other recycling models. The over-riding concern must not be about which recycling initiative is best but how to address inappropriate dumping in landfills and through general rubbish collections that is still prevalent in the majority of communities.

A number of communities either already have or have decided to set up permanent ewaste collection facilities as part of the RCN/CRN e-Cycle scheme:

Are there plans to establish such a facility in your community within the next 12 months?

<table>
<thead>
<tr>
<th></th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>We already have an ewaste collection facility in our community</td>
<td>30</td>
</tr>
<tr>
<td>We are planning to support the establishment of an ewaste collection facility in 2011.</td>
<td>40</td>
</tr>
<tr>
<td>We have no plans to establish a permanent ewaste collection facility in</td>
<td>10</td>
</tr>
<tr>
<td>Don’t know</td>
<td>20</td>
</tr>
</tbody>
</table>

Figure 4-3: Plans to establish a permanent ewaste collection facility

While 50% of the communities responding to the survey indicated that they already have a year-round ewaste collection facility or are planning to establish one in 2011, the 50% who have no plans or don’t know suggests a significant challenge remains. Those who are setting up collection facilities clearly are not yet confident in how successful the ‘user-pays’ e-Cycle scheme will be and as indicated in Figure 4-1, all but one (98%) would like to keep their options open in terms of participating in future eDays.

The eDay event has historically been restricted to computers and computer-related equipment. Surveys carried out at recent eDays have suggested a growing residual demand for recycling other electronic equipment and this was reinforced in the survey of local authorities:

eDay has historically been restricted to computers and computer-related equipment, including mobile phones. What other ewaste would you like included in eDay?

<table>
<thead>
<tr>
<th>Other ewaste for recycling</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries</td>
<td>10</td>
</tr>
<tr>
<td>Large electrical appliances, e.g. fridges, stoves</td>
<td>20</td>
</tr>
<tr>
<td>Small electrical appliances, e.g. toasters</td>
<td>30</td>
</tr>
<tr>
<td>Stereo equipment, including CD players, DVDs, amplifiers, speakers</td>
<td>10</td>
</tr>
<tr>
<td>Television Sets</td>
<td>50</td>
</tr>
<tr>
<td>None</td>
<td>10</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
</tr>
</tbody>
</table>

Figure 4-4: Other ewaste for recycling
Over 80% of the survey respondents indicated that TV sets are now presenting a significant recycling challenge. Almost as many considered that domestic audio and video equipment (CD players, DVDs, amplifiers, speakers) are presenting a similar challenge.

Perhaps the most contentious issue for local authorities is the question of who pays for the cost of recycling. Councils have been very consistent since the problem of ewaste was first raised in the 2006 CANZ report that they do not want to add extra cost to an already stretched rates budget, or put more simply, they did not envisage ewaste recycling being funded from general rates. It has been pointed out that Councils could use their share of the Waste Minimisation Fund to contribute towards the cost of ewaste recycling, but there are many competing demands being made on this limited funding pool.

We asked local authorities who they thought should pay; their responses are summarised in the figure below:

**How would you like these costs to be covered in the future?**

<table>
<thead>
<tr>
<th>Option</th>
<th>% of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users pay when equipment is dropped off</td>
<td></td>
</tr>
<tr>
<td>Subsidy from local authorities</td>
<td></td>
</tr>
<tr>
<td>Sponsorship for one-day collection events</td>
<td></td>
</tr>
<tr>
<td>Retailers include the cost of recycling in the purchase price</td>
<td></td>
</tr>
<tr>
<td>Levy to cover recycling costs is applied to all electronic equipment</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4-5: Who should pay for ewaste recycling**

The above figure reaffirms the view of local authorities that they don’t believe the ratepayer should be paying for ewaste recycling. The support for users paying on disposal (30%) aligns with the percentage of respondents planning to set an e-Cycle collection facility. But what is more significant is the much larger percentage (70%) that considers the recycling costs should be built into the retail price, whether this be at point of sale or through a levy. There was very strong support for the development of product stewardship or extended producer responsibility models, as these shifted recycling responsibility (and costs) back to the manufacturer:

"It is easier to get people paying when they want the item rather than when they don’t want it."

"Charging the user when items are dumped will just cause illegal dumping; it must be a charge/levy at the beginning of the product life cycle."

"Building the end-of-life costs into the purchase price of the item is the easiest and most sustainable option"

"The main issue with ‘user pays’ is that the local transfer station charges a minimum of $12 up to 100kg; to ask for a substantial amount more for one monitor is hard for some to understand."

The cost of $20 per item for ‘eDay everyday’ collections is greater than the cost for landfill disposal; this will...
be a disincentive for the public to use such a service; the cost charged has to be realistic, affordable and less than landfilling costs.”

“Placing a charge on residents will not be accepted in rural areas, too easy to ‘fly dump’.”

Our overall conclusion from the survey of local authorities is that most are seeking solutions for effective ewaste recycling and, even though some are setting up collection centres, most have serious concerns about the effectiveness of any solution that requires payment by the consumer on disposal. There is also clear support for further eDays, at least until the success of the RCN e-Cycle scheme has been demonstrated.

4.5 DECREASING PRICE OF COMPUTERS

We have witnessed a dramatic drop in the cost of new computer and computer-related equipment during the last five years. Couple this price drop with rapid technological changes and high impact advertising and we have an environment where consumers feel pressured to regularly upgrade their electronic appliances. Even devices that are still working perfectly well seem to quickly get passed on when a new model arrives. Apple’s iPhone and iPad illustrate this trend very well. The iPhone3 was released in July 2008 and the iPhone4 just less than two years later in June 2010. The iPad has experienced an even faster upgrade path with just one year between the original launch in April 2010 and the iPad2 release in April 2011. We are not suggesting that these one or two year-old devices automatically become ewaste, but they are indicative of the increasing rate of technological change.

Desktop computers used to be relied on to give good service for up to 10 years, possibly with some RAM and hard-drive upgrades. The life of laptops has always been much shorter with many businesses choosing to replace laptop equipment every two years. Now couple this trend with the migration away from desktop units to laptops and we can expect the rate of obsolescence to increase by a factor of two or three. These trends result in two outcomes – less demand for refurbished equipment and more ewaste.

4.6 FALLING PRICE OF PRINTERS

The price of ink-jet printers, especially those for home use, has dropped so much in the last five years that it is not uncommon for the cost of replacement ink cartridges to exceed the cost of the printer itself. This apparently rather strange situation is driven by the opportunity for suppliers to make bigger margins on consumables than the hardware. This practice is common with mobile phone suppliers who ‘lock in’ customers with two-year usage plans in exchange for a ‘free’ or nearly free mobile phone.

Printers are now in a similar position. The ink-jet cartridges supplied with the printers are typically small ‘start-up’ units that don’t last very long. Within a short time after purchase the consumer is faced with the need to insert new cartridges and discovers a cost of around $100 for their $50 printer. The difference in ink-jet cartridge capacity may not be well understood and users may be tempted to simply replace their printers with a new unit whenever the cartridges run out.

We are now facing a rather alarming situation where printer hardware is considered as a consumable. Certainly the cost of repair (replacement parts and labour) already exceeds the cost of a new unit.

4.7 DECREASING PRICE OF FLAT SCREENS

Like computer equipment the price of display devices has fallen dramatically during the last five years – and they have increased in size. This applies to both computer screens and TV sets. In 2006, a 17” CRT monitor was considered perfectly adequate for most computer users. Today a 17” LCD screen is viewed as an entry level device, with most display devices being much larger. In 2006, standard TV sets came with 21” to 25” CRT screens. 28” and 32” units were regarded as monster TVs and required at least two people to lift them. Today a 32” High Definition TV is considered as entry level (at around $700), with 50” units only twice as much. Price is not as much as a barrier to purchase as the size of wall needed to mount the TVs.

The reason to change from a CRT TV to an LCD, LED or plasma TV is often about space saving, but also the unquestionable improvement in picture quality with high definition sets. Promotional material for LCD and LED screens also often refer to their lower energy usage, but this can be misleading, as people often upgrade to larger screens, which in fact consume more energy than the old CRT units.

But that is quickly overlooked when consumers visit the mesmerising displays of flat screen units in a JB HiFi or Noel Leeming store. The net effects of these technological and price
changes have been an increasing trend to send the old CRT for recycling, or in the absence of that option, to landfill. During the next two years we can expect this trend to accelerate with the analogue TV switch-off.

4.8 GOING DIGITAL: THE ANALOGUE TV SWITCH-OFF

The Government has announced the timetable for switching off analogue TV transmissions, commencing in September 2012 in Hawkes Bay and concluding some 18 months later in the main centres.15 A recent survey16 indicated that 28% of all households have an analogue TV set; this equates to at least 500,000 TVs. A recent report from EECA17 suggests that in mid 2009 New Zealand had a stock of about 2.2 million CRT television sets. Not all were being used, but all will become obsolete by November 2013 unless consumers purchase a digital TV converter (‘set-top box’) from Sky, TelstraClear or Freeview.

Some of the CRT TVs are already being used with digital TV converters, but despite a ‘Going Digital’ campaign18 to persuade users that if they purchase a converter box they don’t need to replace their TV sets, we believe most consumers will use the analogue switch-off as an opportunity to upgrade to a flat screen digital TV sooner rather than later. While the Going Digital claim that any television will continue to work with a digital converter is technically correct, when consumers discover the cost of a new flat screen is not much more than a digital converter, they are likely to ditch their old analogue set. Certainly this has been the case in Australia where the conversion to digital has already started. A similar campaign has failed to convince and Australians are dumping their old TVs by the thousands19.

It would be reasonable to suggest that at least two-thirds of our CRT stock will be disposed of by the end of 2013. This means that New Zealand has the opportunity to divert 2.2 million obsolete TVs from landfills by ensuring households have the right incentives to dispose of them for responsible recycling.

Currently these incentives do not exist; in fact it is just the opposite. Disposing of a TV set through the RCN e-Cycle scheme or other reputable recyclers will cost as much as $20 per item, or possibly even more for large units. Disposal of a 20kg unit in a landfill will cost around $2. Dumping on the roadside, which has been happening in Australia, costs the consumer nothing. We believe the only way to address this imbalance is to provide a free and accessible recycling option to ensure that up to two million TVs do not end up in landfills over the next three years.

4.9 PROSECUTION OF RECYCLER

In 2009, a complaint was made to the government against the eDay recycling partner, CRTNZ, accusing the recycler of attempting to export ewaste without a Basel Permit. The Ministry of Economic Development investigated the complaint and decided to press charges. The grounds for doing this have never been made public, but according to CRTNZ, the materials involved were not ewaste, but were intended for re-use markets. This raised the whole issue of what standards apply for equipment intended for re-use. It has been common practice for recyclers to ship computer equipment for re-use overseas, especially CRT monitors. Recyclers have consistently reporting that over 85% of the monitors received through collection events such as eDay are in perfectly good working order. Consistent with the principles of good environmental management – reduce, reuse, recycle – recyclers attempt to find “reuse” markets before breaking equipment down for recycling. The former enables them to secure a small return to cover transport costs (often no more than $1 per item after handling costs are covered), while the latter is a net cost, which can be as much as $2 per kilogram, or $20-$30 for a 17” computer monitor.

However the CRTNZ case, which eventually came to a hearing in May 2010 and resulted in a relatively small fine (around $13,000),20 has made it almost impossible to now export electronic equipment for reuse markets. The testing and audit requirements are so rigid and costly that any profit that can be gained from resale is overwhelmed by the compliance costs. The net result of these court proceedings is to restrict any equipment reuse to domestic markets, and as noted above the dramatic drop in equipment prices means there is a rapidly diminishing demand in New Zealand for refurbished electronic products. Even programmes that rely on refurbished computers such as the 2020 Communications Trust’s Computers in Homes have now moved to flat screen monitors.

Recycling centres and opportunity shops around the country have discovered the same problem – no one wants a CRT monitor any more. This has caused a progressive shift away from re-use and refurbishment towards recycling.

A free and accessible recycling option will ensure that up to two million TVs do not end up in landfills over the next three years.

No one wants a CRT monitor any more. This has caused a shift from re-use and refurbishment towards recycling.
4.10 INTEREST IN EWASTE RECYCLING

One of the positive outcomes from the last five years has been a growth in interest in ewaste recycling, from small local community recyclers to large multinational corporates. For many years local communities have tried to encourage reuse and recycling to the maximum extent possible. Typically this has focused on glass, metal, plastics and paper collection, sorting and recycling. However a number of communities have also set up second hand shops at landfills to prevent items that still have a use from being dumped. In 2006, we identified a number of these landfill shops that were extracting working computer equipment and making them available for sale. However, even in 2006, the demand for this equipment was very low as most computer equipment reaching landfills really was at end-of-life. Since 2006, we have seen a new trend at these community recycling centres, involving the disassembly of computer equipment to extract the materials of value and then dump the rest.

In 2006, Trash Palace in Porirua was one of the most developed community-based computer recycling operations, employing people with disabilities to disassemble computers and monitors and extract the materials of value. In 2006 we were critical of how the residual (and hazardous) waste was being disposed of – in the Porirua landfill. In 2006, RCN in Auckland had tried to progress this one step further by not only working with the people with disabilities (the Abilities Group) but also using a hotwire technique developed by Rose Engineering to separate clean CRT monitor glass from the leaded glass.

Five years on, we have seen an expansion in the number of community groups trying to tackle ewaste. Two that have come to our attention recently are Cargill Enterprises in Dunedin and E-waste Recycling Hawkes Bay in Hastings. Like Trash Palace and the Abilities Group Cargill Enterprises employs people with disabilities and seeks to provide meaningful work for them. Cargill Enterprises has had a long history of producing and supplying products and services to Dunedin, Otago and the rest of New Zealand, for nearly 50 years. They are the trading arm of the Disabled Citizens Society (Otago) Inc and have more than 100 Staff with Disabilities working for their nine Business units. Ewaste is the responsibility of one of these units.

E-waste Recycling Hawkes Bay was originally set up by the St Vincent de Paul Society in the Hawkes Bay but is now in private hands. It is the only organisation providing an ewaste service in the Hawkes Bay.

A key motivation for many of these community and small business groups has been to create employment by using revenues from the sale of extracted metals such as copper; the preservation of the environment is a secondary consideration. The most hazardous and difficult-to-process materials are still being dumped in landfills. Another practice encouraged at some landfills is to incentivise staff to extract materials of value – profits from the sale of these materials are returned to a staff fund.

It is hard to be critical of these efforts as they are doing part of the job – recovery of valuable metals – but it is important that we don’t see this as an end solution. It is also expected that when product stewardship schemes are implemented, the suppliers who will be funding the scheme will demand high standards for recycling their products. This will include world-class recycling processes, occupational health and safety practices and strict chain of custody reporting. It is unlikely that community and small business recyclers will be able to meet these standards; nevertheless they could potentially play an important role in the collection, storage and packaging of ewaste, ready for transport to a commercial recycling centre. This is the positive aspect of the e-Cycle scheme currently being deployed by RCN and the community recycling network (CRN). It is creating a network of local collection centres supported by three regional disassembly centres.

The organisations that are expected to play a larger role in ewaste recycling in New Zealand in the future are the global recycling companies including Sims and TES-AMM, two already significant players in New Zealand. Both organisations have robust chain of custody and recycling processes, two critical elements for sustainable ewaste recycling.

The major TV and IT brand manufacturers take the issue of ewaste very seriously and many have take-back schemes for their own branded equipment. While this works well for the corporate sector and in organisations where there are relatively large quantities of equipment, supplier schemes have failed to provide accessible take-back services for households, community organisations and small businesses. In the absence of agreed accreditation standards for recyclers, manufacturers have typically done their own homework and selected trusted recycling partners. The disadvantage of this approach is that once a commercial relationship is established between a brand supplier and a recycler, no other recycler is
acceptable. This played out in 2009, with a computer supplier withdrawing their support for eDay when they discovered that the recycler selected for eDay was not their preferred recycler.

During the last five years the industry organisations representing suppliers and recyclers have been disappointingly quiet about the ewaste issue, although in retrospect this is probably not surprising. Without any incentive (or stick) to take action, the lowest cost short-term option is to do nothing. That said, some recognition should be given to the efforts of the Consumer Electronics Association in 2007 and 2008 to facilitate the development of an agreed product stewardship for TV sets. The achieved what they were tasked to do, but were let down when government did not proceed with the necessary regulations to prevent free riders. NZICT20 has come into existence during the last five years and has been remarkably successful in creating a voice for the IT industry, but while they have recognised ewaste as an issue it has not made it yet to their priority list. We hope this will change in 2011 as a result of developments in Australia, where most of the brand suppliers have regional headquarters and where policies are set for New Zealand distributors.

A possible sleeping giant is the Scrap Metal Recyclers Association and the multi-million dollar scrap metal industries that they represent. Scrap metal is a profitable and successful business. Few scrap metal dealers have yet ventured into the ewaste business, or the e-scrap business as they prefer to call it. But a recent development in Christchurch has resulted in the establishment of E Scrap Recycling.21 What is particularly interesting about this development is that this company is willing to pay for most e-scrap, in sharp contrast to the recently established RCN e-Cycle initiative where the people disposing of the ewaste are expected to pay.

4.11 RCN E-CYCLE SCHEME
The RCN Group is an established player in computer remarketing and recycling. In 2010, they were successful with the Community Recycling Network in securing a $400,000 grant from the Waste Minimisation Fund to establish 20 permanent ewaste collection centres and two new regional ewaste processing plants in Wellington and Christchurch, modelled on the existing Auckland facility.

This is an excellent step towards establishing a more robust ewaste infrastructure. The 20 collection centres provide an opportunity for the associated communities to drop off their ewaste year round without need to wait for the annual eDay event.

However the fundamental weakness of the scheme is that it relies on a user-pays model. The advertised charges as at 1 May 2011 range from $5 for a desktop PC to $20 for a CRT TV to $69 for a large photocopier:22

The following footnote appears on the RCN e-Cycle website explaining the reasons for the charges:

It is at the discretion of each drop off location as to what prices they set. The drop off locations are charged by RCN for most items that they collect for recycling. This is to cover labour, administration, some recycling charges and logistics costs. We want this solution to be sustainable and that is why we have launched this project based on a user pays model.23

We recognise that this is the only way a commercially sustainable solution can be achieved today, given the absence of a supplier-funded product stewardship scheme, but this will not achieve the desired outcome of diverting ewaste from landfills. There is strong opposition from communities and local authorities to a scheme where the costs of recycling are 10 times higher than landfill charges.

We welcome the RCN e-Cycle initiative as a step in the right direction but until that scheme is adequately funded by suppliers we believe it will contribute little to addressing New Zealand’s ewaste challenge.

4.12 INTERNATIONAL PRESSURE
The final major development in the last five years has been changing international attitudes towards ewaste. In 2006, countries such as Australia, Singapore and South Korea were happy to accept ewaste from New Zealand as fully assembled units. However, as the volumes of ewaste have progressively risen, there is more international pressure on countries to process their own ewaste, or as a minimum dissemble the products into component elements.

The recycling of ewaste involves a significant amount of manual labour, especially for the initial disassembly and separation of hazardous from non-hazardous components. This is no different for Australia, Singapore, South Korea or any other OECD country for that matter, where labour rates are similar. Under the Basel Convention New Zealand is only permitted to export ewaste to another
We should process as much of our ewaste as possible within New Zealand.

OECD country and only with the agreement of the destination country.

At the beginning of 2009, South Korea for example was willing to accept complete CRT monitors for recycling, but by the end of that year, they would only accept disassembled monitors. There are reports that even mainland China, which has often been the final destination of the world's ewaste, is closing its doors to accepting ewaste from the West.

In 2007, we exported most of the monitors collected on eDay to Australia for processing; these were palletised and loaded into containers. It was expected that 80-90% would be redirected into re-use markets, but in the end all but 5% were recycled. The transport partner requested that all the bases be removed from the monitors to facilitate packaging and transport, but every base that was removed resulted in the corresponding monitor being classified as ewaste. Today, international recyclers such as TES-AMM carry out initial disassembly of monitors in New Zealand with only the CRT tube being exported for further processing.

It is unlikely that the volume of ewaste in New Zealand will ever justify investment in the high technology automated extraction plants used in Asia to extract source metals from circuit boards, so we can expect that these will need to be extracted and exported indefinitely. The same is true of the leaded glass in CRT monitors. There are no facilities available in New Zealand to extract the lead from the glass; the nearest processor is a lead smelter in South Australia that uses the leaded glass as a flux in the smelting process; the residual glass becomes slag that can be used as road fill.

There is also a growing international awareness of the need for closer monitoring of ewaste exports. A recent report and BBC Panorama programme in the UK revealed that leading waste and recycling companies in the United Kingdom were linked to the export of electronic waste to poor African nations.

Our conclusion in considering these trends is that we should process as much of our ewaste as possible within New Zealand, but recognise that some components will always need to go offshore to Australia or Asia for further processing.
The NZICT Group is an industry association made up of over 100 New Zealand technology companies. It was founded to provide a unified voice to address issues facing the industry as a whole. http://www.ict.org.nz/

E-scrap recycling http://www.escraprecycling.co.nz/

RCN e-cycle Community Electronics Recycling Price List http://www.e-cycle.co.nz/price-list/

Ibid.

Adrian Wan, Fears of e-waste pile-up growing, HK


Andrew Wasley, UK e-waste illegally dumped in Ghana, Guardian Environment Network, 16 May 2011 www.guardian.co.uk/environment/2011/may/16/uk-ewaste-dumped-ghana
This section describes the market, market trends and installed base, for television sets and computer equipment in New Zealand. It also assesses the extent of ewaste for these products. Television sets and computer equipment are not the only source of ewaste in New Zealand, but they represent the greatest volumes and most urgent disposal issues.

5.1 Key points

5.1.1 Television sets

- There are approximately 4 million TV sets in New Zealand in homes and hotels/motels. We estimate that 2.2 million of these use cathode ray tube (CRT) screen technology.
- During the last five years between 300,000 and 370,000 TV sets were sold each year; total sales grew by 19% in 2010.
- There has been a dramatic change in the New Zealand television market over the past five years, with sales of CRT sets falling from nearly 80 per cent of the market to effectively nothing.
- Flat screen (LCD and plasma) televisions have taken over (in 2010 LCD = 75% and plasma = 24%) TV prices have fallen dramatically: e.g. 32 inch LCD screens in January 2011 were only one-tenth as expensive as they were five years earlier.
- Average screen sizes are rising significantly.
- Largely because of the changeover to digital television, CRT televisions will become unusable without a digital set-top box and present options for passing on surplus CRT TVs will be eliminated. The digital changeover begins in 2012 and ends in 2013. We believe most consumers will take advantage of the changeover to upgrade to a new flat screen digital TV.
- We believe householders will actively seek final disposal of one third of the 2.2 million CRTs between now and the end of 2012. Another third may want to do this by the end of 2013 and the balance soon after that.
- Total weight of glass in the CRT TV stock is 35,000 tonnes, and this glass contains 7,000 tonnes of lead.

5.1.2 Computer equipment

- There are about 7.8 million desktop computers in New Zealand (3.0m in homes and 4.8m in business/government). This does not account for final disposals to ewaste since 2006, which is likely to be minimal for home computers but could be much higher for business computers.
- Computer sales are growing strongly. The total (including laptops) in 2010 was 720,000, compared with 560,000 in 2006 and 322,000 in 2001.
- There has been a strong trend to laptop computers, which made up 62% of computer shipments in 2010. Laptops now account for three quarters of shipments to homes and half of shipments to business.
- Shipments of CRT computer monitors effectively ceased in 2006.
- The estimated total stock of CRT monitors in homes is around 1.9 million. We believe the great majority – say 80% or 1.5 million units – are no longer being used and are poised for final disposal. This represents 2,100 tonnes of lead.
- In 2006 the stock of computer CRTs in businesses was estimated at 4.4 million; today, we believe that most have been replaced with flat screen LCDs; we estimate that one third have already been recycled or dumped in a landfill; the remaining two thirds have either been refurbished for use in other markets or remain in storage.
- Better arrangements are available to businesses for recycling their end-of-life desktop boxes and monitors, as these brand owners typically take-back their equipment and ensure it is recycled. But we have been unable to quantify the extent of such disposals. Our best guess is that one third of the CRT stock will have been disposed of, leaving around 3.1 million commercial monitors containing over 4000 tonnes of lead.

Householders will dispose of up to 2.2 million CRT TVs over the next three years.

The estimated number of CRT computer monitors in New Zealand homes is 1.9 million. Eighty per cent or 1.5 million of them are no longer being used.

John MacGibbon
5.1.3 Estimated volume of desktop boxes, CRT monitors and CRT televisions

<table>
<thead>
<tr>
<th>Item</th>
<th>Number (m.)</th>
<th>Ave. weight (kg)</th>
<th>Total weight (tonnes)</th>
<th>Lead weight (tonnes)</th>
<th>Per head of population (number)</th>
<th>Per head of population (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop boxes</td>
<td>7.8</td>
<td>11</td>
<td>85,800</td>
<td>n.a.</td>
<td>1.8</td>
<td>19.8</td>
</tr>
<tr>
<td>CRT monitor (bus.)</td>
<td>3.1</td>
<td>16</td>
<td>49,600</td>
<td>4,340</td>
<td>0.7</td>
<td>11.2</td>
</tr>
<tr>
<td>CRT monitor (home)</td>
<td>1.9</td>
<td>16</td>
<td>30,400</td>
<td>2,660</td>
<td>0.4</td>
<td>6.4</td>
</tr>
<tr>
<td>CRT TV</td>
<td>2.2</td>
<td>24</td>
<td>52,800</td>
<td>7,040</td>
<td>0.5</td>
<td>12.0</td>
</tr>
<tr>
<td>Totals</td>
<td>15</td>
<td></td>
<td>218,600</td>
<td>14,040</td>
<td>3.4</td>
<td>49.4</td>
</tr>
</tbody>
</table>

Table 5-1 Number of computers and CRT TVs in New Zealand

Notes:
- These are total stocks, including those still in use and those being stored unused.
- Numbers of business monitors are based on 2006 estimate\(^{27}\) plus subsequent shipments\(^{28}\), minus estimated 30% final disposal.
- The average weight for CRT monitors is based on an eDay NZ Trust estimate.
- The average weight for CRT TVs is based on a 1000-item sample of sets processed by RCN Group.
- Calculations for lead weight assumed 1.4kg for computer monitors and 3.2kg for TV monitors. This was based on glass in typical equipment weighed by the MRI rendering facility in Melbourne, advised in 2006. The average proportion of lead in the glass was assessed at 20%.

More detail on the marketplace and ewaste contribution for television sets and computer products follows on the next page.
Who's statistics to believe (and does it matter anyway?)

This analysis of the New Zealand television market is based on a continuous survey by GfK Retail and Technology Australia and New Zealand, based in turn on sales returns provided by retailers. It should be noted that the Consumer Electronics Association believes that GfK’s figures are too high and that the annual rate of television sales in New Zealand is likely to be closer to 260,000 than the 366,000 figure released by GfK for 2010. The Consumer Electronics Association’s figures are based on relatively informal soundings of its members, who represent TV manufacturers. The Association has suggested that some retailers may inflate the figures they provide to GfK, for competitive reasons. GfK disputes this, saying that all retailer figures are supplied confidentially and individual retailers would get no competitive advantage from inflating their figures. On the other hand, figures supplied by the Department of Statistics and based on Customs Department returns, show TV imports numbering considerably more than the GfK retail sales (417,000 units in 2009 and 461,000 in 2010). Who to believe? Of course it is not apples for apples, because one set of figures covers imports and the other retail sales, but even so, the differences are much more than one might expect. This report has generally opted for the GfK figures as both a happy medium and a source of greater and more rigorous detail. The trends shown by the GfK figures look reasonable and differences in the overall numbers between their figures and Statistics NZ figures are relatively insignificant in the overall scheme of things.

5.2 TELEVISION SETS

5.2.1 CRT televisions

We believe that approximately four million TV sets are currently in New Zealand homes (in use and in storage). About 2.2 million of these use cathode ray tube (CRT) screen technology. CRT sets will soon become obsolete and represent a huge disposal problem. The analysis below describes the New Zealand television market, trends in the market, and ewaste issues for television sets.

5.2.2 Television retail sales volumes and trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Rear projection</th>
<th>CRT</th>
<th>LCD</th>
<th>Plasma</th>
<th>TOTAL</th>
<th>Change in Total column</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>26,600</td>
<td>230,700</td>
<td>22,600</td>
<td>19,200</td>
<td>299,100</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>22,300</td>
<td>173,200</td>
<td>67,500</td>
<td>28,500</td>
<td>291,500</td>
<td>-3%</td>
</tr>
<tr>
<td>2007</td>
<td>22,300</td>
<td>113,500</td>
<td>143,000</td>
<td>39,700</td>
<td>318,500</td>
<td>+9%</td>
</tr>
<tr>
<td>2008</td>
<td>14,400</td>
<td>57,000</td>
<td>220,200</td>
<td>62,000</td>
<td>353,600</td>
<td>+11%</td>
</tr>
<tr>
<td>2009</td>
<td>1,400</td>
<td>20,800</td>
<td>226,000</td>
<td>61,400</td>
<td>309,600</td>
<td>-12%</td>
</tr>
<tr>
<td>2010</td>
<td>70</td>
<td>2,900</td>
<td>278,200</td>
<td>87,800</td>
<td>368,970</td>
<td>+19%</td>
</tr>
</tbody>
</table>

Source: GfK

Table 5-2: Television retail sales trends (2005-2010)

Figure 5-1: Television retail sales trends (by equipment type)

Notes:
- Over the six-year period, just under two million new television sets were sold in New Zealand. 600,000 of them were CRTs.
- Despite two years when the total sales volume dropped, the overall average annual increase since 2005 has been around 5%.
- Even in the years when overall sales decreased, there were considerable increases in sales of flat screen TVs – the overall averages were dragged down by the fall-off in sales of CRT and rear projection TVs. The average annual increase during the period was 78% for LCDs and 37% for plasmas.
- These figures call into question a recent (December 2010) Energy Efficiency and Conservation Authority (EECA) estimate of 2.5 to 3.5% annual growth in television set sales. While the flat screen sales boom can be
expected to taper off, annual sales increases may well exceed the EECA estimate for some time to come. The EECA research used figures that were up to a year older than those now available, and missed the significant upturn in flat screen sales that occurred during the latter part of 2010 and in January 2011.

5.2.3 Percentage shares of television sales volumes by type:

<table>
<thead>
<tr>
<th>Year</th>
<th>Rear proj.</th>
<th>CRT</th>
<th>LCD</th>
<th>Plasma</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>8.5</td>
<td>77.5</td>
<td>7.6</td>
<td>6.4</td>
</tr>
<tr>
<td>2006</td>
<td>7.3</td>
<td>59.6</td>
<td>23.2</td>
<td>9.8</td>
</tr>
<tr>
<td>2007</td>
<td>6.7</td>
<td>35.7</td>
<td>45.1</td>
<td>12.5</td>
</tr>
<tr>
<td>2008</td>
<td>3.9</td>
<td>16.2</td>
<td>62.4</td>
<td>17.6</td>
</tr>
<tr>
<td>2009</td>
<td>0.4</td>
<td>6.7</td>
<td>73.0</td>
<td>19.8</td>
</tr>
<tr>
<td>2010</td>
<td>0.0</td>
<td>0.8</td>
<td>75.4</td>
<td>23.8</td>
</tr>
</tbody>
</table>

Source: GfK

Table 5-3: Television sales trends (percentages by equipment type)

5.2.4 Prices for selected TV sizes, January 2005 – January 2011

<table>
<thead>
<tr>
<th>January year</th>
<th>LCD</th>
<th>Plasma</th>
<th>Average, all screens</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>26&quot;</td>
<td>32&quot;</td>
<td>40&quot;</td>
</tr>
<tr>
<td>2005</td>
<td>3,317</td>
<td>5,223</td>
<td>0</td>
</tr>
<tr>
<td>2006</td>
<td>2,028</td>
<td>3,010</td>
<td>4,885</td>
</tr>
<tr>
<td>2007</td>
<td>1,638</td>
<td>2,031</td>
<td>3,370</td>
</tr>
<tr>
<td>2008</td>
<td>994</td>
<td>1,343</td>
<td>2,647</td>
</tr>
<tr>
<td>2009</td>
<td>763</td>
<td>1,058</td>
<td>2,151</td>
</tr>
<tr>
<td>2010</td>
<td>673</td>
<td>821</td>
<td>1,725</td>
</tr>
<tr>
<td>2011</td>
<td>548</td>
<td>620</td>
<td>1,240</td>
</tr>
</tbody>
</table>

Source: GfK

Table 5-4: Television set price trends (2005- 2011)

Notes:
- Screen sizes shown in the table were selected from a much wider range that was available. Their selection was based on the more popular sizes historically, in terms of numbers sold. However, the average price was calculated on all flat screen sizes (including those not shown above).
- Overall, prices in January 2011 were only about a quarter of what they were in 2005. This is misleading, however, because in 2011 people are, on average, buying bigger screens which are intrinsically more expensive than smaller screens. The price difference is far more dramatic within the same size of screen. For instance, the price of 32 inch LCD screens – the most popular LCD screen size both today and in 2005 – has dropped by nearly 90 percent.
- Size for size, plasma screens have always been cheaper than LCD screens and have taken the lead as far as increasing size is concerned. In 2005, 90% of plasma screens were 42 inches. At this time, 97% of LCD screens were 32 inches or less. Forty-two inches was still the most popular plasma size in 2011, but its share had fallen to the start of the period, CRT TVs were dominant, with a 77.5% market share. The share quickly dropped to less than one percent in 2010. LCD TVs took over, moving from 7.6% in 2005 to 75.4% in 2010. Plasma TVs have played second fiddle to LCDs throughout the period, but in 2010 they actually increased their market share, mainly at the expense of CRT sales. Plasma TVs are significantly cheaper than LCD TVs at higher screen sizes. Rear projection TV sales moved from 8.5% of the total in 2005 to effectively nothing in 2010.

Notes:
- At the start of the period, CRT TVs were dominant, with a 77.5% market share. The share quickly dropped to less than one percent in 2010.
- LCD TVs took over, moving from 7.6% in 2005 to 75.4% in 2010.
- Plasma TVs have played second fiddle to LCDs throughout the period, but in 2010 they actually increased their market share, mainly at the expense of CRT sales. Plasma TVs are significantly cheaper than LCD TVs at higher screen sizes.
- Rear projection TV sales moved from 8.5% of the total in 2005 to effectively nothing in 2010.
55%. Moving in were 50 inch plasma screens, which took 39% of the market in 2011. Plasma screens 58 inches and larger had moved from 0% to 3%.

- Between January 2005 and January 2011, weighted average screen sizes increased from 24 inches to 34 inches for LCD and from 42 inches to 46 inches for plasma.

5.2.5 Television sets – retailers and brands
The usual sales channel for new TVs is retail stores, especially large chains including Appliance Connection, Dick Smith Electronics, Harvey Norman, J B HiFi, Noel Leeming, The Farmers, Retravision, 100% Your Electric Store, Smiths City, The Good Guys and The Warehouse.

All TVs in New Zealand are imported. According to GfK Research, in January 2011, the top selling brands, in terms of ranking were:

<table>
<thead>
<tr>
<th>Brand</th>
<th>LCD</th>
<th>Plasma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samsung</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Panasonic</td>
<td>3</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Sony</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>LG</td>
<td>4</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Konka</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: GfK

Table 5-5: TV sets: top selling brands (January 2011)

Notes:
- The top five brands accounted for approximately 80% of total sales of all types (70% for LCD and 100% for plasma).
- In 2006 the top three brands were Philips, Panasonic and Sony. Philips left the New Zealand market at the end of 2008. The Konka brand, manufactured in China, is sold by Dick Smith. In 2006, Dick Smith was selling TVs under the Dick Smith and Digitor brands.
- Actual market shares for individual brands were confidential.

5.2.6 Estimating the total number of CRT television sets
While we have a good idea of the volume of TV sets being imported and sold, it is difficult to estimate the total number of television sets in New Zealand homes, and the rate at which these sets become unused and are either being passed on to others, in home storage or being disposed of (usually to landfill).

While there is no direct data on the numbers of TVs actually in homes, the EECA report refers to a Statistics New Zealand estimate of 2.9 million and a Nielson estimate of 3.3 million units. We know, from the adjusted GfK sales figures, that at least 600,000 more TV sets have been purchased since that time (mid 2009). All but 12,000 were flat screen models.

In mid 2009, about two-thirds of the 3.3 million home stock estimate were CRTs, the EECA report suggested. This equates to a CRT stock of about 2.2 million. Since mid 2009, sales of new CRT TVs and landfill disposals may well have cancelled each other out, so one could assume that the total current stock of CRT TVs in New Zealand homes, both functioning and in storage, remains at around 2.2 million.

Note: this is significantly lower than an estimate of 3.4 million CRT TVs made by UMR Research in a 750-person sample survey carried out for the Ministry for the Environment in January 2006.

5.3 TELEVISION DISPOSALS

5.3.1 When will CRT television sets be dumped?
Though we have a rough idea of the total stock of CRTs in homes, it is very difficult to estimate when they will be dumped. We know that considerable numbers of TVs are being stored in homes, unused. Some of these unused TVs will no longer be working, but most probably still function.

Estimates of numbers of unused TVs vary enormously. The 2006 UMR survey estimated that 6.1% of TVs, or 210,000 sets, were not in use. The 2010 EECA report estimated that one third of households had at least one TV that was not being used. That would mean at least 530,000 sets, or more than double the UMR figure. A survey of people who brought equipment to the 2010 eDay revealed that 25% of them had a TV at home awaiting disposal.

We can find no reliable national data about the rate at which unused CRTs are being sent to landfill. We do know that after new TVs are bought, many older TVs, usually CRTs, remain in use as secondary sets in the home – e.g. in bedrooms. They are also passed on to children’s flats, charity etc, or sold, probably mainly through TradeMe (however TradeMe’s annual CRT TV sales are only about 20,000).1

5.3.2 Passing-on option for old CRT TVs being eliminated
The option of ‘passing on’ or selling older television sets will soon be effectively unavailable. By
November 2013 New Zealand will have switched to digital television. The switchover will be phased, starting with Hawke’s Bay and the West Coast in September 2012.

CRTs (and some older flat screens) will not receive a digital signal unless they are paired with appropriate ‘set-top boxes’ (Freeview, Sky TV, Telstraclear). We believe that relatively few people will now buy set-top boxes, given that prices of flat screen televisions with built-in Freeview tuners now start at under $300.35

The digital switchover imperative and the opportunity to improve television reception in marginal reception areas, coupled with the excellent ‘excuse’ these factors give to upgrade to enhanced viewing pleasure with bigger, brighter HD screens, may well be why flat screen television sales really took off during 2010 and early 2011. The boom in TV sales during that period contrasted to lacklustre sales of other household goods.

But more than ‘cast-offs’ will be affected by the digital switch-over. Primary television sets in homes will become equally useless, unless they are paired with set-top boxes. Many of these analogue TVs, of course, are already operating as digital receivers because they are paired with Freeview/Sky/Telstraclear.

The Ministry of Culture and Heritage believes 70% of homes already have digital access, either to CRTs or flat screens. But in most cases, digital access would only apply to living room TVs. Large numbers of second or third CRT sets, which many homes have, will be potentially useless. They could be converted to digital access, but we believe most will be discarded.

It is clear that New Zealand is heading for a very rapid increase in numbers of CRT TVs which people want to finally dispose of. In the past, these surplus TVs could be passed on or sold, but the digital switchover will reduce this opportunity. The other activity that has kept many unused (but working) CRT TVs out of landfill has been simply storage in the home. People can be reluctant to finally dispose of items that are actually working. This inertia may not apply to TV sets rendered finally unworkable because of the digital switchover.

5.3.3 Approaching a disposal deluge
We are facing a disposal deluge for CRT TVs. But how much and when? It seems likely that we are already at a tipping point when people see little point in retaining or passing on CRTs that are not in primary use.

Even CRTs that are in primary use with a digital connection are likely to be replaced by flat screens sooner rather than later, because users will be lured by ever-cheaper flat screens that not only give a bigger and better picture, but, because of their wide-screen aspect ratio, show all the pictures and captions that are invisible at the edges of 4:3 ratio CRTs.

Added to this will be continuing replacement of CRT TVs that break down (though modern CRT TVs can last up to 20 years).

It would not be unreasonable to suggest that within 18 months, householders will be in a final disposal mindset for at least a third of New Zealand’s 2.2 million CRT TV stock. Perhaps another third will want to do this by the end of 2013, when the digital switchover will have completed, and the balance soon after that.

5.3.4 Disposing of flat screen and rear projection televisions
This review has concentrated on CRT TVs because they are a more immediate problem: they are mostly older, heavier and contain more toxic materials. Almost all of the flat screen stock is under five years old and will function for at least another five years. Estimates of longevity vary, but LCD TVs seem likely to last for 30-60,000 hours and plasma TVs for 20,000 to 30,000 hours. Thirty thousand hours is equivalent to watching TV for eight hours a day, seven days a week, for ten years.

Some flat screen TVs are already partly obsolete because they don’t have HD resolution and don’t have built-in digital tuners. Some may be sent to final disposal before they stop working, but numbers will probably be low for several years to come. While flat screen TV ewaste may not be an immediate issue, it is something that should be analysed more carefully in future studies of this type.

Rear projection TV is one type of large TV that is now thoroughly obsolete and units are likely to be disposed of within a short time frame. Over 80,000 of these TVs were sold in New Zealand between 2005 (the earliest figures we have seen) and 2010, when they ceased to be sold.

5.4 COMPUTERS
The sales and distribution infrastructure for computers is considerably more complex. Whereas TVs are sold mainly to homes by retailers, the computer market is much wider and sales and distribution channels are many and varied.
5.4.1 Home market (including some small business)

There are four main channels for new computers:

1. Retail shops – including the same chains selling TVs, except for The Farmers. A wide range of brands is available – especially Hewlett Packard (HP), Lenovo (the renamed IBM range), Acer, Dell, Apple and a variety of locally assembled ‘whitebox’ models, sometimes bearing retailers’ name badges. Some retailer chains sell only laptops – some of which are imported directly.

2. Direct sales through website and phone (these include smaller operators such as ComputerStore and the large Dell operation, through which most of that company’s computers are sold (some Dell product is also retailed by JB HiFi.)

3. Direct from ‘whitebox’ assemblers. The major remaining assemblers for home and small business markets appears to be PB Technologies and Ascent. (Previously, local assemblers also produced desktop computers bearing major retailers’ brandnames such as Dick Smith Electronics. Little if any of this is happening now.)

4. Auction through Trade Me (mostly locally assembled by small operators).

Leasing of computers by home users is rare, though it is common in the commercial sector. Only 1% of home market respondents in the 2005 UMR survey rented a computer system.

5.4.2 Commercial market (corporates, government, education)

Systems for distributing new computers into the commercial market are more complex and varied and they include a significant amount of leasing. Corporates can purchase directly from resellers, but more often purchasing is done via intermediaries:

- Outsourcers and systems integrators who set up and roll out computer systems on behalf of client organisations – examples include EDS, Gen-i, Divers Group, Fujitsu, Datacom, Unisys, Computerbrokers, LanTech, HCC Pacific and numerous local IT companies.

- Lease and/or finance companies. Major-brand companies have their own finance/lease subsidiaries. Examples are Dell Financial, IBM Global Financing and HP Financial. A variety of brands is also financed or leased through independents including CIT Group, Equico, TeRenco Finance, UDC, Macquarie Finance and All Leasing.

Insite and Cyclone are two local companies who assemble and sell to the education and small business markets. Both companies also sell imported brands such as HP and Lenovo, and locally assembled desktops are becoming less important.

5.4.3 Computer suppliers to New Zealand

In 2010, the top five suppliers of all computers, including laptops, were, according to IDC:

1. HP (29%)
2. Acer
3. Toshiba
4. Dell
5. Apple

The percentage share was only available for the biggest supplier. HP was also the biggest supplier in 2006, when it also had a 29% market share. Acer maintained its second position between 2006 and 2010. Next down, Toshiba and Dell swapped places, with Toshiba rising to number three. Apple entered in fifth place in 2010, while Lenovo dropped out of the top five.

All of the top five brands, and most other brands, are imported. About a quarter of desktop boxes sold in New Zealand are locally assembled ‘whitebox’ machines.
### 5.4.4 Computer shipments in New Zealand, 2001-2010

<table>
<thead>
<tr>
<th>Year</th>
<th>Desktop</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Business</td>
<td>Home</td>
<td>Total</td>
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<td>Home</td>
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<tr>
<td>2001</td>
<td>160,586</td>
<td>105,701</td>
<td>266,287</td>
<td>228,727</td>
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<td>2002</td>
<td>173,044</td>
<td>107,802</td>
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<td>2003</td>
<td>210,766</td>
<td>117,546</td>
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<tr>
<td>2004</td>
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<td>125,367</td>
<td>354,094</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Laptop</th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Business</td>
<td>Home</td>
<td>Total</td>
<td>Business</td>
<td>Home</td>
</tr>
<tr>
<td>2001</td>
<td>47,451</td>
<td>8,669</td>
<td>56,120</td>
<td>96,440</td>
<td>49,171</td>
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<td>2002</td>
<td>58,909</td>
<td>12,328</td>
<td>71,237</td>
<td>95,210</td>
<td>49,171</td>
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<td>2003</td>
<td>85,580</td>
<td>28,618</td>
<td>114,198</td>
<td>120,550</td>
<td>95,210</td>
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<td>2004</td>
<td>96,440</td>
<td>49,171</td>
<td>145,611</td>
<td>120,550</td>
<td>95,210</td>
</tr>
<tr>
<td>2005</td>
<td>120,550</td>
<td>95,210</td>
<td>215,760</td>
<td>120,550</td>
<td>95,210</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Total units</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>266,287</td>
<td>228,727</td>
<td>495,014</td>
<td>354,094</td>
<td>217,026</td>
</tr>
<tr>
<td>2002</td>
<td>280,846</td>
<td>207,383</td>
<td>488,229</td>
<td>317,026</td>
<td>109,643</td>
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<td>328,312</td>
<td>228,727</td>
<td>557,039</td>
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<td>125,367</td>
</tr>
<tr>
<td>2004</td>
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<td>228,727</td>
<td>582,821</td>
<td>354,094</td>
<td>125,367</td>
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<td>2005</td>
<td>317,026</td>
<td>207,383</td>
<td>524,409</td>
<td>317,026</td>
<td>109,643</td>
</tr>
</tbody>
</table>

**Source:** IDC (2011)

### Table 5-6: Computer shipments in New Zealand (2001-2010)

**Notes**

- Shipments of computers in New Zealand (both laptops and desktops) totalled 720,000 in 2010. This was more than double the level of ten years earlier.
- Shipments increased every year except for 2009, when there was a drop of 70,000. (This paralleled a drop in television sales in the same year.)
- Cumulative totals over the ten year period were 5.3 million (3.1 in businesses and 2.2 in homes).
- Over the ten year period, desktop sales were 2.9 million and laptop sales were 2.4 million. However, there was a strongly increasing trend to laptops, whose share rose from 12% in 2001, to 47% in 2006 and 62% in 2010.
- Initially laptops had a greater share in businesses, but the proportion of laptops shipped to homes increased rapidly. In 2010, three-quarters of home computer sales were laptops, while even in businesses, laptops made up half of the total. The laptop shares are shown on the next page.
EWASTE IN NEW ZEALAND — FIVE YEARS ON

5.4.5 Whitebox share of the desktop market
This sector is declining. IDC estimates its share decreased from 39% in 2001, to 30% in 2005 and 25% in 2010 (about 70,000 units). There is no ‘whitebox’ equivalent for laptop computers.

5.4.6 Computer monitors
In 2010, 329,000 computer monitors were shipped in New Zealand. All were LCD; CRT monitor shipments have been minimal to nil since 2006. It is also interesting to note that total sales peaked in 2005 and declined since then, probably as a direct result of the move to laptops.

Table 5-7: Laptop market share (2001 – 2010)

<table>
<thead>
<tr>
<th>Type</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>8%</td>
<td>10%</td>
<td>20%</td>
<td>28%</td>
<td>46%</td>
<td>55%</td>
<td>62%</td>
<td>69%</td>
<td>73%</td>
<td>74%</td>
</tr>
<tr>
<td>Business</td>
<td>23%</td>
<td>25%</td>
<td>29%</td>
<td>30%</td>
<td>37%</td>
<td>43%</td>
<td>43%</td>
<td>44%</td>
<td>49%</td>
<td>48%</td>
</tr>
<tr>
<td>Home &amp; business</td>
<td>17%</td>
<td>20%</td>
<td>26%</td>
<td>29%</td>
<td>40%</td>
<td>48%</td>
<td>52%</td>
<td>5%</td>
<td>60%</td>
<td>62%</td>
</tr>
</tbody>
</table>

Source: IDC (2011)

Table 5-8: Computer monitor sales trends (2001-2010)

<table>
<thead>
<tr>
<th>Type</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT</td>
<td>296,067</td>
<td>297,014</td>
<td>238,704</td>
<td>195,887</td>
<td>83,271</td>
<td>22,866</td>
<td>1,487</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>LCD</td>
<td>13,542</td>
<td>40,260</td>
<td>134,461</td>
<td>201,450</td>
<td>364,539</td>
<td>324,161</td>
<td>371,162</td>
<td>376,266</td>
<td>314,873</td>
<td>328,917</td>
</tr>
<tr>
<td>Total</td>
<td>309,609</td>
<td>337,274</td>
<td>373,165</td>
<td>397,337</td>
<td>447,810</td>
<td>347,027</td>
<td>372,649</td>
<td>376,268</td>
<td>314,873</td>
<td>328,917</td>
</tr>
</tbody>
</table>

Source: IDC (2011)

5.5 ESTIMATING UPCOMING COMPUTER EWASTE

5.5.1 Desktop computer boxes
The 2006 e-Waste in New Zealand report estimated the following stock of desktop computer boxes in New Zealand as at the end of 2005:
- Home: 1.9 million (of which 251,000 were not in use)
- Business: 2.9 million.

Between 2006 and 2010, additional desktop shipments totalled 1.1 million for homes and 1.9 million for businesses. This gives current grand totals, not allowing for disposals, of:
- Home: 3.0 million
- Business: 4.8 million

This gives a total of 7.8 million boxes, which at an average of 11kg each totals 86,000 tonnes.

It is impossible to accurately assess disposals of desktop boxes, 65,000 were dropped off at the four national eDays (2007-2010), which represented an average of just over one in every carload. We believe this is only about 5% of the total number of desktops reaching end-of-life. The remainder are in home storage, being processed by a commercial or community recycler (some are even organising their own community collection days) or being dumped in landfills.

5.5.2 CRT monitors
Before allowing for disposals, the total stock of CRT computer monitors would effectively be the same as estimated in 2006, because few CRT monitors have been shipped since 2005.

5.5.2.1 CRT monitors in homes
In January 2006 it was estimated that the number of CRT computer monitors in homes was 1.9 million, of which 256,000 were not in use. We believe that most of the balance of these CRT monitors would no longer be in use today: (a) they would have been superseded when computer systems were replaced by newer systems that included LCD monitors or were replaced by a laptop; (b) because CRTs that were part of existing systems were replaced by increasingly cheaper LCDs; and (c) because the CRTs developed faults and were replaced by LCDs.

We believe it would be reasonable to assume that at least 80% of home computer CRTs are no longer being used. This would mean that the stock of CRTs ready for final disposal is in the region of 1.5 million, containing 2,100 tonnes of lead. The balance of the home computer CRT stock will be...
These figures of potential disposal numbers do not include what has actually been disposed of since 2006, mostly direct to landfill, street collection (e.g. in Auckland) or annual eDays, which have operated since 2007. We have no figures for landfill and street collection disposals, while the total number of monitors collected at eDays has been 75,000 – relatively minimal in the scheme of things. Effectively there have been no take-back schemes for home computers provided by retailers or manufacturers.

It seems clear that the great majority of the estimated 1.9 million home computer CRT monitor stock is at or near final disposal time. However, it is not clear when these items will actually be finally disposed of. Households tend to store both unused (but working) and non-working computer systems, and have shown a reluctance to pay for their disposal.

5.5.2.2 CRT monitors in business/government

The 2006 e-Waste in New Zealand report estimated that in January 2006 there were 4.4 million computer CRTs in business/government. As with home computers, effectively no CRT monitors have been added since that time. Given the more rapid turnover of commercial computer systems, it is likely that virtually the entire 4.4 million stock is no longer with the original users. Some will have been sold through refurbishers or remarketers to home or small business use. Some will be stored. Some will have been sent to landfills and end-of-life recyclers. Given services for end-of-life recycling provided by companies such as Dell and HP for business-size installations, a good proportion of these CRTs may have already been finally disposed of. One large recycler believes it could be up to one third. If correct, that would leave 3.1 million business CRTs either in use or waiting for final disposal.

5.6 LAPTOP COMPUTERS

Between 2001 and 2010, 2.4 million laptops were shipped in New Zealand – effectively all that have ever entered New Zealand. We know from our eDay collections that laptops are entering the waste stream in significant numbers, but we have no comprehensive information on the total quantity of past or likely future disposals of these computers as ewaste.
Next to CRT monitors, printers are the least economic computer items to recycle. This may well encourage people to ditch their old printers and trade up to a new ones.

5.8 Other consumer electronics

Because this report has concentrated on computer equipment and television sets, we have not generally investigated the volume and disposal situation for other consumer electronics products. We do, however, have data from GfK for retail sales of video players and recorders. Total sales of these between 2005 and 2010 were approximately 2.5 million (including a 20% adjustment to allow for total retail sales). 88% were standalone units, while the balance were sold with home theatre packages.

Video player/recorder import statistics were also available from Statistics NZ, and for the 2005-2010 period they correlated well with the GfK figures, with 2.6 million units. Statistics NZ figures went back to 2000 and show total imports over the 11 year period of 3.6 million units.

5.7.2 Other computer peripherals

Statistics NZ could not give figures for any other peripherals, but GfK did give standalone scanners. There were relatively small in number, however. For instance in 2010, only about 2400 standalone scanners were sold. In the same year, about 175,000 MFD devices were sold, that incorporated scanners. Only limited information is available on the extent of computer peripherals. There are no statistical time series that extend further back than 2006.

26 Desktop boxes are the ‘box’ portion of desktop computers that incorporates the central processing unit, hard drives etc.
28 Data provided by IDC New Zealand www.anz.idc.asia
29 GfK Retail and Technology Australia and New Zealand is part of an international market research organisation. In New Zealand it receives monthly sales returns from a ‘panel’ of retailers. GfK believes this panel covers about 95% of television sales and about 80% of the other consumer electronic items considered in this report. In order to approximate 100 per cent of retail sales, GfK’s television figures have been inflated by 5% and other items by 20%.
30 LCD screens include models now being marketed as ‘LED’. LED screens still use LCD display technology, but they are backlit by LED lighting rather than fluorescent lighting. LED TVs are currently significantly more expensive, but are thinner and lighter.
31 Proposed Minimum Energy Performance Standards and Labelling for Televisions: Consultation draft for stakeholder comment issued pursuant to s36 (2) of the Energy Efficiency & Conservation Act 2000, Energy Efficiency and Conservation Authority (EECA), December 2010. Their figures were based on a TV usage and purchasing survey done for the Authority by Neilson, dated June 2009.
32 Op cit
34 Estimated very roughly by using the following technique: Items are listed on TradeMe for an average of one week, so multiply current CRT TV listings by 52. Then apply separately listed ‘sell-through’ proportions for the category. Sell-through means the proportion of listed items that actually sold over the previous month.
35 Transonic 19 inch at The Warehouse $299, June 2011 – $396. The Warehouse also had 22 inch Transonsics for $349. Dick Smith Electronics was selling a 22 inch Samsung in June for $399. All these TV sets had built-in tuners that could receive Freeview.
36 ‘Whitebox’ computers are locally assembled from imported parts, most of which come from Taiwan or China. Almost all of them run the Windows operating system, which would normally be purchased in New Zealand.
37 IDC definition: ‘shipments’ are counted as the number of units sold into the channel within the country of intended final use or those sold directly to end-users in a given period (also known as ‘sales-in’). ‘Sales-in’ shipments may reach the channel or end-user directly by way of a local subsidiary or local representative. If a shipment is held in inventory by a local subsidiary, it is not included in ‘sales-in’ until it is sent into the channel or to the end-user in direct sale cases. Local subsidiaries are not considered part of the channel. In OEM (Original Equipment Manufacturer) situations, shipments are attributed to the company whose name appears on the final product. Shipments are counted once the system is sold into that company’s channel or to an end-user.
38 Including business, government and education sector.
39 The IDC estimation techniques for whitebox computers take a number of aspects into account including performance of the larger suppliers, returns of shipments of processors into the market (from Intel and AMD) and sales of Windows operating systems provided by Microsoft.
40 Op cit
41 Op cit
6. Ewaste recyclers and recycling practices

6.1 KEY POINTS

- Some materials used in the manufacture of computers and televisions have a value when recycled; others incur a cost when safely disposed of or recycled.
- The cost of separation and extraction typically exceeds the return that can be obtained from the sale of recovered materials.
- Few recyclers are able to provide a comprehensive recycling service; materials with little or no value, including hazardous materials, are typically sent to landfill. There are no facilities in New Zealand for processing leaded glass in CRT monitors and TVs, nor for extracting materials from printed circuit boards.
- Most recyclers are not forthcoming in explaining their recycling processes; despite bold claims about good recycling practices, few are willing to publish details on their websites or respond to inquiries, claiming commercial sensitivities.
- The RCN e-Cycle initiative is a positive development in establishing permanent collection points but by imposing drop-off charges for most ewaste, the scheme on its own does not solve New Zealand’s burgeoning ewaste problem.

6.2 RECYCLING ELECTRONIC PRODUCTS

Electronic products, including computers and televisions, are complex products made of multiple materials. Some of the materials within electronic products have a value when recycled, while others have minimal value and can even attract a cost for correct disposal.

This complexity makes recycling difficult and usually labour intensive. The solution to this is to install recycling plant that automates much of the process and separates materials using a range of different processes. Such plants have been installed overseas where volumes of ewaste are much higher and justify the investment in this costly infrastructure.

The challenge for recyclers is to find enough value in the materials they extract from ewaste to pay for a labour intensive process, cover the costs of disposing of residual material, and turn a profit. This has meant that, to a large extent, New Zealand relies on the export of ewaste to other countries with recycling solutions already in place.

There is a range of operations set up to handle ewaste in New Zealand. These include some combination of:
1. Refurbishment and reuse
2. Component removal and sale
3. Limited material extraction and onshore recycling
4. Material separation and export
5. Export whole for recycling
6. Landfill

We conducted an online survey of organisations claiming to recycle ewaste in May 2011. The search found 27 organisations and these are listed in Appendix 3. Within the scope of this report, we have not been able to visit or talk to all organisations to verify their practices so we have listed the companies based on information they make publicly available regarding their services and practices.

6.3 RCN E-CYCLE INITIATIVE

One of the most significant ewaste recycling programmes set up in recent years is the RCN e-Cycle project. The RCN Group, who are business-to-business ewaste recyclers, have partnered with the Community Recycling Network (CRN) to create a public solution for ewaste recycling. The project has been helped by $400,000 of funding from the Ministry for the Environment’s Waste Minimisation Fund.

The RCN e-Cycle programme involves 20 collection sites around New Zealand. These collection sites offer a recycling service to consumers, householders, small businesses and schools for ewaste. Eight of these collection sites are members of the Community Recycling Network (CRN), who are partners in the programme. Collection sites have been set up at:
- Central Otago Waste Busters, Alexandra
- RCN Group, Auckland
- Hurunui Recycling, Christchurch
- E-Waste Recycling Hawkes Bay, Hastings
- Nelson Recycling Centre, Nelson
- Xtreme Waste, Raglan
- Rotorua District Council managed by Materials Processing Limited, Rotorua
- Mainfreight Ltd, Mt Manganui
- Wanaka Wastebusters, Wanaka
- Trash Palace @ Mana Recovery, Porirua, Wellington

Simon Wilkinson
• Seagull Trust, Thames
• Clean Stream, Kaitaia
• RCN Group, Wellington
• RCN Group, Christchurch

Several more sites are in negotiation and likely to come into action at the time of writing this report, including Invercargill, Queenstown, Whangarei, Dunedin, Kapiti Coast and Hamilton.

Sites that are partners in the RCN e-Cycle programme collect all of the items listed in the table below and have been given a base cost for recycling each item. The charges have been calculated to cover operational, logistic and administrative costs. Transport costs to one of the three RCN processing facilities (Auckland, Wellington, Christchurch) are additional and this increases the costs considerably for areas outside the three main centres.

Each collection site has the freedom to pass on this charge to the customer, or to subsidise the costs in some way. For example, in Rotorua the Council is fully subsidising these recycling costs, meaning that all ewaste items are free-of-charge for customers at the town recycling centre. At the ewaste collection site in Kaitaia customers are being charged a flat fee of $5 for all items, with the difference being subsidised by the Council.

Collection sites that participate in the programme are given the freedom to handle the ewaste in their own way. This means some sites may be dismantling equipment themselves and choosing what to send through the programme, while others simply collect, aggregate and send on to RCN for recycling. The RCN e-Cycle programme does pay for certain components of ewaste once dismantled – e.g. cable, yokes, printed circuit boards.

Each site participating in the programme is required to have a health and safety policy in place, and a training course is being run by EXITO (Extractive Industries Training Organisation) at each site on handling, dismantling and health and safety when managing ewaste.

When sufficient volumes of equipment are collected at a partner site, RCN organises transport of the ewaste to their nearest RCN Group recycling depot. RCN Group has recycling facilities in Auckland, Wellington and Christchurch. Once at these facilities the recycling pathways depend on the type of equipment shown in Table 6.2 on the opposite page.

The RCN e-Cycle initiative is a significant attempt to provide an ewaste recycling solution in an environment where a coordinated product stewardship approach does not currently exist. It provides a self-sustaining solution by imposing a recycling charge for equipment that the user is required to pay, unless subsidised by local ratepayers.

No manufacturers are involved in the programme and because the costs lie fully with the end consumer and/or ratepayer, it does not represent a product stewardship approach to ewaste in New Zealand.

<table>
<thead>
<tr>
<th>Item</th>
<th>Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT computer monitors</td>
<td>$14</td>
</tr>
<tr>
<td>CRT TVs</td>
<td>$20</td>
</tr>
<tr>
<td>LCD &amp; plasma TVs</td>
<td>$20</td>
</tr>
<tr>
<td>LCD computer monitor</td>
<td>$6</td>
</tr>
<tr>
<td>Desktops</td>
<td>$5</td>
</tr>
<tr>
<td>Laptops</td>
<td>$5</td>
</tr>
<tr>
<td>Office servers</td>
<td>$5</td>
</tr>
<tr>
<td>Hubs, switches &amp; routers</td>
<td>$4</td>
</tr>
<tr>
<td>Patch panels &amp; modems</td>
<td>$4</td>
</tr>
<tr>
<td>Inkjet</td>
<td>$11.50</td>
</tr>
<tr>
<td>Desktop laser</td>
<td>$11.50</td>
</tr>
<tr>
<td>Workgroup laser</td>
<td>$11.50</td>
</tr>
<tr>
<td>Photocopier – small</td>
<td>$46</td>
</tr>
<tr>
<td>Photocopier – medium</td>
<td>$46</td>
</tr>
<tr>
<td>Photocopier – large</td>
<td>$69</td>
</tr>
<tr>
<td>Cellphones</td>
<td>Free</td>
</tr>
<tr>
<td>UPSs – small</td>
<td>$11.50</td>
</tr>
<tr>
<td>UPSs – medium</td>
<td>$11.50</td>
</tr>
<tr>
<td>UPSs – large</td>
<td>$11.50</td>
</tr>
<tr>
<td>Laptop batteries (separate)</td>
<td>$6</td>
</tr>
<tr>
<td>Fax machines</td>
<td>$11.50</td>
</tr>
<tr>
<td>Copier toner</td>
<td>$4 per kg</td>
</tr>
<tr>
<td>DVD players</td>
<td>$6</td>
</tr>
<tr>
<td>VCRs</td>
<td>$6</td>
</tr>
<tr>
<td>Stereo systems</td>
<td>$6</td>
</tr>
<tr>
<td>Washing machine</td>
<td>$29</td>
</tr>
<tr>
<td>Microwaves</td>
<td>$11.50</td>
</tr>
</tbody>
</table>

Table 6-1: RCN e-Cycle charges (1 May 2011)
Televisions and CRT monitors and some photocopiers and printers

- Disassembled manually and mechanically.
- Metal components (such as the CRT copper yoke) are removed for scrap metal recycling in New Zealand and in export markets.
- Plastics such as housings and other components are baled and exported for recycling.
- CRT glass is split using three new CRT splitting machines in Auckland, Wellington and Christchurch. Phosphors inside the tube are vacuumed out for recycling/disposal. The front panel glass, containing low levels of lead, is recycled in New Zealand. The back glass containing high levels of lead is being stored for shipping overseas for recycling. Basel Permits for CRT glass export have been applied for.

Printer and photocopier toner cartridges

- Exported to the Close the Loop recycling plant in Australia for full recycling.

All other products and components, including hard drives, printed circuit boards etc.

- Are exported to recycling plants in Australia, Singapore and Japan.
- Exported under approval from MED

Table 6-2: RCN e-cycle recycling processes

### 6.4 EWASTE RECYCLERS

In May 2011 we conducted an internet search and collated all publicly available information we could find on ewaste recyclers in New Zealand. The results are detailed in the tables in Appendix 3. The organisations listed below do not include all of the 20 sites that are part of the RCN e-Cycle initiative, as some of these are still being established. There are eight community recycling network (CRN) collection centres that are part of the RCN e-cycle initiative; some of these undertake dismantling and recycling of ewaste.

<table>
<thead>
<tr>
<th>Community recyclers/ collection centres</th>
<th>Commercial recyclers (NZ)</th>
<th>Commercial recyclers (international)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abilities Group</td>
<td>Computer Consultancy and Recycle IT Ltd</td>
<td>Sims Recycling Solutions TES-AMM</td>
</tr>
<tr>
<td>Cargill Enterprises</td>
<td>Computer Recyclers</td>
<td></td>
</tr>
<tr>
<td>Earthlink</td>
<td>Computer Recycling Ltd</td>
<td></td>
</tr>
<tr>
<td>Molten Media</td>
<td>Core Technology Brokers</td>
<td></td>
</tr>
<tr>
<td>Southland Disability Enterprises</td>
<td>DecomIT Ltd</td>
<td></td>
</tr>
<tr>
<td>Trash Palace*</td>
<td>Divers Group</td>
<td></td>
</tr>
<tr>
<td>Central Otago Wastebusters*</td>
<td>E-Scrap Recycling</td>
<td></td>
</tr>
<tr>
<td>Hurunui Recycling*</td>
<td>Cyclere</td>
<td></td>
</tr>
<tr>
<td>Earthlight*</td>
<td>E-Waste Recycling Hawkes*</td>
<td>Bay IT Recycle</td>
</tr>
<tr>
<td>Nelson Recycling Centre*</td>
<td>Recycle</td>
<td>ITRecycler</td>
</tr>
<tr>
<td>Xtreme Waste*</td>
<td></td>
<td>PC Recycle</td>
</tr>
<tr>
<td>Wanaka Wastebusters*</td>
<td></td>
<td>PC Recycling</td>
</tr>
<tr>
<td>Rotorua District Council*</td>
<td></td>
<td>RCN e-Cycle*</td>
</tr>
<tr>
<td>Mainfreight Ltd (Mt Maunganui)*</td>
<td></td>
<td>RCN e-Waste*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Recytech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Remarkit</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Ark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The Computer Broker Ltd</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Upcycle Ltd/CRTNZ</td>
</tr>
</tbody>
</table>

Table 6-3: ewaste recyclers in New Zealand (May 2011)
Many ewaste collectors/recyclers in New Zealand take the approach of partially dismantling collected equipment in order to resell components and/or extract materials that can be recycled for some value. Primarily these are the metal components and the components that contain precious metals such as printed circuit boards. The more difficult to recycle equipment, components and materials are usually then passed on to ‘strategic partners’ that are typically one of the larger, more specialised, ewaste recyclers such as RCN Group, Sims Recycling Solutions or TES-AMM. These larger operations hold Basel permits for export of ewaste and have commercial arrangements with overseas recycling plants.

Most ewaste collectors charge a fee per item to cover recycling costs. There are some exceptions to this, particularly in Auckland where there are a number of collectors that offer a free drop-off for most types of equipment. Some Auckland operators even offer free pick-up of items. This is most likely because in Auckland the logistics costs are lower and volumes are higher, making it easier to extract positive value from recycling. Auckland also gives easy access to export avenues and large scale recycling aggregators. It is unclear if the collected equipment is processed in an appropriate way or how residual, zero to low-value materials are dealt with under this model.

Christchurch’s E-Scrap Recycling, a division of Metalcorp scrap metal recyclers, is the only recycler in the country we are aware of that actually pays for many items of ewaste, and publishes a list of prices paid (see Table 6-4). Mixed, unseparated computer scrap is taken for free, and there is a charge of $4.50 for each CRT monitor and television. There are no publicly available details of how, or where, collected equipment is recycled, probably due to commercial sensitivity.

On the New Zealand ewaste scene there are also a large number of community groups, or charitable trusts, that undertake the refurbishment and relocation of electronic equipment. These organisations primarily collect equipment and refurbish to place into schools and low-income households. Obsolete equipment that cannot be refurbished is often passed on to a recycling partner, but some will dismantle ewaste to some extent and partner with a larger recycler to gain some value from separated materials.

There are also specialised, business-to-business, decommissioning operations that manage large volumes of ex-lease and obsolete equipment on behalf of corporate clients. They offer a secure destruction service of sensitive equipment such as hard-drives, and also remarket any reusable equipment. These companies will often partner with recyclers to handle the obsolete and decommissioned equipment.

In summary, some materials are being extracted for recycling onshore in New Zealand –

<table>
<thead>
<tr>
<th>Computer scrap</th>
<th>Price NZ$/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>IC chips</td>
<td>20.00</td>
</tr>
<tr>
<td>Fans</td>
<td>0.38</td>
</tr>
<tr>
<td>CPU cards</td>
<td>20.00</td>
</tr>
<tr>
<td>Laptops</td>
<td>0.93</td>
</tr>
<tr>
<td>Memory sticks</td>
<td>8.00</td>
</tr>
<tr>
<td>Slave cable</td>
<td>0.20</td>
</tr>
<tr>
<td>Telecom boards</td>
<td>3.19</td>
</tr>
<tr>
<td>Low grade circuit boards</td>
<td>0.12</td>
</tr>
<tr>
<td>Medium grade circuit boards</td>
<td>0.70</td>
</tr>
<tr>
<td>Mixed computer scrap</td>
<td>0.00</td>
</tr>
<tr>
<td>PC server incomplete</td>
<td>0.29</td>
</tr>
<tr>
<td>PC server complete</td>
<td>0.40</td>
</tr>
<tr>
<td>PC mothersboards</td>
<td>3.08</td>
</tr>
<tr>
<td>Hard drives</td>
<td>0.93</td>
</tr>
<tr>
<td>CPU processors</td>
<td>31.00</td>
</tr>
<tr>
<td>Keyboards / mouse</td>
<td>0.00</td>
</tr>
<tr>
<td>CD-Rom and floppy drives</td>
<td>0.17</td>
</tr>
<tr>
<td>Apple computers (Mac)</td>
<td>0.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Telecommunications scrap</th>
<th>Price NZ$/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meterboxes</td>
<td>0.65</td>
</tr>
<tr>
<td>Modems</td>
<td>0.15</td>
</tr>
<tr>
<td>Telephone switches</td>
<td>0.29</td>
</tr>
<tr>
<td>Telephones / printers / faxes</td>
<td>0.00</td>
</tr>
<tr>
<td>Cellphones</td>
<td>2.10</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Power supply scrap</th>
<th>Price NZ$/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>NiMH batteries</td>
<td>0.55</td>
</tr>
<tr>
<td>NiCd batteries</td>
<td>0.33</td>
</tr>
<tr>
<td>Lithium batteries</td>
<td>1.37</td>
</tr>
<tr>
<td>AC adapters and charges</td>
<td>0.50</td>
</tr>
<tr>
<td>PC power supply</td>
<td>0.44</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chargeable materials and items</th>
<th>Price NZ$/each</th>
</tr>
</thead>
<tbody>
<tr>
<td>TVs</td>
<td>4.50</td>
</tr>
<tr>
<td>CRT monitors</td>
<td>4.50</td>
</tr>
</tbody>
</table>

Table 6-4: E-Scrap price list (1 April 2011)
predominantly scrap metals, and more recently CRT front panel glass through the RCN e-Cycle project. But the majority of equipment is either exported whole for recycling overseas, or dismantled to some extent and segregated components are exported for recycling in large, specialised plants overseas.

Until such time as a system is put in place that collects all ewaste through a coordinated nationwide system that is free-of-charge to consumers, there is unlikely to be sufficient volume of ewaste to enable large-scale recycling plants to be set up in New Zealand.

Instead, there will be occasional investment in small scale plant that enables the processing of certain materials for recycling in New Zealand.
7.1 KEY POINTS
- New Zealand has an excellent legislative framework for product stewardship – the Waste Minimisation Act (WMA) 2008.
- The New Zealand IT and TV suppliers are unwilling to develop a voluntary product stewardship scheme in an industry with such a high potential for free-riders.
- No voluntary product stewardship schemes in the electronics sector have been advanced.
- The issue of free-riders is a key factor preventing the development of voluntary scheme, suggesting the need for a regulatory intervention.
- The WMA sets out clear processes for the development of regulations to address free-riders.
- Section 23 of the Act empowers the Minister to develop regulations without needing to declare priority products.
- From 1 July 2011, the new Environmental Protection Authority will take over monitoring and compliance responsibilities associated with the Basel Convention and we expect the EPA’s mandate may expand in the future to cover other aspects of ewaste management.
- New Zealand has fallen behind other countries in failing to address the growing ewaste challenge with an appropriate regulatory response. Of the 34 OECD countries, only New Zealand and 6 others do not have ewaste stewardship regulation in place.
- The Basel and Waigani conventions provide an adequate framework for the transboundary movement of ewaste between countries.
- New Zealand needs to anticipate likely global changes in managing the disposal if products containing mercury and brominated flame retardants, as new conventions are expected to limit our flexibility to export or recycle these elements of ewaste.

7.2 BACKGROUND
There have been significant changes in the regulation of waste in New Zealand since the last ewaste status report in 2006. The passing of the Waste Minimisation Act in 2008 has created a legislative framework that provides an excellent opportunity to improve the management of ewaste in New Zealand.

This chapter reviews a regulatory pathway that would enable product stewardship of ewaste in New Zealand under the Waste Minimisation Act. We have also examined other New Zealand regulations of relevance to the ewaste debate. Finally, we have also looked at some of the international ewaste initiatives that have the potential to impact on the New Zealand market and therefore may influence the Government’s policy approach.

7.3 WASTE MINIMISATION ACT 2008
The Waste Minimisation Act was passed in September 2008. The Act contains measures to minimise and improve the management of waste in New Zealand. The main components of the Act:
- Provides a legislative framework for product stewardship regulation
- Enables accreditation of voluntary product stewardship schemes
- Puts a levy on all waste going to landfill (currently $10/tonne)
- Establishes a Waste Minimisation Fund to distribute the collected levy for waste minimisation projects
- Requires Territorial Local Authorities (TLAs) to have Waste Management and Minimisation Plans in place by 30 June 2012 in order to access the Waste Minimisation Fund; until this date TLA’s are able to use their existing Waste Management Plans
- Gives powers to Territorial Local Authorities to establish consistent waste bylaws

The most significant components of the Act relating to potential improvements in the management of ewaste are the sections that enable product stewardship through regulation.

7.4 PRODUCT STEWARDSHIP AND THE WASTE MINIMISATION ACT
The Waste Minimisation Act lays down a framework for product stewardship in New Zealand. It has been designed to encourage voluntary approaches to product stewardship, but also has the ability to create regulation for products if a mandatory approach is required.

Voluntary product stewardship schemes are supported under the Act by the provision of an accreditation system for schemes. The Act enables industry to develop product stewardship schemes for any product or product group and, provided it meets established criteria, the scheme can seek
accreditation from the Minister for the Environment. There are already five accredited voluntary product stewardship schemes and applications for two more are being processed at the time of writing. The five accredited schemes are:

- Geocycle Holcim Used Oil Recovery Scheme – used oil collection and disposal scheme.
- The Plasback™ - scheme to recover used farm plastics for recycling.
- The Glass Packaging Forum’s glass packaging product stewardship scheme - scheme for reducing the amount of glass packaging sent to landfill.
- Agrecovery Rural Recycling Programme – scheme to recover agrichemical plastic containers, silage wrap, crop protection net and agrichemicals.
- Refrigerant Recovery - scheme to collect and destruct unwanted synthetic refrigerants, chlorofluorocarbons (CFC’s), hydrochlorofluorocarbons (HCFC’s) and hydrofluorocarbons.

None of these accredited schemes relate to ewaste.

The Waste Minimisation Act also allows for a mandatory approach to product stewardship should a voluntary approach not deliver the desired results. The Act enables the creation of new regulations that would make a product stewardship scheme mandatory for a product or class of product. The process for this is:

1. A product is declared a priority product by the Minister for the Environment
2. As soon as practicable after the product is declared a priority product, a product stewardship scheme must be put in place and accreditation of that scheme must be obtained
3. Regulations can be created that prohibit the sale of the priority product, unless the product is a member of an accredited product stewardship scheme

The first step would be for a product to be declared a priority product. The Minister can only do this if he/she is satisfied the product will EITHER cause significant environmental harm when it becomes waste, OR, that there are significant benefits from the reduction, reuse, recycling, recovery or treatment of the product. The Minister must also be satisfied that a product stewardship scheme will effectively manage the product.

Before declaring the product as a priority product the Minister must also:

- seek advice from the Waste Advisory Board,
- consider any public concerns about environmental harm associated with the waste product,
- allow the public to comment on the proposal to make the product a priority product, and
- consider how effective any existing voluntary scheme has been for the product.

The process leading to ewaste, or individual categories of ewaste, becoming a Priority Product and therefore subject to a regulated product stewardship scheme is discussed below.

### 7.5 A POTENTIAL REGULATORY RESPONSE

The emphasis in New Zealand to date has been on a voluntary approach to product stewardship. With encouragement from the Ministry for the Environment, the New Zealand IT and TV industry designed draft voluntary product stewardship schemes for their products in 2008. Both sectors of the industry decided that the free-riding of their schemes would be at such a level as to place them at a competitive disadvantage. The industry concluded that it was not feasible to implement their schemes without regulation from the Government to prevent free-riders.

The Ministry for the Environment recognises that the free-rider issue can be significant:

- Free-riders are those who don’t contribute or comply with a product stewardship scheme, but benefit from it.
- In some situations even a small amount of free-riding can compromise the entire system. In others, free-riding may not threaten the viability of a product stewardship scheme and may be accepted and dealt with by those involved.
- Free-riding has contributed to a shift internationally from relying solely on voluntary initiatives of producers to the introduction of mandatory programmes for some products by governments.

The free-rider problem has also been a barrier to the implementation of a voluntary product stewardship scheme in Australia by the IT and TV industry. The TV industry in Australia had designed and was ready to implement a product stewardship scheme but would only do so with the assistance of the government to regulate free-riders. This need
to control free-riding has led to the “co-regulatory” response now being developed by the Australian Government (see Chapter 9, page 73).

The New Zealand IT and TV industry is therefore understandably unwilling to develop a voluntary product stewardship scheme with such a high potential for free-riders. This signals a market failure to deal with the problem of ewaste in a nationally coordinated way, and means that if the government wants to address the ewaste problem it needs to create regulations that support the industry in developing a nationwide scheme.

There is some frustration from the industry, especially in the TV sector, about the lack of action by government to address the free-rider issue. After spending nearly 2 years attending meetings and developing a draft scheme, the participants felt let down when government did not proceed with free-rider regulations. This has now become a key reason for not advancing a voluntary product stewardship scheme.

The Waste Minimisation Act does provide for the development of regulatory backup for voluntary product stewardship schemes and the Ministry for the Environment has recognised there may be a need for this type of regulatory backup. In their 2009 consultation document on the Waste Minimisation Act the Ministry stated:

One issue that may arise for industries developing voluntary schemes is ‘free-riding’ from businesses that benefit from the programme but do not contribute to it.

The Act allows for regulations to be developed in support of voluntary schemes, including controls on disposing of products or waste; controlling the manufacture or sale of products containing specific materials; take-back services for products; labelling; and advance disposal fees. We are not currently proposing to make any regulations. Before proposing any in future, we would need to consult further and consider the costs and benefits.

This tends to suggest that some form of regulation to back up a voluntary product stewardship scheme could be possible under Section 23 of the Waste Minimisation Act, and which does not necessarily require the product to be declared a priority product.

Section 23 allows for the regulation of products (whether a declared priority product or not), to:

- require take-back services for products;
- prescribe product labelling;
- set advance disposal fees; or
- require a deposit to be charged for a product

We have received a legal opinion from Rae Nield, Solicitor, on whether the Minister for the Environment has the powers under Section 23 of the Act to make regulations to support industry-based recycling schemes, in circumstances where the products involved (in particular IT products and television sets) have not been, or are unlikely to be, declared priority products:

In summary, it is my view that the Minister does have those powers under the Act. The scope of those powers would include controls on disposal of the products, requiring take-back services, fees or refundable deposits, product labelling, information collection, and any other matter contemplated under Part 2.

Having said that, I point out that for the Minister to make any regulations, significant procedural requirements must be satisfied, in addition to the specific procedures provided within the Act itself. The Minister would need to be convinced that the result was worth the cost and effort.

The full legal opinion is included as an appendix to this report. It is unlikely that ewaste disposal to landfill would be prohibited using Section 23, as there is not adequate infrastructure in place to provide an alternative to disposal. Any attempt to use Section 23 to control the take-back or disposal of ewaste would be subject to adequate consultation with those who may be affected by the regulations, and considerations of cost benefit analysis through a regulatory impact statement. This means the same regulation-making process would be required to implement Section 23 tools as would be required for declaring ewaste a priority product in order to provide regulatory support of an industry product stewardship scheme.

The WMA allows the Minister to enable regulation of ewaste by declaring ewaste as a priority product. This is the main regulatory pathway through which a product stewardship approach to ewaste can be developed in New Zealand. The Minister for the Environment can declare ewaste as a whole, or individual categories such as IT equipment and/or TVs, to be priority products. Before declaring a product as a priority the Minister would need to:

1. Consult with stakeholders and the public and seek the advice of the Waste Advisory Board
2. Commission a Regulatory Impact Statement (RIS) to ensure there is a robust case for this regulation

In analysing the costs and benefits of regulation through a RIS, the Minister would need to be satisfied that:

- The product will or may cause significant environmental harm when it becomes waste; or
- There are significant benefits from reduction, reuse, recycling, recovery, or treatment of the product; and
- The product can be effectively managed under a product stewardship scheme.

These are essentially the same areas considered by the Australian Government’s 2009 RIS on end-of-life televisions and computers. This RIS, written by PricewaterhouseCoopers and Hyder Consulting, identified several key points also relevant to New Zealand, including:

- There is a tangible risk that different jurisdictions will implement a different approach to the television and computer waste problem in the absence of a national approach.

- The television and computer recycling rate is low in Australia, at around 10% of the volume reaching end-of-life.

- Televisions, computers and computer products contain embedded resources that are non-renewable and that are currently lost.

- A survey of 2,000 Australians by URS found that there is a willingness to pay for a guaranteed increase in the recycling rate and capture of non-renewable resources. The results indicate society places an intrinsic value on increasing recycling of resources which is over and above the current market value of those recovered wastes.

- The URS survey suggests that community expectations are not being met under current disposal methods.

- There has been difficulty getting the support of all industry players for a voluntary industry approach to television and computer recycling schemes, creating a freerider problem.

The cost benefit analysis in the Australian regulatory impact statement showed there would be positive net economic benefits from implementing a scheme in Australia.

The Ministry for the Environment has already consulted stakeholders regarding priority products under the Waste Minimisation Act. In 2009 the Ministry for the Environment released the consultation document Waste Minimisation in New Zealand – A discussion document from the Ministry for the Environment. One of the questions asked in this discussion document was: "Which products do you think should be the highest priority for a mandatory product stewardship scheme?" In their summary of submissions document the Ministry for the Environment states that of the 166 submissions received “most submitters saw the need for priorities to be established” and “the most frequently mentioned were agricultural chemicals, waste oil, tyres, ewaste and packaging.”

It also seems clear that the Minister for the Environment, the Hon Dr Nick Smith has accepted this position. In a speech to the WasteMINZ annual conference in October 2010:

I have also announced the 2010 New Zealand Waste Strategy that through its flexibility, will foster innovation and help the waste sector make further progress. You will note our focus on waste streams with the greatest harm – ag chemicals, ewaste, tyres, ag plastic – in grants and product stewardship, reflecting the new Government’s priorities.48

There is stakeholder support for ewaste to be declared a priority product. Work overseas has identified the costs and benefits of regulating for product stewardship of ewaste. What remains is for a local cost benefit analysis to draw on this information in a New Zealand context. Given many of the similarities with the Australian ewaste situation, it is felt that the results of a New Zealand RIS would also conclude that regulating for a product stewardship scheme would result in positive net benefits.

Following the analysis, the Minister could declare ewaste, or specific ewaste products, to be Priority Products. This will require an industry product stewardship scheme to be established and will allow for regulations that mandate producers to participate in a scheme.

7.6 THE COMMERCE ACT 1986

The aim of the Commerce Act is to promote competition in markets within New Zealand. It prohibits conduct that restricts competition (restrictive trade practices) and the purchase of a business’s shares or assets if that purchase leads to a substantial lessening of competition in the market.49

When developing product stewardship schemes in New Zealand companies must be mindful of
the Commerce Act and take steps to ensure that they do not breach the Act. The Ministry for the Environment has recognised this and advises that companies should particularly keep the Act in mind when scheme development involves:

- Businesses working together on developing schemes especially where there are price implications
- Businesses forming joint ventures or other cooperatives to operate a product stewardship organisation (PSO)
- Using a levy or a deposit-refund system as part of a product stewardship scheme
- Targets to restrict the amount of a product sold
- Awarding contracts/partnerships to service providers such as recyclers.

Concerns about possible anti-competitive actions have been advanced by some industry stakeholders as one of the reasons for not progressing a voluntary product stewardship scheme.

The Commerce Act does allow for parties to reach agreements that have anti-competitive elements, but the agreement must be subject to Commerce Commission authorisation. Organisations embarking on product stewardship scheme development should ensure that no actions are carried out until it has been evaluated for anti-competitive elements and, if necessary, an application has been made to the Commerce Commission for authorisation.

7.7 ENVIRONMENTAL PROTECTION AUTHORITY ACT 2011

The Environmental Protection Authority Act was passed by Parliament on 11 May 2011 and establishes a new Environmental Protection Authority (EPA) as a standalone crown agency from 1 July 2011.

The new authority will streamline and strengthen national environmental regulatory functions currently spread across Government. The new authority will be responsible for the regulatory functions of:

- National consenting under the Resource Management Act 1991 (RMA)
- Hazardous Substances and New Organisms Act 1996
- Ozone Protection Act (1996)
- Climate Change Response Act (2008) - legislation that covers the administration of the Emissions Trading Scheme
- Stockholm, Rotterdam, Basel, and Waigani Conventions and the Cartagena Protocol on hazardous waste
- Antarctica (Environmental Protection) Act 1994
- Exclusive Economic Zone (proposed).

Of particular relevance is the EPA's new function administering permits for export of hazardous waste under the Basel Convention. Ewaste is classified as hazardous and its export is closely controlled under this Convention, as discussed below.

7.8 HEALTH AND SAFETY IN EMPLOYMENT ACT 1992

Health and safety is an important aspect to consider when examining the current situation regarding ewaste in New Zealand. There are a wide variety of organisations involved in the handling and recycling of ewaste, as discussed in other chapters of this report, and it is not clear how many of them comply with health and safety requirements. We have briefly examined these requirements under the Health and Safety in Employment Act below.

Every employer shall take all practicable steps to ensure the safety of employees while at work. In particular they have a duty to:

- Provide and maintain a safe working environment;
- Provide and maintain facilities for the safety and health of employees at work;
- Ensure that plant machinery and equipment in the place of work is designed, made, set up, and maintained to be safe for employees;
- Ensure that systems of work do not lead to employees being exposed to hazards in or around their place of work; and
- Develop procedures for dealing with emergencies that may arise while employees are at work.

The standard of care that is required of all employers is that they take “all practicable
steps’. Any judgement of whether a safeguard was ‘reasonably practicable’ is to be made taking common practice and knowledge throughout the industry into account. All operators should therefore be ensuring they are aware of good practice for the industry with regards to health and safety management.

The Ministry for the Environment has provided guidance on the health and safety hazards associated with handling ewaste. It provides good practice information in their 2011 online guide: “Waste Electrical and Electronic Equipment: Guidance for Collection, Reuse and Recycling.”

7.9 INTERNATIONAL POLICIES

There is a growing level of policy and regulation on ewaste product stewardship globally. The voluntary approach advocated in New Zealand is rapidly becoming the exception to the norm, particularly among the OECD countries. Twenty-seven of the 34 OECD member countries already have some form of ewaste product stewardship in place.

Increasing numbers of countries are implementing product stewardship, or extended producer responsibility, regulation that targets ewaste. There is ewaste product stewardship regulation enacted, or being enacted, in the following countries:
- European Union (27 member countries)
- Japan
- China
- South Korea
- 25 individual states of the USA
- Taiwan

Australia is also close to implementing product stewardship regulation of ewaste, as is discussed in other chapters of this report.

In addition to individual countries taking an increasingly strong stance on take back of ewaste, there are a number of international policy initiatives that impact on New Zealand’s management of ewaste. They include the Basel Convention, the Stockholm Convention on Persistent Organic Pollutants, and a United Nations mercury programme.

7.9.1 Basel Convention

The Basel Convention was ratified by New Zealand in 1994. The Convention restricts the movement of hazardous waste between countries. Many items of electronic waste (electronic equipment not intended for reuse) are classified as hazardous waste and their export is controlled by a permitting system. Items classed as hazardous include (but are not limited to):
- Mobile phones
- Computer monitors
- Televisions
- Printed circuit boards
- Photocopiers
- Fluorescent lamps

Companies or persons exporting electronic waste from New Zealand to Basel signatory countries must obtain a Basel permit from the Ministry of Economic Development.

There are currently six Basel permits relevant to the export of ewaste from New Zealand. Six Basel permits relevant to the export of ewaste from New Zealand.

The Ministry has advised that as at the end of May 2011, a further six applications are currently being processed.

Countries that are party to the Basel Convention

<table>
<thead>
<tr>
<th>Exporter</th>
<th>Waste product</th>
<th>Destination</th>
<th>Quantity (tonnes)</th>
<th>Expiry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Recycling Ltd</td>
<td>Electronic scrap</td>
<td>Singapore</td>
<td>1000</td>
<td>14/6/2011</td>
</tr>
<tr>
<td>TES-AMM NZ</td>
<td>Scrap CRT monitors</td>
<td>Australia</td>
<td>900</td>
<td>27/6/2011</td>
</tr>
<tr>
<td>Fuji Xerox NZ</td>
<td>Used office equipment</td>
<td>Thailand</td>
<td>400</td>
<td>25/8/2011</td>
</tr>
<tr>
<td>Fuji Xerox NZ</td>
<td>Used office supplies (including toner)</td>
<td>Thailand</td>
<td>351</td>
<td>25/8/2011</td>
</tr>
<tr>
<td>TES-AMM NZ</td>
<td>Mixed electronic scrap</td>
<td>Singapore</td>
<td>1,200</td>
<td>5/10/2011</td>
</tr>
<tr>
<td>Sims E-Recycling</td>
<td>Waste cathode ray tube glass</td>
<td>United Kingdom</td>
<td>700</td>
<td>11/10/2011</td>
</tr>
</tbody>
</table>

Table 7-1: Current (May 2011) Basel permits relevant to the export of ewaste from New Zealand
set up the Partnership for Action on Computing Equipment (PACE) initiative in 2008. PACE is working on projects to improve the management of ewaste globally. So far it has produced a Guidance Document on Environmentally Sound Management of Used and End-of-Life Computing Equipment and is working on developing pilot schemes for environmentally sound management of used and end-of-life computing equipment.

7.9.2 Waigani Convention

The Waigani Convention is similar to the Basel Convention but governs the trans-boundary movement of hazardous waste in the Pacific region. It effectively stops exports from New Zealand and Australia into the South Pacific states, but allows imports from the South Pacific into New Zealand and Australia. The movement of ewaste from the Cook Islands to New Zealand as part of the eDay 2010 programme was managed under the Waigani Convention. The Convention requires the formal endorsement of both the exporting and importing governments.

7.9.3 United Nations Mercury Programme

Mercury was identified as a “chemical of global concern” following a 2002 global mercury assessment. A United Nations Environment Programme (UNEP) Global Mercury Partnership was initiated, and more recently there have been negotiations on a global, legally-binding instrument on mercury. This instrument could take the form of a convention, similar in nature to the Basel Convention. The draft of this convention includes measures to restrict the global supply of mercury, measures to restrict the use of mercury, and measures to restrict the discharge of mercury into the environment.

This proposed Convention may have implications for the way in which mercury-containing products are handled in New Zealand and how exports are controlled. This may impact on the handling and treatment of products such as LCD televisions and computer screens (that have a mercury-containing backlight). However, it is uncertain how the final version of the convention will look and therefore we cannot predict its impact on the New Zealand ewaste collection and recycling industry.

7.9.4 Stockholm Convention and brominated flame retardants

The Stockholm Convention on Persistent Organic Pollutants (POPs) is a global treaty that entered into force in 2004. The Convention requires Parties to take measures to eliminate or reduce the release of POPs into the environment. Two types of brominated flame retardant have been listed as POPs:

- Octabromodiphenyl ether (OctaBDE);
- Pentabromodiphenyl ether (PentaBDE)

These brominated flame retardants have been used in the past in plastic components of ewaste and may therefore still be present in older equipment still within NZ households.

The Stockholm Convention requires countries that are party to the Convention to take measures to eliminate or reduce the release of POPs into the environment. In the case of many POPs, the restrictions extend to not allowing the recycling of the substance. However, the two brominated flame retardants are exempt from this restriction, allowing material containing these POPs to be recycled.

Recommendations were made to the 5th Conference of the Parties to the Stockholm Convention on 25-29 April 2011 that this exemption be removed for recycling of brominated diphenyl ether (BDE) flame retardants. The intention is to prevent the brominated flame retardants from being recycled into new materials. Many developing nations strongly supported an African-lead proposal to remove the exemption and effectively ban the export of plastics containing BDE to developing countries. However, several developed countries, including the EU, Australia and the USA defeated the motion, instead reaching an agreement only to encourage countries not to export wastes containing flame retardants listed in the Stockholm Convention rather than requiring them to stop export.

The issue has the potential to remain on the agenda and eventually could have the effect of banning the recycling of ewaste components containing BDE in New Zealand and preventing their export for recycling overseas. This would mean that all materials containing BDEs would have to be disposed of to landfill, as no alternative disposal route such as POP destruction in high temperature incinerators exists in New Zealand. If they place restrictions on the way these materials can be managed in New Zealand this will place further pressure on New Zealand to create a domestic solution to the management of ewaste.

Rae Nield Legal opinion on regulating for product stewardship: options outside the priority product scheme, 24 May 2011 (included as an appendix in this report).


www.comcom.govt.nz/the-legislation/


www.med.govt.nz/templates/Page___10556.asp

From 1 July 2011 this responsibility will fall to the new Environmental Protection Authority, as described earlier in this chapter.

Current Basel Permits are listed on the Ministry of Economic Development’s website www.med.govt.nz


See www.unep.org/hazardoussubstances/Mercury/tabid/434/Default.aspx for more details


8. The economics of ewaste

8.1 KEY POINTS

- There is a large overhang of ewaste in the community and this overhang is likely to grow.
- Currently, the costs of ewaste are borne by the community voluntarily. The costs are mostly hidden (non-market costs).
- Non-market costs revolve around the volunteer work associated with eDay activities, storage of ewaste by the community, environmental costs associated with landfills, and health costs.
- New Zealanders seem to value recycling highly, and the richer we get the more highly we value it. This factor needs to be counted as a benefit of a successful ewaste disposal scheme.
- One way of dealing with the ewaste problem is through a product stewardship scheme. Product stewardship “calls on those in the product life cycle—manufacturers, retailers, users, and disposers—to share responsibility for reducing the environmental impacts of products” (US EPA).
- Product stewardship is about understanding, controlling, and communicating a product’s environmental, health, and safety related effects through its life cycle, from production to final disposal or reuse. It has emerged in response to the increasing concern that:
  - Potentially valuable and useable resource are being ignored;
  - Waste disposal can have a detrimental impact on the environment and health.
- Voluntary approaches to solving the ewaste problem will not work because of the structural (i.e. large number of firms within the industry with frequent entry and exit) and behavioural (i.e. fierce price competition that exists between market participants) market characteristics of e-product retail markets.

8.2 INTRODUCTION

Ewaste management is an on-going environmental issue in most developed countries, including New Zealand. Developing economically, environmentally, socially and politically acceptable and durable strategies for the management of ewaste is challenging because of differing views on priorities and acceptable trade-offs. The policy choices have considerable consequences for all stakeholders. Policymakers need to consider how big a problem ewaste poses (now and in the future) and how to select effective and efficient policies to deal with it.63

This chapter examines the economics of waste management in general, and ewaste in particular, in the New Zealand context. We are specifically interested in the implications for policies and strategies that could address the ewaste management issue. By applying an economic framework to the management and disposal of ewaste, we aim to address the fundamental question of what level of effort to reduce, reuse, recover or recycle ewaste is likely to be durable over time and leave the community better-off.

8.2.1 Economics and ewaste

Why consider economics and ewaste? While ewaste is viewed in terms of volumes and the practical issues of disposal, it is also very much an economic issue. Efficient use of resources requires maximising the value obtained from them, or minimising the resources required to achieve an outcome. Ewaste is a resource and needs to be analysed in this framework.

It is one thing to focus on the reductions in the volume of ewaste but quite another to ensure that the community ends up better off from ewaste restraint. To understand the issue more fully, a broader assessment of all the consequences of such activity is required, such as that provided by a full cost benefit analysis (CBA).64 While a full CBA is out of scope of this exercise, we will be focusing on the high level market and non-market values that drive any intervention logic, since they point...
to the quantum of effort it is sensible to put into ewaste reduction, reuse, and disposal relative to other products.

Here we are focused on ewaste; however, ewaste is a small part of a disposal spectrum that includes all solid waste, wastewater management, the legacy of contaminated sites, point discharges into the air and hazardous waste. The mistake that is often made is to treat all wastes in the same way. The lessons from institutional economics suggest that while the broad based economic approach is required, each type of waste has its own type of characteristics which require careful case-by-case analysis to uncover the most efficient approach to disposal.

8.2.2 What are we dealing with?

Briefly, ewaste is computer and television material of no further value in its current use. The suggestion that we have an ewaste problem implies that current ewaste management is in some sense regarded as insufficient or inappropriate i.e. the sporadically organised eDays, the outlets that break down ewaste for a fee, or dump it in landfills, has not solved the “overhang” of ewaste and there is genuine concern in the community about this problem. So our assessment must include:

- What is it about ewaste management activities that might prevent a socially optimal and sustainable treatment level of ewaste emerging?
- What would a socially optimal pattern of ewaste minimisation look like?
- What is the most efficient way of correcting the current incentives to more closely approach the optimal level of ewaste treatment?

This chapter describes:

- An economic approach to ewaste and why it is an economic issue. This includes understanding what ewaste is, the economics of discarding, the general problem waste creates, the rationale for intervention and a possible approach;
- A framework that could assist in the development of a public ewaste treatment intervention;
- The characteristics of possible approaches; and
- A high level evaluation of the type of regulatory frameworks that potentially could work for ewaste.

8.3 AN ECONOMIC APPROACH TO EWASTE

This section examines the general economics of ewaste management, as a basis for framing policy. Ewaste treatment is a problem if it leaves the community worse-off than it would be if the community and its members were part of an appropriate system. So an economic perspective is necessarily broad, spanning effects on both consumers and producers of ewaste management services, material using industries and activities more generally, and the natural environment which is the ultimate repository of ewaste.

An economic perspective also requires looking at the effect of activities on the use and productivity of all resources available to the community – not just material resources, but also others, such as energy, capital, labour and people’s “free” time, and the quality of the natural environment. Many of these resource effects are essentially “off-budget” and hidden from the entities involved in ewaste management decisions, and making these hidden effects more apparent has an essential role in identifying the overall impacts of wastes and policies to redress them.

In the next section, we look at the components of “off-budget” impacts and how they can be classified.

8.3.1 Total economic value

The figure on the next page sets out a way of examining the different costs and benefits associated with ewaste management. Use values are relatively easily defined, into commercial uses and indirect use values. Use values involve the direct commercial activities associated with recycling materials. An indirect use value might be the value minimisation of waste (and ewaste) being put into landfills so that the potential ewaste streams are more efficiently used. A non use value can be an:

- Option value (i.e. to preserve it for future use, say when populations grow);
- Existence value (to preserve what we have and improve on what we have). In the case of ewaste it may be the knowledge that the issue is being addressed in a socially acceptable way; and
- Other non use values such as preserving something for future generations i.e. ensuring that a solution is durable.
The important issue that total economic value describes is that value is more than what can be observed in markets for the buying and selling of ewaste products. Other issues need to be considered whose value cannot be observed in market transactions. Therefore, we are interested in whether or not the social benefit of an intervention outweighs the social cost.

8.3.2 What is ewaste?

8.3.2.1 Definition of ewaste

For the purposes of this report, we are defining ewaste as any computer or television product or substance that has no further use or value in its current use, and which its owners would willingly discard (adapted from the general definition of waste set out by the Australian Productivity Commission 2006). This definition excludes products or substances that are reused or sold by the organisation that owns them, but it includes those that have no value for its current owners but may have value for others (e.g. recyclable materials). The generally accepted definition of ewaste includes electrical and electronic equipment, but our focus is on the two specific types of ewaste that currently present the greatest challenge.

8.3.2.2 Is there an optimal level of ewaste?

An economically optimal level of ewaste produced by a community depends on comparison of the cost of ewaste abatement with the cost of disposal. In economics this is usually where the level of waste abatement achieved avoids waste to the point where the marginal cost of so doing just equals the cost of disposal, i.e. to the point where it costs as much to avoid a tonne of ewaste as it does to dispose of it. Ewaste avoidance includes both activities to recover and reuse discarded materials, and reducing material use at source. Cost in this sense is ‘net’ of benefits so it includes the wider value that society puts on disposing of ewaste and the full opportunity cost of resources used in ewaste abatement and disposal, including environmental costs, across the community, not just financial costs to any one party involved (see figure above summarising the components of total economic value).

For most ewaste materials, an optimal level of abatement will not result in zero waste, because not all ewaste is equally avoidable. For instance, recovering pre-used products (including potentially reusable materials) from the community is the easy part of ewaste recovery. The real problem is how to disassemble the components and extract value from the ewaste products in an efficient manner when exporting to countries with abundant labour resources is restricted. This disadvantages nations such as New Zealand, because labour is relatively expensive, the amount of ewaste generated is relatively small, and New Zealand is a long way.
from markets for recyclable materials.

Further, outside the main centres it becomes successively more costly in terms of unit costs, since attempts to recover materials that are more dispersed, require more transport and increase processing costs. In this situation, it may not be practical to recover all ewaste; therefore, the optimal waste is not usually zero waste.

8.3.3 The economics of reuse, recycling and disposal

From a global perspective, ewaste management does not act in isolation, but is part of the system of material utilisation in the world economy e.g. scrap iron for recycling has been internationally traded for many years.

When materials are discarded, three possible routes emerge. They may be collected for reuse or recycling; they may be collected for disposal at a legitimate facility and hence returned to the environment through relatively controlled means; or they may be returned to the environment in an unregulated manner through illicit dumping or burning.

The viability of an activity such as recycling both affects, and is affected by, arrangements upstream in the supply of materials from primary sectors and imports, and also downstream arrangements for disposing or on-selling materials once they are discarded. Trade assures the materials-use cycle is not a closed cycle in any country. New materials may enter the cycle as raw materials imported from other countries, or as materials embedded in imported products. Conversely, recovered materials may leave the economy as exports if the returns from so doing exceed those on the local market.

It should be noted that the costs to society are not always well understood or are possibly hidden. One way to think about the product cycle and its possible “hidden” costs in general, is through the following example (taken from NZIER 2007).

In the mid 1980s there was a debate on the replacement of glass returnable milk bottles with cartons and plastic bottles. The system of doorstep deliveries with returnable bottles internalised to the consumer the cost of delivery, collection, cleansing and reuse of bottles, whereas retail carton sales did not and resulted in carton consumers receiving a partial subsidy from ratepayers who were the primary funders of the landfills in which the new containers ended up. Even though consumers and ratepayers may be the same people, consumers and manufacturers that supply them are not getting the correct price signal of the full resource cost of their choices.

8.3.4 What is the policy problem with ewaste in general?

Waste disposal and waste management facilities can inflict adverse effects on neighbouring communities—leachate contamination, combustion risk, greenhouse gas emissions, neighbourhood nuisances like littering, noise, odours and pest species – which derive from market failures and may be reduced by appropriate policy. The policy questions that arise are:

- How much waste abatement is worthwhile across the community?
- What tools or instruments best achieve this level of abatement, so as to maximise the net benefit to the community?
- Are such instruments most cost effectively applied through waste policy, or through some other channels of government policy?

Ewaste in general is perceived as a problem because it represents a missing chance to get more out of the resources we have. The issues are:

- Space for landfills is perceived to be scarce;
- Concerns over availability and conservation of raw materials, pressures on which might be relieved by less wasteful material use;
- There is an opportunity to recover and re-use scarce materials;
- The large overhang of ewaste in the community;
- Ewaste detracts from societal well-being because it has costly effects that harm the environment and human wealth, e.g. due to contamination of land and water, emissions into atmosphere, detractions from amenity;
- Consumers do not know what to do with the ewaste, since it is becoming increasingly difficult to dispose of ewaste in a costless and socially acceptable way.

It is not obvious that there is any market failure with respect to land availability for landfills, although communities strongly oppose the location of landfill facilities in their neighbourhoods. If land becomes scarce, prices rise and landfills become dearer and/or more remote from population centres that generate wastes, landfill disposal costs rise and alternative discard options become more competitive. There are also risks from possible subsidence, or soil and/or water pollution problems from older landfills. Similarly international commodity markets anticipate scarcities with higher prices and greater activity in
developing new sources or substitutes that relieve scarcity. The problem of ewaste is primarily about its adverse environmental effects and whether these are adequately taken account of in private decisions that generate waste. That is, have non-market influences and values been taken into account as they are under administrative law such as the Resource Management Act (RMA).

Part of the concern over waste, and specifically ewaste, management stems from a long observed trend of waste volumes increasing over time. Drivers of this increase include growth in population, economic activity, incomes and consumption, increase in the number and decline in the average size of households, and changes in the consumption habits of the population (e.g. move to more convenient packaged foods). Ewaste in particular is growing fast because of increased rates of technological change, rapidly decreasing prices and a high rate of obsolescence, especially with (bulky) computer and television equipment. This will be exacerbated further in New Zealand by the switch to digital television.

The residential sector is frequently identified as problematic on grounds that whereas commercial and industrial users have financial incentives to reduce the waste they create, incentives on householders are more muted and indirect because of the way in which their waste management services are delivered and funded. Waste minimisation policies also target businesses.

From an economic perspective, at least some of this increase in waste volumes is unavoidable, because of the correlation between rising activity, wealth and consumption levels, and the rising cost of successive increments of waste avoidance or material recovery above the easy pickings of the ‘low hanging fruit’. Although, the rising cost of waste disposal will be partly mitigated by the willingness to pay more for appropriate waste disposal as society’s wealth increases. For most materials, as long as substitutes are available at low cost, total recovery and waste elimination will not be economically feasible and the optimal level of waste produced by a community will not be zero. In this respect, we do not pay the full cost of disposal.The more ewaste generated, the less of this cost is paid.

### 8.3.5 The rationale for intervention

In determining an appropriate policy response we need to consider the role of government/ industry intervention. Administrators often justify government intervention on grounds of it being in ‘the public interest’, a term which is subject to various interpretations by those exercising powers of intervention. Economics has a more tightly defined rationale for public intervention, reflecting its concern with the utilisation of finite and scarce resources in satisfaction of potentially unlimited human needs, and its focus on economic efficiency – enhancing economic well-being by maximising outputs from a given set of inputs, or minimising inputs for a given set of outputs.

Government intervention is only clearly defensible in situations where private initiatives are likely to fail and a government intervention will work.

Governments can act in these situations because of their authority to change behaviour vested through the political process and their ability to raise funds by taxing the community, which benefits. Local governments can perform similar functions where the issues only impact on local constituents.

The role of government from the economic perspective includes:

- Setting the rules of the economic game by controlling the institutions within which economic activity takes place;
- Providing public goods which a private supplier is unlikely to supply because of the impossibility of recovering full costs of supply, either because it is infeasible to charge for them and exclude non-payers from also receiving the benefits, or because charging would deter use which could be accommodated at zero additional cost;
- Correcting externalities, which are effects arising from others’ actions borne by third parties without compensation. This involves the imposition of private costs and benefits on parties not directly involved with an activity e.g. a negative externality is emission of greenhouse gases;
- Controlling market imperfections which distort competitive conditions, such as monopoly power or imperfect information. Imperfect information to make informed decisions can sometimes mean that the consequences of a poor consumer choice are high. For example consumers may:
  - Select goods on price and be reluctant to pay a price premium for high efficiency products even though it may work out that the “cheaper” product may be more expensive to the consumer (and society) over its life;
  - Fail to take into account environmental impacts of the product purchased, generating too much waste, or managing disposal poorly;
Be unaware of the size of benefits of product stewardship; 69
Be unable to gauge the environmental impact of the products or systems purchased.

- Redistributing income, goods or services according to politically-set notions of equity and social justice. This relates to ‘fairness’, or, perhaps more practically, what society deems as fair. This will probably be included in the wider objectives (outputs) demanded by the government. While the definition is decidedly fuzzy it does alter outcomes in the short term – long term however, justification for sustaining funding through what amounts to political patronage is uncertain at best; and

- Furthering other politically mandated objectives that are unlikely to emerge in the absence of intervention. These may include explicit social, environmental or economic goals.

One thrust of modern economics, influenced by the Coase theorem, has been the re-examination of the role of property rights and entitlements as a means of appropriating what were previously regarded as open access ‘free’ resources (e.g. waste disposal, soil conservation, and air pollution). Redefining entitlements opens the possibility of problems being resolved through private negotiation (e.g. companies taking back their own branded products after use), rather than through public intervention. In this instance, government intervenes to support economic development to provide a structure through which market-like allocation processes can operate, rather than providing a mechanism with which to direct allocation itself.

In short, this means that, in certain circumstances, there is a rationale for government to fund the means to drive economic development, provided that it meets the criteria set out above. This does not imply that government has to intervene, just that the logic shows that some public action might be appropriate. Further the form of the action would still have to selected, with an eye to achieving the best result.

8.3.6 Product stewardship

One way of reducing the worst aspects of discarding waste and developing durable and safer environmental outcome is to develop a product stewardship approach for any particularly product. According to the United States Environmental Protection Agency (USEPA): 70

Product stewardship is a product-centered approach to environmental protection. ... product stewardship calls on those in the product life cycle—manufacturers, retailers, users, and disposers—to share responsibility for reducing the environmental impacts of products.

The USEPA also comment on the characteristics of product stewardship and the importance of examining each case separately:

Product stewardship recognizes (sic) that product manufacturers must take on new responsibilities to reduce the environmental footprint of their products. However, real change cannot always be achieved by producers acting alone: retailers, consumers, and the existing waste management infrastructure need to help to provide the most workable and cost-effective solutions. Solutions and roles will vary from one product system to another.

Product stewardship, therefore, is about understanding, controlling, and communicating a product’s environmental, health, and safety related effects through its life cycle, for production to final disposal or reuse. It has emerged in response to the increasing concern that:

- Potentially valuable and useable resource are being discarded; and

- Waste disposal can have a detrimental impact on the environment and health.

In OECD counties, product stewardship has been used principally for packaging waste, electronic and electrical equipment, batteries, bottles, paint cans, automobiles, waste oil, tyres, refrigerants and other products. The principles of product stewardship are not restricted only to consumer products and apply equally to natural resources.

In New Zealand, under the Waste Minimisation Act (2008) five accredited voluntary product stewardship schemes already exist, these are associated with:

- **Waste oil** – the Geocycle Holcim Used Oil Recovery Scheme – used oil collection and disposal scheme. According to the Ministry for the Environment, 71 a large amount of waste oil has been recovered and co-processed at the Westport Cement Works during this first year of accreditation;

- **Farm plastics** – two schemes are in place that recover farm plastics: the PlasbackTM scheme and the Agrecovery Rural Recycling Scheme;

- **Refrigerants** – a scheme to collect and safely dispose of unwanted synthetic refrigerants, chlorofluorocarbons (CFC’s), hydrochlorofluorocarbons (HCFC’s) and hydrofluorocarbons from household whiteware;
8.3.7 Summary
In this section, we have set out the economic approach to waste and specifically ewaste. Economics is an important tool in assisting policy makers because it is about the choices that made in the use of resources. Some of the issues that arise from viewing ewaste as an economic issue have been canvassed in this section. This includes:
- Understanding what ewaste is and whether there is an optimal level of ewaste;
- Explaining the importance of market as well as non-market valuation when considering the benefit that communities obtained from waste minimisation;
- Examining the economics of discarding to demonstrate that we do not pay the full cost of waste disposal. As a general rule of thumb, the more waste generated the less we pay in terms of the full cost of disposal;
- Explaining the general problem that waste creates i.e. environmental, health, and an increase costs associated with non-market values; and
- The rationale for intervention and a possible approach to addressing the problem i.e. product stewardship.
- It is also important to note that in any particular scheme the best way to deal with the ewaste question will be dependent on consumer responsiveness to incentives created. A lack of consumer response is likely to have a major detrimental impact on any ewaste disposal scheme.

8.4 A FRAMEWORK FOR EWASTE MANAGEMENT
In this section, we set up a framework for evaluation. In particular, we examine the steps to consider when deciding upon an approach to ewaste management.

An organising framework was created to catch the essence of steps required to illustrate why

In any particular scheme the best way to deal with the ewaste question will depend on consumer responsiveness to incentives created. A lack of consumer response is likely to have a major detrimental impact on any ewaste disposal scheme.
ewaste is a problem which requires government attention. The framework set out in figure 8-2 allows us to set out the steps that illustrate why government intervention of some form or another is appropriate in the case of ewaste.

The design of this analysis has deliberately been kept simple. To do this, we have abstracted from the full detail of all ewaste issues in question. This analysis should contain just sufficient complexity and reality to allow us to consider the questions of interest in a realistic setting.

Why have we chosen a model framework? A model portrays a system of relationships which, although abstract, seeks to capture the salient elements of the real world. Any real world problem will have a large number of variables with a large set of, often complex, relationships between them. We wish to draw out the main points of interest without the complications of the full set of issues. In this way, we hope to gain insight into the problem at hand and advance the solutions for it. The potential cost of this process is to eliminate characteristics that might colour the questions under discussion.

The figure on page 60 shows the high level analytical framework used, which consists of stages. These include:

- **Step 1**: Why should government intervene in ewaste disposal when other voluntary schemes are successfully in place i.e. there are consequences, a market solution is unlikely, and there is no effective remedy for consequences;
- **Step 2**: What are the product characteristics that might make government intervention more likely, perhaps in the form of a full coverage products stewardship arrangement i.e. understanding the seller concentration, the significance of local and foreign production; government and industry willingness, consumer concerns, stable institutions, strong/weak industry cohesion, maturity of the market, the importance of branding, importance of repeat purchase and ability to have complete coverage of any scheme introduced;
- **Step 3**: What are the overarching principles that any product stewardship model should entail i.e. it should: be targeted to objectives, have a degree of shared responsibility, deliver community net benefits, be done at least cost, be simple to administer, be transparent and accountability lines should be clear, have clear ownership and acceptability and provide incentives;
- **Step 4**: This step is require to underline the importance of evaluation. Any system will need to be reviewed at a date set prior to the introduction of the scheme.

The approach taken is at a high level and concentrates on evaluating the general approaches that could be taken to tackle ewaste issues, possible government support, and the steps necessary for a durable solution to found. The following sections work through these steps.

### 8.5 WHY SHOULD GOVERNMENT INTERVENE IN EWASTE MANAGEMENT?

The first step involves understanding the nature of the ewaste problem. The OECD (2005) has set out some useful general intervention criteria which we can apply to think about the ewaste issues. These are:

- **Environmental effectiveness** – the extent to which the measure reduces the risk of environmental damage;
- **Economic efficiency** – the extent to which the measure reduces aggregate costs of fixing the ewaste issue that leads to a least cost solution;
- **Administration and compliance costs** – the extent to which those administering and complying with the measure absorb resources that would be potentially productive elsewhere in the economy;
- **Revenues** – the extent to which the measure generates revenue or makes demands on other sources of government revenue;
- **Wider economic effects** – the extent to which the measure impacts on macro-economic conditions in the economy, such as price levels, inflation, employment and economic growth, and on competitiveness and trade patterns and income distribution;
- **Non-market effects** – the extent to which a measure changes attitudes and awareness of environmental effects being addressed; and
- **Dynamic effects and innovation** – the extent to which measures stimulate innovation.

Below we look at each of these issues in turn to further understand the impact on the ewaste problem.

#### 8.5.1 Environmental effectiveness

Government intervention would lead to a reduction in environmental damage from ewaste. While
this is quite clear the real question is what is the extent of the environmental problem? In 2006, the Productivity Commission in Australia argued that the concerns about hazardous materials in computers are overstated and that there are limited environmental issues with discharging ewaste into landfills. However despite this, in November 2009, Environment Minister Peter Garrett announced agreement across all Australian States to proceed with national legislation for ewaste, which has now materialised into a Product Stewardship Bill.

In New Zealand, consumers do seem concerned with the amount of environmental damage caused by ewaste given the survey responses associated with eDay 2010. The figure below sets out the response to the rationale for bringing eDay waste along for collection. Roughly 50% gave answers that reflected environmental reasons for collection.

![Figure 8-3: What is the main reason for bringing your computer waste here today?](image)

*Note: * denotes environmental values associated with ewaste by consumers (51% of respondents)
*Source: eDay Report 2010*

This suggests that while environmental impacts may not be very large, in the short term, they are still important for consumers and that consumers see the collection of ewaste as an important issue (possibly pointing to high existence values associated with dealing with ewaste). 72

Council behaviour could potentially reinforces this by increasingly having special policies for ewaste, i.e. some councils such as Wellington City Council are now considering charging for ewaste disposal.

The lack of easy disposal increases the hoarding of ewaste in the community and adds to the environmental issues that have real impacts on consumer behaviour.

Furthermore, holding an annual eDay over a period of five years has increased expectations by consumers that they will be able to freely dispose of any ewaste they might have. Figure 8-4 on the opposite page from the eDay survey shows the answers when asked what consumers might do if there was no eDay. A large number were not sure what they would do or they would wait for another eDay.

### 8.5.2 Economic efficiency

The components of efficiency include:

- Technical (or productive) efficiency refers to the most cost effective way of providing a given service, i.e. maximising the net value of a particular process or activity. For instance, expanding the scope of a scheme so that the scale operation can be increased in order to reduce processing costs;
- Allocative (or matching) efficiency refers to the ease with which resources can move across an economy to their most productive uses, i.e.
maximising the net value of all activities across the economy by ensuring that collection points and processing facilities are well positioned;

- Dynamic (or innovation) efficiency refers to the optimisation of innovation and rate of change to new activities. For instance, continued investigation into all aspects of ewaste marketing chain to reduce costs and find new markets for re-cycled material.

This is further complicated because allocative and technical efficiency have a dynamic component to them: for instance, a regulatory process that unduly discourages new investment, increases transaction costs, and prolongs use of older, less effective economic processes would not be efficient in a technical, allocative or dynamic sense. Therefore, the feasibility, effectiveness of policies, and simplicity of any particular action need to be considered.

From an efficiency perspective, the current eDay voluntary approach is feasible and simple but not effective since the overhang of ewaste remains. The approach has been done at minimal cost but is not sustainable long term. There is a limit to what volunteers are prepared and able to do over time. It is very unlikely that purely voluntary product stewardship schemes will work, in fact purely voluntary versions of such schemes have not succeeded anywhere in the world.

Further businesses are not prepared to enter into a purely voluntary product stewardship process because of the free rider problem i.e. some (non participating) firms who benefit scheme do not pay their share of the costs of such a scheme (for whatever reason).\textsuperscript{22} One of the main reasons for this is structural. This industry’s nature allows small businesses to rapidly enter and exit the local market, making it difficult to detect and penalise non compliance (Productivity Commission, 2006).

Moreover, the disposal of ewaste usually occurs years after purchases. In a dynamic market the participants will have changed. For example, the scale of the free rider problem is shown by the eDay survey (2010) which indicates that 44% of the ewaste collected was either unbranded or an obsolete brand (see figure below).

Currently, ewaste costs central government a minimal amount, although they have contributed towards the costs of three national eDays and taken responsibility for ewaste where businesses have failed. They are also assisting the RCN Group and the Community Recycling Network establish 20 local collection facilities and three regional recycling facilities, to be operated on a commercial basis with users paying to drop off their ewaste. These efforts can be characterised as market transactions since they have a value in the market. The eDay Trust and other organisations, supported by large numbers of volunteers, have also contributed with management skill and collection organisation (mostly on a voluntary basis). These can be characterised as non-market contributions.

The current level of cost therefore is quite difficult to determine because the costs have been borne by communities (e.g. volunteering, extra ewaste in landfills, and costs of hoarding ewaste) in what are often non-market transactions. Businesses, government and consumers have had
minimal costs associated disposal of ewaste. With government intervention one would expect some movement of costs on to business, government and the consumers of e-products, however there is uncertainty about whether the level of cost will be higher, although it will be more visible (i.e. be priced into markets).

8.5.3 Administrative and compliance costs
Any government intervention is likely to shift costs on to government, businesses, and consumers of e-products and away from other members of society – a shift from less formal non-market arrangements to a more formal market arrangement. In this regard, the costs will be less “hidden” relative to current processes i.e. in non-market processes. Whether costs will be higher and where those costs fall will depend on details of any intervention proposed. This will depend on:

- The type of government intervention, particularly on how well it solves the free rider problem; and
- The values associated with non-market costs saved.

8.5.4 Revenues collected
Given current technologies, the development of a thriving ewaste business will be relatively difficult, if not impossible. Most computer and television equipment is assembled in countries with low labour costs because it is made up of imported parts that are hand assembled. This problem is compounded by:

- The restrictions associated with the Basel Convention (ratified by New Zealand in 1994) that have the impact of restricting the international ewaste trade;
- The lack of scale associated with the production of ewaste in New Zealand. Unlike other New Zealand exports the product differentiation is very limited and can be duplicated by other suppliers at lower cost; and
- The distance from other markets is much greater than other suppliers. Given that this is a commodity product transport costs have a major impact on competitiveness.

This has important implications for a small developed country a long way from ewaste markets. The ewaste product is costly to disassemble locally because of high wages (relative to where the product was assembled), it is hard to sell internationally since New Zealand cannot differentiate its ewaste product from other countries, and the lack of scale means that processing and shipping costs are relatively high per unit of product. This puts New Zealand at a disadvantage relative to other countries in disposing of ewaste, therefore, there is likely to be some cost to government here from intervention. Depending on the design of the product stewardship scheme, this cost to government might be relatively small and of limited duration, since we would expect that suppliers and consumers of e-products will pay for the running costs of such a scheme over the long run.

8.5.5 Wider economic effects
The digital revolution combined with the switch from analogue to digital television is likely to increase the hoarding of ewaste in the community i.e. there is likely to be more ewaste in the supply/future not less.

8.5.6 Non-market effects
Any government intervention in the ewaste sector is likely to have a marginal impact on total recycling initiatives because of the comparatively small amount of ewaste relative to other waste. However, there is likely to be a bigger non-market benefit for society since there are strong indications (e.g. Covec, 2007 and eDay survey 2010) that society sees reuse, recycling and discarding of waste as an important issue.

8.5.7 Dynamic effects and innovation
Any improvement in dynamic effects and innovation is likely to come from the way that government intervenes and the steps to reduce costs of any particular intervention. This is because there is more scope on the supply side of the issue than on the demand side i.e. because ewaste is a generic product it is difficult to see how New Zealand ewaste could be sold at premium in international markets. Demand side issues are made even more difficult because of the lack of scale and distance from markets (see section above on ‘Revenues Collected’).

8.5.8 Questions on intervention logic
To decide whether some sort of government intervention is necessary we address the following questions.

8.5.8.1 Is there a market failure?
There is evidence of a market failure because of the large overhang of ewaste in the community. While there have been voluntary efforts through initiatives
such as eDay and some supplier take-back schemes for business to alleviate the problem they will not solve the long term issues of how we deal with ewaste given that consumers are expected to buy more of it over time.

This problem could be further exacerbated if councils put conditions on ewaste disposal or charge for ewaste disposal. This makes it difficult for consumers to cheaply, easily and responsibly dispose of ewaste.

8.5.8.2 Can the market failure be resolved in the market?
Free riding will stifle any attempt to develop a durable voluntary response. With entry and exit relatively easy, firms can easily shirk their responsibilities under a voluntary scheme leaving others to shoulder the burden. The extent of this problem is underlined by the eDay collection in 2010 where 44% of the computers collected were unbranded or obsolete brands.

8.5.8.3 Is there a workable (low cost) government intervention available?
It has been beyond the scope of this chapter to examine the detail of an intervention strategy. However, we can make some generic statements about the impact of government intervention in this area. These are:

- In any government intervention, the costs are going to shift from the non-market sector to the market sector. The characteristics of market based costs (e.g. the financial incentives/disincentives constructed to deal with ewaste) are much easier to predict than the characteristics of non-market costs (i.e. the costs associated with managing volunteers);

- Any intervention will need to deal with “orphan” products. There will be a time lag between selling and disposal e.g. companies that once sold such products can go out of business, and/or develop different views about disposal of ewaste leaving a disposal problem for others to deal with;

- The question of when to intervene:
  - Front-loading the problem at the point of sale has one major issue; getting the costs of disposal right so that the price reflects the true cost of disposal;
  - Back-loading the problem at the point of disposal presents a number of difficult issues, most notably to do with those who shirk/evade their responsibilities in the disposal process (e.g. dump irresponsibly).

These practical implementation issues need to be considered carefully when designing an intervention since the costs and incentives associated with the intervention, as well as its real impact will have a bearing on its success.

8.5.8.4 Are the consequences of inaction high?
In Australia, the Productivity Commission (2006) maintains that the environmental and health problems of discarding ewaste into to landfills have been overstated.

In New Zealand, we have a growing issue of ewaste being hoarded by consumers for two reasons:
- The cost of disposal is relatively high and growing;
- Consumers are sensitive about putting ewaste into landfills for perceived environmental reasons (despite the assessment by the Productivity Commission).

With e-product sales growing, this problem is likely to increase and with it the consequences of inaction. Whether the consequences of inaction could be considered high is a matter of debate, however concerns over waste issues are growing. Work by Covec (2007) suggests that the willingness of society to do something about the waste issue is also relatively high. In this respect, the eDay Trust, the number of volunteers who help out on eDays, and consumers who hoard ewaste (for whatever reason) are examples of this concern as is their willingness to shoulder the cost of the current policies.

8.6 PRODUCT CHARACTERISTICS
In this section, we look at the characteristics in industries that might lend themselves to successful interventions to address the ewaste problem. It is important to note that these market characteristics are not always mutually exclusive i.e. an industry may exhibit some characteristics that are important for intervention but not all the characteristics required to be successful.

In this case, if an intervention (voluntary or otherwise) is justified, then it is likely it will be some form of product stewardship arrangement. Economics also indicates the policy instruments to address these current distortions fall into a spectrum of broad headings:

- ‘Moral suasion’ through education and infor-
EWASTE IN NEW ZEALAND — FIVE YEARS ON

A durable voluntary scheme without some form of government action is very unlikely to get off the ground since firms that have long term e-product strategies are unlikely to agree to accept responsibility for ewaste generated by unbranded suppliers, or collect ewaste outside major urban areas, unless they are very large customers.

It illustrates the large numbers of companies involved in the local marketing of e-products and the significant amount of unbranded and obsolete brands that are part of the make up the overhang of ewaste in the community. It is in this respect, a durable voluntary scheme without some form of government action is very unlikely to get off the ground since firms that have long term e-product strategies are unlikely to agree to accept responsibility for ewaste generated by unbranded suppliers, or collect ewaste outside major urban areas, unless they are very large customers.
8.6.1.2 Barriers to entry
The types of industries that are likely to have successful joint action approaches are also likely to have some barriers to entry, to create relatively high margins. In these industries, typically with few players, non price competition is important as they battle for market share. Strategies such as the development of a product stewardship approach can assist in this non price competition; others are forced to match the initiator.

There are few barriers to entry for e-products. New companies are entering and exiting along the marketing chain. Price competition is fierce and ewaste strategies only exist for a few branded multinationals. Therefore, in this situation, the development of voluntary product stewardship approaches is difficult to organise and thus very unlikely.

8.6.2 Industry behaviour
Behaviours and attitudes of market participants are also important.

8.6.2.1 Market maturity
Where markets are mature and product development moves relatively slowly the capacity to identify and track products across the life cycle make it easier to coordinate industry action. In these markets, innovations can be embraced by the incumbent market participants in a straightforward manner and businesses have the capacity to implement such schemes.

All of the product stewardship schemes in New Zealand exhibit some degree of market maturity. Plastics, whiteware, oil and glass are relatively mature industries with established distribution chains.

Contrast this with e-products where innovations are occurring all the time and firms are relatively new. With markets that are immature and evolving at a rapid rate the chances of industry coordination are low.

8.6.2.2 The difference between business and consumer schemes
There is a major difference between stewardship schemes that target those who market products to business and those who market to consumers. Business users often lease equipment and therefore have no responsibility at end-of-life, or alternatively negotiate ‘take-back’ as part of new equipment supply.

Consumers do have the problem of how to dispose of the e-products once used. The incentives on householders are muted, indirect and possibly conflicting because of the way in which waste management services are delivered and funded e.g. consumers have environmental concerns about how ewaste is currently being disposed in landfills, despite it being economically efficient to do so.

8.6.2.3 Competition
Linked closely with maturity of markets is competition, since businesses have the capacity to develop a competitive edge by developing a core competitive advantage by building product stewardship into their marketing mix. In New Zealand, this has occurred in the farm plastics industry where two competitors are providing rival product stewardship services to farmers to remove waste plastics from farm and using that opportunity to market other products.

While competition is fierce in e-product markets, the marketing mix is geared to price sensitive new products in fast developing markets. New products are being developed all the time and once competitors have successfully copied these products or produced their own versions, margins are thin and price competition is far more important than non price competition. In this situation, a voluntary product stewardship arrangement agreed to by all industry participants is unlikely.

8.6.2.4 Coverage
A key success factor is having all stakeholders covered by the same scheme. For an industry-wide scheme to work successfully all stakeholders at the same stage of the marketing chain should receive the same benefits/costs. No scheme should put one or a group of companies at a disadvantage.

One of the big difficulties for e-products companies is to agree on a similar approach to ewaste. Free riding is extremely important because price competition is so fierce. Any scheme that disadvantages one group of companies because it has to shoulder disproportionately more of the costs, is unlikely to succeed.

8.6.2.5 International trends and agreements
In some product groups and in some countries there is a strong push for product stewardship approaches. This is particularly so if a company supplies into those markets or part of your product involves hazardous goods. For example, Fisher and Paykel have set up a stewardship foundation. One of the reasons for this is that they are required to manage CFCs and HCFCs under the Montreal Protocol.
8.6.2.6 Industry associations

Industry associations that have strong, comprehensive coverage and are able to demonstrate that they can work together cooperatively are possible candidates for product stewardship arrangements. If industry associations can successfully combat free riding then the benefits and costs will be shared sensibly by all stakeholders.82

In e-product markets, it is not obvious that this will be possible given the industry conditions (structure and behaviour) described in each of the sections above.

8.6.3 Summary

Industries with higher barriers to entry, fewer competitors, rely on non price competition, and deal in more mature markets are more likely to be able to sustain a voluntary approach that requires little government involvement and is durable over time.

The characteristics of the e-products market have little in common with these markets and therefore it is very unlikely that industry will be cohesive enough to develop a durable voluntary product stewardship scheme that effectively deals with ewaste.

8.7 HIGH LEVEL GUIDANCE ON APPROACH

In this section we set out a high level approach to government intervention in the form of a product stewardship arrangement. It is high level, because we have not attempted to do a detailed analysis of the various options. Therefore, our intention here is to focus on the area where an approach is most likely to solve the ewaste problem. We also stress that because this is a high level evaluation, potentially a number of hybrid solutions could be considered (particularly those that are likely to reduce administrative and compliance costs further). In effect, what we have done in this section is set up a number of generic models that can be further refined once a general approach to ewaste policy is formulated.

The economic approach focuses on situations where markets fail. However, it is also appropriate to address concerns about sustainable development across economic, social and environmental dimensions (OECD 2001). Provided impacts on social and environmental outcomes are fully accounted for, an efficient activity is also a sustainable one.

To capture these regulatory features/instruments we have set up four generic models (see table below). These are:

- Voluntary arrangements established by industry. This is to capture the moral suasion approach;
- Voluntary agreements established as a partnership between industry and government, where the participation of individual firms is not compulsory. This is to capture self regulation approach where membership of the scheme is voluntary;
- Co-regulation that combines industry self regulation and government regulation. This is done to illustrate the combination of self regulation and impact of economic instruments;
- Regulation that is established and enforced by government. This is done to gauge the high level impact of prescriptive approaches and the use of economic instruments.

8.7.1 Looking at the options

The models are set out in the opposite table. For each generic model, we have set out the criteria for evaluation to consider the merits of each product stewardship option.

8.7.1.1 Environmental effectiveness

A voluntary scheme is unlikely to have a lasting impact on the overhang of ewaste in the community because the scheme is not durable. For example, it does not:

- Create the right incentives for all stakeholders (i.e. it encourages free riding) leading to a few shouldering most of the disposal burden, and
- Deal with the conflicting signals sent by local government (i.e. increasingly moving towards charging for ewaste disposal), and central government (which has relied, recently, on voluntary solutions),

This is likely to be exacerbated by increased number of digital products coming on to the market.

Similarly, a joint government industry voluntary scheme is unlikely to be effective because the structure of the industry (large number of players with a range of views on ewaste) and behaviour of participants (strong price competition). In this situation, we expect the scheme to breakdown (because of the free rider problem) and therefore the overhang of ewaste in the community will remain.

Co-regulation (between business and government) and regulation by government are more likely to fix the ewaste problem, although...
8.7.1.1 Environmental effectiveness

- Not effective: overhang of ewaste remains.

8.7.1.2 Net community benefits

- Unlikely. Costs outweigh benefits. Most costs are non-market and ‘hidden’.
  - Unlikely. Costs outweigh benefits. Most costs non market and ‘hidden’.
  - Possible, although this will depend on detail of proposal and on the community valuations of the ewaste ‘problem’.
  - Possibly, any net benefit will be small since costs are likely to be high relative to benefits and on the community valuations of the ewaste ‘problem’.

<table>
<thead>
<tr>
<th>Generic models/approaches</th>
<th>Voluntary industry</th>
<th>Voluntary industry/govt agreements</th>
<th>Co-regulation</th>
<th>Regulation by govt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental effectiveness</td>
<td>Not effective: overhang of ewaste remains.</td>
<td>Not effective: overhang of ewastes remains.</td>
<td>Likely to be effective.</td>
<td>Likely to be effective.</td>
</tr>
</tbody>
</table>
| Net community benefits    | Unlikely. Costs outweigh benefits. Most costs are non market and ‘hidden’. | Unlikely. Costs outweigh benefits. Most costs non market and ‘hidden’. | Possible, although this will depend on detail of proposal and on the community valuations of the ewaste ‘problem’. | Possibly, any net benefit will be small since costs are likely to be high relative to benefits and on the community valuations of the ewaste ‘problem’.
| Economic efficiency       | Unlikely, since it does not achieve objectives, too many free riders. | Unlikely, the scheme is not durable, too many free riders. | Possibly, to be efficient will depend on details of scheme. | Difficult to obtain - danger of cost outweighing benefits. |
| Incentives                | Weak               | Weak                               | Strong        | Strong             |
| Ownership and acceptability | By a few           | By a few                           | By most       | By most but variable |
| Ease of administration    | Easy               | Easy                               | Depends on the relationship between government and business and workability of proposals. | Difficult, since government has little understanding of the fine details of the industry being regulated. |
| Market characteristics    | Not conducive to voluntary approach. | Not conducive to voluntary approach. | Fractured nature of the industry will require careful design to ensure that all players share costs and benefits equitably. | Fractured nature of industry means that imposing regulation may lead to tension between government and industry. Part of that design will be dealing with orphan product. |

*Source: NZIER*

**Table 8-1: Approaches to product stewardship for ewaste: likely outcomes**

| Each approach potentially has different cost structures. |
| For a joint voluntary government – industry scheme a similar impact is likely occur. Free riding is likely to render any scheme ineffective and short lived. Again, most of the costs will be “hidden” and borne by the community in the form of environmental, health, and the costs associated with storage of ewaste. Perceptions of the way the issue is being handled in the community are also likely to suffer. In particular, this is likely to |
impact on existence and possibly bequest values since the overhang of ewaste will grow.

Net community benefits are possible with co-regulation. However, this will depend heavily on the scheme design and the attitude of the participants. The advantage of having industry involved in the process is that costs – which industry have an incentive to focus on – can be more easily kept under control. Community benefits are likely to be enhanced because perceptions of environmental benefits associated with ewaste (existence and bequest values) will improve since something is been seen to be done about the ewaste issue.

Under a government regulation only approach, it is likely that costs will be difficult to control. With only partial industry cooperation, gaming would occur and it is more likely that ways will be found by business to circumvent the regulations. Community benefits are likely to be enhanced because perceptions of environmental benefits associated with ewaste will improve because the government is being seen to be doing something about the ewaste issue. However, if a social benefit did occur then it is likely to be very small.

8.7.1.3 Economic efficiency
Voluntary and voluntary industry–government agreements are unlikely to be efficient for society because they will not achieve the objectives of either option. Voluntary efforts to reduce the ewaste overhang in society are likely fail; therefore, any cost incurred that promoted and supported the schemes is likely to be lost. These costs are likely to “hidden” or non-market because those that contribute their time are likely to do so on a voluntary basis. There is also the environmental, health and storage cost consequences of a continuing ewaste problem.

For a co-regulated scheme economic efficiency could occur, although the extent of the efficiency gains will depend on scheme design. Business involvement could be a major factor in reducing costs to the industry, consumers and government. Costs are likely be borne by industry, government and e-product consumers rather than the wider community as they are now.

Regulation by government will mean that economic efficiency will be difficult to achieve, mainly because of the structure of industry and the different attitudes of the participants.

8.7.1.4 Incentives and scheme ownership
The incentives for participants associated with each regulatory approach will be key to its success in resolving the ewaste issue. In voluntary schemes, the incentives to free ride are very high because there are many industry players and price competition is fierce. Therefore, the success of a voluntary scheme is likely to be low.

The focus of a compulsory scheme is on incentive alignment with the policy objectives. In this situation, incentives are more likely to be aligned under a co-regulation scheme relative to government-only regulation. In this respect, a co-regulation model which incorporates industry ideas is more likely to be accepted by all industry players. If incentives can be aligned properly and the scheme is transparent and flexible, there is also room to reduce cost further over time.

Under a government only approach, business does not have ownership of the issue and therefore is likely to more passive in its implementation or in the worst case finding ways of shirking their ewaste responsibilities.

8.7.1.5 Administration and market characteristics
One of the major advantages of voluntary schemes is that they are fiscally cheap to administer, therefore they are the favoured tool of policymakers and economist. This process works best if markets are concentrated and there are few players. In e-product markets, there are many players and a large number of different strategies being adopted. This is not conducive to a voluntary approach and therefore a voluntary scheme is likely to fail.

The fractured nature of the market means that a compulsory scheme is more likely to achieve the desired outcome. In this respect, a co-regulation approach is more likely to have success relative to a government only regulatory approach, since it is more likely to reflect industry concerns and ways to overcome them, although, the ease of administration will depend on the design and the relationship between industry and government.

8.7.1.6 Summary
A voluntary approach to product stewardship is unlikely to work in the case of ewaste. While a voluntary approach is favoured by many because of its ease of administration and lack of (market based) costs, it will not achieve the goal of reducing to a minimum the overhang of ewaste in the community, in fact, ewaste overhang in the community is likely to increase.

Compulsory schemes are likely to be more
8.7.2 Review

Possibly the most important step in this process is that after implementing a new scheme an appropriate review timetable is set up. Valuable information, correction of defects, and fuller understanding of how the scheme is working can be gained from such a review e.g. for example, while the five stewardship arrangements in New Zealand have not all been reviewed, valuable information coming out from feedback from those running the schemes. One of the key concerns is free riding and how it impacts on scheme viability.

8.8 Conclusions

Ewaste is a growing concern in developed countries like New Zealand as well as for developing countries such as our Pacific Island neighbours; finding workable solutions acceptable to all affected parties is challenging. We have little reliable information on how big the problem is but we do know that it will get larger as more e-products come onto the market.

Ewaste is perceived to be a problem mainly because there is a large overhang of ewaste in the community. Reasons for this are:

- Consumers do not know what to do with the ewaste, since it is becoming increasingly difficult to dispose of ewaste in a cheap and easy way e.g. consumers are increasingly being charged for ewaste disposal at landfills;
- Ewaste detracts from societal well-being because it is seen as having costly effects that harm the environment and human health, e.g. due to contamination of land and water, emissions into atmosphere, detractions from amenity. This problem is exacerbated by an increase in e-products on the market;
- Space for landfills is perceived to be scarce;
- Some hold concerns over availability and conservation of raw materials, pressures on which might be relieved by less wasteful material use, and recycling;

From an economic perspective, material ewaste is simply material no longer of value in its current use, which its owner would willingly discard. Whether it gets reused, recycled or disposed in a landfill depends on which option is most beneficial or least costly to the owner. Ensuring the discard decisions of private individuals and businesses are also most beneficial for the community at large is a justifiable issue for public policy to address.

Taking account of the ‘hidden’ or non-market consequences of actions is a primary consideration for policy. This includes not only correcting the distortions and failures in market operations that cause problems with ewaste, but also putting in place policy that avoids undue impacts on business activities that have widely felt consequences for investment and community well-being.

To this end we have adopted the product stewardship approach to dealing with the ewaste question and developed a four-stage model that examines:

- Why should government intervene to fix the ewaste problem? This includes:
  - Identifying the market failure. Of particular concern is the overhang of ewaste in the community;
  - Identifying if there is a market solution. The industry point to the problem of free riders as being of particular concern in e-product markets, but have indicated a willingness to fund ewaste schemes provided government ensures compliance by free-riders; and
  - Are the consequences of ewaste high? While there is some debate about the environmental impact of disposing ewaste into landfills, it is clear that the New Zealand community value recycling highly.
- The characteristics of the industry that would lend itself towards either a voluntary or compulsory product stewardship scheme. Of particular issue in ewaste is the structure of the e-product market (i.e. a large number of players in the e-products market) and the behaviour of participants (i.e. strong price competition) means that obtaining a cohesive voluntary agreement are likely to be difficult;
- Evaluating the approaches to product stewardship through four different options. The most palatable of these is co-regulation option since it most unlikely that a voluntary scheme will work and a government regulation only approach is likely to be too costly; and
- Reviewing of any scheme put in place.
It is also important to note that in any particular scheme the best way to deal with the ewaste question will be dependent on consumer responsiveness to incentives created. A lack of consumer response is likely to have a major detrimental impact on any ewaste disposal scheme.

**REFERENCES**


63 We do not know how big the overhang of e-waste is in the community; however, we do know that it will get larger as time goes on particularly with the switch from analogue to digital television.

64 In fact, a full cost benefit analysis has been carried out in Australia by PWC and Hyder Consulting (2009). It showed a clear net benefit to the community.

65 A more comprehensive discussion is in the next section.

66 Total Economic Value: adapted from Serageldin (1999)

67 The Basel convention on the control of transboundary movements of hazardous wastes and their disposal came into force in 1992. Its intent was to put in place strict rules around the import and export of hazardous waste. It requires verifiable notice, consent and tracking of waste across national boundaries and encourages the recycling of waste in home countries. New Zealand signed the Basel Convention in 1989 and ratified it in 1994.

68 Commonly called in economics a market failure. Market failure refers to circumstances in which markets do not allocate resources to achieve the best returns for the community.

69 See discussion in next section.

70 www.epa.gov/osw/partnerships/stewardship/


72 This is backed up by work done for MfE by Covec (2007) which suggests a high willingness to pay for recycling schemes.

73 The main commercial concern is that those who join a product stewardship scheme will be at a competitive disadvantage. They will face higher costs while all industry members will share in the benefits. In the competitive e-products industry this could be significant.

74 New Zealand will switch to digital-only in 2012 to 2013. Hawke’s Bay and West Coast will switch off analogue transmissions first in September 2012; Southland, Otago, Canterbury, Nelson, Tasman and Marlborough in April 2013; Wellington, Manawatu-Wanganui, Taranaki and Gisborne in September 2013; and finally Bay of Plenty, Waikato, Auckland and Northland in November 2013.

75 The RCN/CRN ewaste recycling project to establish permanent ewaste recycling centres is an example, but many councils have concerns that their communities will not be willing (or even able) to pay the full costs of recycling.

76 These include importers, retailers and increasing levels of online purchasing.

77 Some e-product companies do take back ewaste from their own brand, although this is not well known among consumers (authors conversation with an anonymous stakeholder).

78 Efforts were made between 2006 and 2008 to develop collaborative industry-led product stewardship schemes, but in the absence of regulations to prevent free-riders, the schemes have not progressed.

79 In these two schemes farmers pay a fee for removal of plastic waste. Anecdotal evidence suggests that they do so for two reasons. Firstly to remove unwanted plastics from the farm and from paddocks where it is a potential hazard for farm machinery and secondly, environmentally it is the right thing to do (conversation with MfE on farmer motivations for supporting product stewardship).

80 Many foreign subsidiaries have little discretion on global policies set by a parent, therefore they have very little choice when it comes to choosing about joining voluntary product stewardship schemes.

81 For more detail see www.productstewardship.org.nz/content/view/7/24/

82 The two industry associations potentially responsible for a product stewardship scheme (CEANZ and NZICT) have thus far been unable to make any progress on e-waste and have made it clear that they will not put any effort into this until there is government support through regulations to ensure a level playing field (no free-riders).

83 As the costs fall on the volunteers.
9. Ewaste recycling in Australia

9.1 KEY POINTS

- Ewaste is now squarely on the agenda of federal and state governments in Australia.
- The Product Stewardship Bill 2011 was introduced into Parliament in March 2011 and was passed by the Senate on 15 June 2011, and the House of Representatives on 22 June 2011.
- The Bill’s passage through both Houses of Parliament paves the way for a national industry-led television and computer recycling scheme to be phased in from the end of 2011.
- All importers of TVs and IT equipment above the specified threshold specified in the proposed legislation (including parallel importers) will be subject to the powers of the legislation (and sub-ordinate regulations), and required to participate in, and co-fund the Scheme.
- Computers and televisions have been identified as the first products to be subject to the new legislation and regulations based on a co-regulatory product stewardship approach are already being drafted after public consultation in March 2011.
- A co-regulatory approach was sought by industry as the most effective way to engage different brands and suppliers, while also providing great autonomy for more progressive companies to design, fund and implement their own product stewardship programs and services. A co-regulatory model also ensures that industry manages its own funding, thus avoiding the risk of government collecting, managing and potentially wasting industry funds.
- An aggressive geographical rollout plan is planned, commencing late 2011 or early 2012, to reach all of Australia within five years.
- The legislation and regulations are a direct response to a recognition that the current piecemeal approach to ewaste, which has relied on voluntary industry initiatives, has failed to result in any significant measurable environmental benefits or outcomes.
- All Australian stakeholders now accept that product stewardship and extended producer responsibility are the best solutions for addressing the growing mountains of ewaste.
- Leadership in developing a product stewardship solution has come from industry groups Product Stewardship Australia (PSA), the Consumer Electronics Suppliers Association (CESA) and the Australian Information Industry Association (AIIA).
- The Australian Government’s ‘Switch to Digital’ programme, which is already underway, failed to take account of the need to have programmes in place for recycling obsolete TVs. Considerable on-ground evidence from local councils and the waste management sector in Australia indicates that consumers are not generally opting for set-top boxes as a digital switch solution and are tending to purchase new digital TVs. This is resulting in noteworthy volumes of obsolete TVs being disposed of.
- PSA and AIIA have introduced an Interim Industry Standard (IIS) to govern the environmental and occupational safety and health (OSH) performance of ewaste recyclers.
- PSA and AIIA have agreed to establish a single product stewardship organisation (PSO) to cover televisions and computer equipment.
- When the Product Stewardship Bill is enacted, and all TV and computer companies become ‘liable parties’ subject to the powers of the Act, it is expected that all 150-170 suppliers will become part of the PSO; the requirements to establish nationwide ewaste collection systems would be too costly for any single supplier.
- The PSO will take responsibility for procuring ewaste recycling services as well as for community outreach, branding and education programmes.
- As a minimum recyclers will need to be certified as complying with the international benchmark for environmental management ISO 14001.
- Certification of recyclers will be carried out by independent certification bodies who are accredited to do so by JAS-ANZ (Joint Accreditation System Australia and New Zealand)
- New Zealand can leverage on the extensive and expensive background work carried out in Australia over the last two years.
- Given the close relationships between TV and computer suppliers in Australia and New Zealand, often involving the same companies, there are likely to be obvious benefits in aligning New Zealand’s approach to ewaste with that of Australia.

9.2 EWASTE ON THE AUSTRALIAN AGENDA

Environmental and social impacts resulting from
the production and consumption of electrical and electronic products is now squarely on the agenda of national governments, local authorities, policy makers, manufacturers, brand-owners, environmental activist groups and many other non-government organisations (NGOs).

Australia is no exception, and the last decade has witnessed an explosion of awareness and action among all stakeholders involved with end-of-life consumers electronics and ICT equipment, including mobile telephones, and business imaging consumables. The vast majority of key stakeholders are more than ready and eager to now see a permanent national collection and recycling scheme for obsolete or end-of-life TVs and computers, including peripherals.

What is emerging strongly in Australia, is that product stewardship and associated policies, programs and approaches related to extended producer responsibility (EPR) and shared product responsibility (SPR) are gaining momentum, acknowledgment and support. All stakeholders recognise that the essential objectives of product stewardship and EPR are best placed to minimise a range of environmental and human health impacts across the product life cycle from production to consumption and beyond.

Progressive producers and suppliers have been pushing hard for several years for the right policy settings; community and consumer expectations are growing and mindful of ewaste impacts; experienced waste management operators and recyclers can see the commercial benefits; state and territory governments want a solution to an expanding waste stream; and many local councils and regional authorities would welcome the cost of ewaste recycling being shifted across to industry.

No one can question the pent-up demand, interest, enthusiasm and commitment. The timing is right, indeed overdue, to see the National TV and Computer Product Stewardship Scheme for TVs and computers commence as soon as is practicable."

EWISE IN NEW ZEALAND — FIVE YEARS ON

9.3 OVERVIEW OF TV AND COMPUTER RELATED PRODUCT STEWARDSHIP ACTIVITY IN AUSTRALIA

Several key factors characterise the evolution of ewaste advocacy, planning, design and implementation in Australia. While not comprehensive, these points provide a sense of key milestones, major barriers, noteworthy initiatives and imminent outcomes.

- While we see growing pressure on producers and brand-owners to take greater responsibility for end-of-life products, users and consumers also have an obligation to utilise products efficiently, have them serviced and repaired, and ensure their appropriate disposal in partnership with industry. Environmentally responsible purchasing, use and disposal of manufactured goods and related demand-side measures is an area where much more can be done to further reduce environmental impacts.

- Product stewardship (and EPR) is now a well-established approach, based on minimising environmental and human health impacts across the product life-cycle from production to consumption, and beyond. It is a proactive strategy aimed at managing and minimising the life cycle impacts of products and services.

- Product-oriented environmental policies (including EPR legislation, regulations/directives, standards and ecolabelling certification schemes) have expanded rapidly and globally over the last 15 years. The most intense activity has been in European jurisdictions, however Japan, some US states and Canada have also been at the forefront of such work.

- Industry groups such as Product Stewardship Australia (PSA), the Consumer Electronics Suppliers Association (CESA) and the Australian Information Industry Association (AIIA) have played a pivotal, if not driving role in forcing the Australian Government to development appropriate product stewardship legislation and subordinate ewaste regulations.

- Industry commenced practical efforts on investigating end-of-life TV collection and
recycling in 2003/2004, through a joint pilot project co-funded by TV manufacturers through CESA and the Victorian Government (EcoRecycle Victoria). This was soon followed up by a trial project funded by the NSW Government with a focus on IT equipment recycling. The most enduring trial program has been the ByteBack program co-funded by the Victoria Government (Sustainability Victoria) and IT equipment manufacturers and brands through the AIIA’s Environmental Special Interest Group (AIIA ESIG). The ByteBack program has operated successfully over several years chiefly in metropolitan Melbourne and will transition into the National TV and Computer Product Stewardship Scheme once the legislation and regulations are finalised.

- The establishment of PSA as a ‘producer responsibility organisation’ in 2004 by TV manufacturers represents a landmark in the push towards intelligent regulation and the need for a permanent national take-back and recycling scheme. Its profile and advocacy outcomes have been unmatched in terms of influence over government and other stakeholders.

- The overall performance of federal, state and territory governments in Australia with regard to policy and legislation on ewaste has been glacial, process-entrenched and far from solution-oriented.

- This slow and unproductive mode of operation experienced a positive shift and accelerated pace under the former Federal Environment Minister, the Hon Peter Garrett during a key national meeting of all federal and state environment ministers in November 2009. At the landmark meeting in Perth, the Environment Protection and Heritage Council (EPHC) meeting of environment ministers agreed unanimously to develop product stewardship legislation and address the need for ewaste regulations in accordance with what PSA, CESA and AIIA were requesting. In the lead-up to the November 2009 EPHC meeting, two critical pieces of work were commissioned by government to further advance the justification and development of legislation and any required subordinate instruments. These were the:

- Decision Regulatory Impact Statement (RIS) for TVs and Computers;\(^6\) and

- Willingness to Pay for E-Waste Recycling (Choice Modelling study)\(^6\)

- These two reports essentially cleared the way for the development of the Product Stewardship Bill which is currently before the Australian Parliament.\(^6\)

- Industry, through PSA, CESA and AIIA, has been very focused on the need to design, build and fund a national collection, recycling and community education scheme, subject to the Australian Government finalising effective and appropriate legislation to ensure industry-wide participation, and the elimination of any competitive disadvantage that might arise through some companies avoiding their product stewardship obligations. PSA and AIIA are now actively working towards the creation and operation of a single ‘product stewardship organisation’ or PSO that will be charged by its members companies to operationalise and implement industry’s program under the proposed legislation and subordinate regulations.

- Corporate and other B2B-oriented ewaste recycling and management services continue uninterrupted, especially with regard to IT equipment reuse, remarketing, refurbishment often within the context of asset management and equipment leasing arrangements.

- The Australian Government’s ‘Switch to Digital’ program and timeframe has completely ignored the impacts resulting from switching off the analogue signal and the significant extent to which this is now generating obsolete TVs, be it through consumer behaviour or redundant TV technologies. In short, the Federal Department of Broadband, Communications and the Digital Economy (DBCDE), fundamentally failed to identify, assess, quantify and/or mitigate the impacts of the switch to digital process in Australia. Essentially one arm of Government implemented a program which is generating significant volumes of end-of-life TVs without coordinating with, or ensuring that the Environment Department had the appropriate policies and regulatory infrastructure in place to collect and recycle redundant TVs.

- The role of standards that can govern the environmental and OH&S performance of service providers involved in the National TV and Computer Product Stewardship Scheme, is considered to be a very high priority by PSA and AIIA. Until the Australian and New Zealand Standard covering ewaste is finalised in late 2012, PSA and AIIA have developed an
Interim Industry Standard for the Collection, Transportation and Recycling of end-of-life TVs and Computers. This standard will be used by the joint PSO (PSA and AIIA) to manage and control contractual arrangements and performance with all service providers used for the collection, transportation and recycling of end-of-life TVs and computers. Extensive independent evaluation and assessment of the Interim Industry Standard has been undertaken by the Federal Department of the Sustainability, Environment, Water, Population and Communications (SEWPaC). This standard is now ready to be operationalised subject to the Product Stewardship Bill and regulations being finalised in 2011.

9.4 CURRENT FOCUS OF EWASTE PRODUCT STEWARDSHIP ACTIVITY IN AUSTRALIA

The Product Stewardship Bill was introduced into the Australian Parliament on 22 March 2011 and passed unanimously by the Senate on 15 June 2011 and the House of Representatives on 22 June 2011. The Bill was then expected to receive the Royal Assent over the following 7-10 days, after which it would become an Act.

If passed, Australia will take delivery of unprecedented legislation that will deal with end-of-life TVs and computers. As framework legislation it provides the powers and scope to be able to address sectors, product categories and waste streams in addition to ewaste. TVs and computers are simply the first sector that will be regulated under the Act. The Product Stewardship Bill will essentially require manufacturers, suppliers and importers of such products to take action and provide the community and small business with a national recycling service to ensure that ewaste is diverted from landfill with a view to materials recovery and processing.

Ewaste-specific regulations currently being drafted by the Australian Government will underpin industry’s collection, recycling and community education activities. Specifically the regulations will define:

- Products covered under the scheme.
- Obligations of the liable parties, i.e. the importers or domestic manufacturers of televisions, computers or computer peripherals above a specified threshold.
- Outcomes in terms of collection and recycling targets to reach a goal of 80% collection by 2020.
- Reporting obligations and performance evaluation.
- Assessment and approval of product stewardship arrangements.
- Compliance and enforcement, including penalties for failing to meet obligations.
- Commencement of the regulations, expected to be in 2011.

The two key industry groups affected by the bill i.e. PSA and the AIIA, have welcomed the bill as a significant step towards enabling a national take-back scheme. Indeed they have applauded the Government on this vital and overdue environmental reform.

In short, the issue of TV and computer recycling (including peripherals) will be regulated by the end of 2011 subject to the legislation being passed by Parliament. What does this really mean for business? Basically, all importers and/or manufacturers of TVs and computers will be regulated at a federal level. Even retailers who import new TVs and IT equipment above a government-specified threshold would be required to participate. Once the legislation and regulations are finalised, industry plans to commence its national TV and computer recycling program.

A critical area of relevance to industry will be the basis for how individual companies, brands and suppliers will contribute to the funding of the industry program. There has been much discussion and debate about the most equitable and transparent method for calculating the cost base. It is likely that market-share by weight will be the preferred means of ensuring that the industry program collects sufficient funds to be effective and operational. Market-share by weight also provides the ability to recognise important ‘Design for Environment’ (DfE) features such as light-weighting, materials efficiency and specific Design for Disassembly and Recycling features which have the potential to minimize end-of-life processing costs. It is expected that the method for calculating individual member company contributions will be an area of ongoing scrutiny by industry in order to ensure that ‘greener’ companies and their products are not effectively subsidizing less recycling-friendly end-of-life equipments.

With the exception of light-weighting of products, the majority of other potential DfE benefits eg. Design for Disassembly features, fixings and fasteners, can only be fully exploited if the recycling industry has the capacity and capabilities to go beyond a ‘one-size-fits-all’ shredding approach to ewaste. The greenest of TVs and ICT products
rich with DfE features deliver little measurable environmental benefit if the waste management industry does not have the technology and processes to capitalize on such features.

There are effectively four major streams of activity currently underway in Australia, all of which are aimed at operationalising the National TV and Computer Product Stewardship Scheme.

i) The **passing of the Product Stewardship Bill** through the Australian Parliament, and the subsequent making of ewaste regulations that will control industry requirements such as collection and recycling targets and key performance indicators, geographical roll-out, data collection and public reporting, producer stewardship organisation (PSO) governance and approval, as well as community education and awareness. The regulations have yet to be exposed for public comment so there is still uncertainty with regard to specific metrics, targets, milestones and timeframes. It is envisaged that the regulations will be finalised by September 2011.

ii) The **creation of a single PSO** to be the primary operational and compliance body to deliver the industry program on behalf of its member companies. There are currently several major tasks underway to ensure that the PSO is suitably designed and established to ensure that legal, financial and governance activities are in accordance with the necessary government and industry requirements. PSA and AIIA are jointly undertaking this work and it is envisaged that additional companies will join the PSO upon the bill and regulations being passed, at which time an additional 150-170 TV and computer companies will become ‘liable parties’ and subject to the powers of the act.

iii) The third stream of activity is focused on the **PSO’s procurement program** and how it will manage the outsourcing of collection and recycling services provided by third parties. This necessarily involves the application of Interim Industry Standard, but also includes numerous other planning and contractual requirements and their design. For example, the PSO is directly involved in mapping capacity and capabilities in order to identify suitable collection partners across urban and rural Australia as part of the phased five-year geographical roll-out plan. In some cases this will be with local councils and authorities, in other cases it may be with retailers, charitable recyclers, social enterprises, service and repair centres, community environment organisations or other not-for-profits.

iv) The development of the **PSO’s community outreach**, branding and education program represents the fourth stream of activity. This body of work and the resulting outcomes will be critically important in maximizing public awareness of the TV and computer recycling service and ensuring widespread participation. Much of the outreach work will be undertaken in collaboration and partnership with stakeholders who are already substantially networked into the community on recycling issues.

The reality is that there is considerable parallel activity currently taking place between Government and industry to help ensure that the National TV and Computer Product Stewardship Scheme is implemented in a timely manner. This however, is significantly dependent on the timing of the bill and regulations being finalised, as well as the level of information flow from government to industry and the PSO about the likely regulatory requirements.

In short the scheme is likely to commence at the end of 2011 or the beginning of 2012.

9.5 **THE PROPOSED PRODUCT STEWARDSHIP SCHEME**

Funding for the proposed PSO organisation in Australia will come totally from importers. Importers will contribute in proportion to their volume of imports (or market share), data which will be collected by Customs and passed to the product stewardship scheme regulator, who in turn will provide aggregated information to the PSO. The regulator will be empowered to challenge any importers who are not part of an approved PSO and insist that they either establish their own scheme or join an existing one. The penalties for non compliance are expected to be severe and will escalate, based on time, until compliance is achieved.

The Australian regulations are expected to set clear targets for PSOs both in terms of the percentage of materials recycled compared to the number imported each year and the percentage of materials recovered. The former will increase progressively over a 10 year period commencing at around 15%, rising to 80%. Materials recovery is expected to be over 90% of a product by weight in most categories as recyclers have already demonstrated this is technically possible.
The combined industry product stewardship scheme will be rolled out across Australia progressively over a five-year period with a minimum of 150 collection points and limited term collection events established by the end of year five. Estimated costs are likely to increase from around AUS$25 million in year one to over AUS$80 million in year five (when approximately 40-50% of end-of-life ewaste available to collect is being recovered for recycling).

One area still being debated in Australia is the question of thresholds for the proposed regulations in terms of the requirement to participate in a PSO, and thereby contribute to the cost of recycling the ewaste. For example, for televisions, the government has suggested a threshold of 5000 units imported in any one year. However, the TV industry does not accept this and believes there should be no threshold – basically, every importer or ‘liable party’ under the proposed legislation should contribute towards the cost of product stewardship. A similar position is held by the IT brands; however the actual threshold numbers for IT equipment could vary depending on the product class.

More specifically, thresholds effectively exempt liable parties from participating in the Scheme and from contributing to the costs of the Scheme whilst continuing to place new product on to the market. A liable party is classified on the basis that annual imports exceed a specified level. The situation is a “trade-off” between the cost to Government, the PSO and to individual importers, of administering and participating in the Scheme and the loss of revenue to the PSO from exempting imports while still exposing the PSO to the costs of managing end-of-life product imported below the threshold.

Industry has recommended reductions and changes of the threshold in the realm of:

- 1000 units for televisions
- 3000 units for substantive form computer equipment
- 15,000 units for peripheral computer equipment

It is particularly important to note that the definition of a liable party under the proposed legislation in Australia will not differentiate between an OEM, a brand or a retailer who imports directly. This means that all importers above the threshold will be deemed a liable party and subject to the powers of the proposed legislation and regulations, including parallel importers.

9.6 STATUS OF COLLECTION AND PROCESSING OF EWASTE IN AUSTRALIA

To date the status of collection and processing (including recycling) of ewaste in Australia is piecemeal and characterised by isolated and/or sporadic activity with low volumes of ewaste being collected and recycling, and thus the imprimatur and demand for the Legislation.

The vast majority of end-of-life TVs and computers currently end up in landfill via local council-run hardwaste collections (equivalent to the inorganic kerbside collections held in some areas of New Zealand), community drop-off to landfills and transfer stations. Some councils and regional waste groups in urban and rural locations operate permanent ewaste collection and services, as well as limited term ewaste recycling events. The Byteback program also contributes to this activity in Victoria. Some retailers and manufacturers also offer some limited ewaste recycling services, however the overall volumes collected are negligible compared to the volumes of new product entering the market.

Some charitable recyclers associated with faith-based operations are also involved in ewaste collection and recycling, as are a growing number of social enterprises and not-for-profits who are exploring ewaste reuse and recycling as a potential revenue stream.

From a technical processing perspective, i.e. disassembly, materials separation, sorting and recovery, there are a handful of major ewaste recyclers who dominate the market in Australia e.g. Sims E-Recycling, MRI, Tes-ammm, TIC Group, Thiess Services, CRT Recycling, Veolia Environmental Services and SITA. There is however a growing number of smaller, specialist ewaste management service providers which cover logistics, collection, data management, events management, reuse and refurbishment, and/or end-of-life of materials recycling, e.g. PGM Refiners, 1800 Ewaste, Greenbox and Infoactiv Group.

The most recent and useful report covering ewaste collection and recycling capacity and capabilities was under taken in 2010 by Wright Corporate Strategy in collaboration with Rawtec: A Study of Australia’s Current and Future E-Waste Recycling Infrastructure Capacity and Needs.98

PSA and AIIA conducted an online request for information related to existing ewaste collection and recycling services during May and June 2011. The survey targeted local councils and regional waste groups across Australia with a view to mapping...
current capacity, capabilities, as well as interest in participating in the PSO’s future operations. A similar online request for information will be conducted in relation to commercial recyclers during July 2011. The results of this information will be an important input to the PSO’s ongoing procurement design and planning activities.

In summary, it is envisaged that the extent, frequency and quality of ewaste related collection and recycling infrastructure will develop rapidly once the legislation is finalised and the National TV and Computer Product Stewardship Scheme actually commences.

9.7 STANDARDS FOR EWASTE IN THE AUSTRALIAN CONTEXT

Electrical and electronic products contain a complex mix of materials, components and substances, and many components TVs and computers are classed as hazardous waste when the products are dismantled. Dismantling, crushing, recycling or reprocessing end-of-life TVs and computers, if poorly managed, can release hazardous substances into the environment and endanger humans.

In addition, the management of end-of-life TVs and computers involves health and safety issues associated with the manual handling, storage and transport of heavy and bulky items that must also be taken into consideration. It is essential that the environmental and health and safety risks are identified and proactively managed by those involved in the collection, transport and recycling of end-of-life TVs and computers. The Interim Industry Standard (IIS) has been developed to address those risks and will be used by the TV and IT product stewardship arrangement administrator (or PSO) while an official Australian and New Zealand Standard is being prepared through the Standards Australia/Standards New Zealand consensus process.

The IIS has been prepared by TV and IT industry members and has been the subject of consultation with a broad group of stakeholders with a view to creating an interim standard that is broadly acceptable to most stakeholders. The IIS is based on a number of international ewaste standards and particularly on the Electronics Product Stewardship Canada Electronics Recycling Standard 2009.

The IIS will be supported by education, certification and audit programs. It will be a contractual requirement that any recycler engaged by the arrangement administrator will be certified as complying with the international benchmark for environmental management ISO 14001, and this interim industry standard. The certification will not be performed by the arrangement administrator but by any independent certification bodies who are accredited as competent to do so by the government appointed accreditation body for Australia and New Zealand, JAS-ANZ (Joint Accreditation System Australia and New Zealand).

Under the contractual arrangements, collection locations will be required to self-assess and certify compliance with the standard to the arrangement administrator at specified periods.

The arrangement administrator or PSO will periodically audit a sample of collection locations, transport providers and recyclers for compliance with the standard, including the records required to be maintained. This IIS applies to the drop-off collection, transport, and recycling of products covered under the National Television and Computer Product Stewardship Scheme. It defines the minimum requirements to ensure that TVs and computers are managed safely and in an environmentally sound manner at the end of their useful life, from the point of collection from the end user, to the point of final disposition for recovery of raw materials for future products or disposal. It defines the minimum required outcomes and sets out how they are to be measured.

The IIS does not address the re-use market. There are existing avenues and commercial markets for the re-use of televisions and computers. This document is designed to deal solely with TVs and computers consigned by the end user for final disposition as a waste. Therefore the requirements for collection, transport and recycling set out in this document are targeted to handle this scrap or waste.

This IIS is intended to be used as a primary contractual requirement between the arrangement administrator of the television and computer scheme and organisations seeking to participate in the scheme as collection locations, transporters, and recyclers. It may also be used as a contractual requirement by companies, including members of the PSO, seeking to recycle their own end-of-life equipment. The IIS will be used in the auditing and, where applicable, certification of participating organisations.

The IIS includes guidelines that provide further information on the potential hazards and environmental impacts associated with the collection, transport, recycling and processing of end-of-life TVs and computers as well as appropriate controls for those hazards and impacts.

The IIS will not absolve collection locations,
The guiding principles embodied in the IIS cover:

- End-of-life TVs and computers shall be collected, transported and recycled to ensure that the health of people, either those involved in the process or those potentially affected at any stage of the process, is not adversely affected.
- End-of-life TVs and computers shall be collected, transported and recycled to ensure that the environment including land, air, water and groundwater is not adversely affected.
- Collection locations, transporters and recyclers have a duty of care to ensure that all activities are managed in accordance with applicable legislation, regulations, codes and directions and environmental management practices.
- Recyclers have a duty of care to ensure that markets for materials accessed by downstream processors are legitimate and do not breach human health or sound environmental practice standards.
- Decisions regarding treatment of end-of-life TVs and computers shall take into account that the highest resource value is maintained; carbon emissions are minimised; and landfill is a last-choice destination only.
- Components and materials shall be traceable from the first point of removal from original product to the point of final disposition.

The IIS will play a key role in the commencement phase of the National TV and Computer Product Stewardship Scheme. Its application will be superseded by the Australian and New Zealand Standard currently being developed and scheduled for completion by the end of 2012.

9.8 IMPLICATIONS FOR NEW ZEALAND

The obvious implications relate to how information, knowledge, data and research can be shared between the two countries, and in both directions. There is clearly much mutual learning that can benefit the development of ewaste product stewardship initiatives in both locations.

The body of work undertaken to date in Australia is considerable and has been expensive. While some issues do vary between the two countries, many overlap considerably, and New Zealand should draw on this work to avoid unnecessary duplication.

While there are common management structures for some brands in both Australia and New Zealand, other brands operate more autonomously and there the benefits of unified decision-making and funding may not be so beneficial. It is important however to investigate this area of activity in details, especially if the same executives and management staff from Australian based brands can bring knowledge, funding and commitment to the development and implementation of a New Zealand scheme.

Overall, all efforts should be made to work more collaboratively in a practical sense as both Australia and New Zealand move forward to the commencement and expansion of national ewaste collection, recycling and community education initiatives.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>89</td>
<td>‘Arrangement Administrator’ is the term given in the Product Stewardship Bill to the organisation responsible for the co-regulatory arrangements, which in the case of televisions and computers will be the product stewardship organisation (PSO).</td>
</tr>
</tbody>
</table>
10. International approaches to ewaste recycling

10.1 KEY POINTS

- Developed countries, which consume most of the world’s electronic products and as a result generate most of the world’s ewaste, have been taking steps since the late 1990s to address this issue through a variety of legislative and regulatory approaches.
- The most common approach in these countries is to engage all stakeholders (consumer, local government, producer, recycler and central government) in a national solution.
- A number of countries require retailers to offer a take-back service with the purchase of new goods; others provide a nationwide network of ewaste collection centres.
- The large manufacturing nations have in-country recycling facilities capable of extracting scarce materials such as gold and silver and re-using metals such as copper, aluminium and iron in the manufacture of new products.
- The smaller nations have a more limited recycling capability, which typically includes disassembly and separation of major elements, such as glass, plastics, metals and circuit boards.
- Developed countries with good ewaste recycling practices also have agreed standards and systems for monitoring compliance.
- In most countries ewaste recycling is fully funded by producers under a product stewardship scheme, although some collect an Advance Recycling Fee from consumers at the time of purchase. The only two exceptions that we could find where consumers pay on disposal were Japan and South Korea, and in the case of South Korea, this is only to cover collection costs for large items that consumers cannot easily drop off themselves at a collection centre.
- Despite these efforts, there is a growing global concern that current recycling practices will not be able to deal with the escalating growth in ewaste.
- China, which for many years has been the prime destination for ewaste from developed countries, is in the process of banning the importation of ewaste, and this is expected to put further pressure on countries to process their own ewaste.
- North Carolina in the USA has announced that it is banning computer equipment and TVs in landfills from 1 July 2011.

10.2 EWASTE AS A GLOBAL CONCERN

During the last two decades, the quantities of ewaste being generated globally have been accelerating to such an extent that there are increasing concerns about how prepared the world is deal with future increases.69 Technological advances in the electronic industries encourage consumers to frequently replace their existing equipment, often even when it is still in good working condition.

Recycling and disposal of this ewaste is now a major global concern, affecting not only developed countries, who have been responsible for producing most of the ewaste to date, but also for developing countries which in the past have been the largest recipients of ewaste, but increasingly are becoming generators of ewaste themselves.

Ewaste contains various hazardous substances such as heavy metals and brominated flame retardants, which can pollute soil, water and air and pose a risk to human health and cause environmental damage. This has been well understood for some time but while quantities have been small relative to other waste streams it has been easy for communities to turn a blind eye without appreciating possible future environmental risks. However, while nations may not have fully appreciated the environmental risks, they are taking more notice of the other looming problem — a scarcity of the materials used to produce electronic goods. Computers, televisions and other electronic equipment use a number of valuable materials such as gold, silver and other rare earth minerals, and while these are in relatively small quantities in each item of equipment, the huge growth in electronics is raising the possibility that the world’s supplies of some precious metals could be soon exhausted, or restricted by trade barriers. Two years ago concerns were raised about restrictions on access to rare earth elements used in the manufacture of electronic equipment, with 95% of the world’s resources being in China.60 It has been discovered that the cost of extracting scarce metals from electronic equipment is an order of magnitude less than mining the earth for new source materials, even if these can be accessed.

Developing countries like China and India have comparatively low labour costs and lax environmental and occupational laws for ewaste disposal and as a result these countries have become the prime destination of the export of ewaste from developed nations. There have been many reports of the local environments in developing countries being damaged by hazardous substances released...
during primitive ewaste recycling activities. In South-East China, India, Nigeria and Thailand ewaste pollution has contaminated soil and aquifers. In 2010, the concentration of lead in water samples taken from the Lijiang River (China) was 2,400 times higher than the levels of pollutants allowed by the World Health Organization (WHO) Drinking Water Guidelines.92

China is in the process of banning importation of ewaste from developed countries,93 and there is a possibility in the future that other developing nations may also implement laws against illegal import of ewaste, which could influence the present recycling systems of developed countries and apply pressure on them to adopt new in-country strategies to deal with ewaste recycling.

This chapter compares established ewaste recycling practices in a number of developed countries. Further details for each country are included in Appendix 2. Attention is paid to the following particular issues, which are the focus of this report:

- Legislation and regulation
- Collection and recycling process
- Standards/technological advancement
- Product stewardship/financing

10.3 THE WEEE DIRECTIVE

Ewaste recycling systems exist in most developed countries; all are supported by a legislative framework with accompanying regulations. The European Union (EU) was one of the first global regions to address the ewaste issue nearly 10 years ago with the Waste Electrical and Electronic Equipment (WEEE) Directive. All member countries of the EU agreed to develop national product stewardship regulations within the WEEE Directive framework, including a requirement that the producer pays for recycling with no direct cost to the consumer when equipment reaches end-of-life. The WEEE Directive is currently being re-examined and it is expected that higher recycling targets will be set based on the percentage of equipment introduced to the market rather than the current kg/person target.94 The WEEE collection rates in 2008 are summarised in the map below.

**Figure 10-1: WEEE Collection Rates in the European Union, 2008**
There are also growing concerns that the controls over ewaste exports are insufficient to prevent ewaste being sent illegally to developing countries.\(^9\)

10.4 REGULATORY ENVIRONMENTS

A comparative overview of legislation and regulation in a few selected countries and the organisations responsible for their implementation is shown in the table below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Legislation/regulation</th>
<th>Organisations involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>Producer Responsibility Ordinance (2001)</td>
<td>Producer organisations EL-Kretsen and EAF (Swedish waste management recycling electronic product)</td>
</tr>
<tr>
<td>Switzerland</td>
<td>ORDEA (Ordinance on the return, the taking back and the disposal of electrical and electronic appliances)</td>
<td>SWICO &amp; S.EN. S</td>
</tr>
</tbody>
</table>

*Sweden and Ireland are also part of the European Union and therefore their national regulations must fit within the WEEE Directive framework, which requires that the producer always pays for recycling and not the consumer.*

**Table 10-1: Comparison of legislation/regulation and organisations involved in ewaste recycling**

Many countries continue to be challenged by illegal disposal of ewaste, suggesting the need for further effort at the global level to create the right incentives for good environmental and resource recovery practices.

Like New Zealand, these countries have had a legislative framework in place for a number of years, but it is evident that many are still facing problems in implementing effective ewaste management schemes. Many countries continue to be challenged by illegal disposal of ewaste, suggesting the need for further effort at the global level to create the right incentives for good environmental and resource recovery practices.

This is particularly important in countries where ewaste is banned from landfills. California led the way in 2001, banning ewaste in landfills\(^9\) and North Carolina has recently announced a similar ban to take effect from 1 July 2011.\(^\text{10}\)
10.5 STAKEHOLDERS

Most countries have recognised that ewaste management is a shared responsibility; effective systems engage all stakeholders (producer, retailer, consumer, local government and recyclers). A comparative analysis of the role and responsibilities of these key stakeholders in ewaste recycling systems is summarised below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Consumer</th>
<th>Local government</th>
<th>Producer</th>
<th>Recycler</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>Consumer can return ewaste free of charge.</td>
<td>Municipalities are responsible for ewaste collection.</td>
<td>Producers are responsible for the management of ewaste.</td>
<td>Recycling by producer (EL-Kretsen) designated contractors.</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Consumer can return ewaste and pay recycling fee on new product purchases.</td>
<td>Cantonal authorities have overall control as a licensing authority for recyclers.</td>
<td>Manage recycling system, setup recycling fees, licensing and auditing recyclers.</td>
<td>Recyclers need authorisation to operate a recycling facility from the cantonal authorities and a licence from the producer responsibility organisations (PROs).</td>
</tr>
<tr>
<td>Ireland</td>
<td>Consumer can return ewaste free of charge to retailers.</td>
<td>Local enforcement responsibilities.</td>
<td>Finance the take back of ewaste, self-comply or join an approved compliance scheme.</td>
<td>Recyclers collect ewaste for export or extract components and materials before sending of for recycling.</td>
</tr>
<tr>
<td>Japan</td>
<td>Consumer can return the ewaste to retailers, local government, collection companies and pay recycling fee.</td>
<td>Collect ewaste from consumer and transport to designated centre, also collected illegally dumped appliances.</td>
<td>Collection via retailers, setup of designated centre.</td>
<td>Recycling by producer-designated contractors.</td>
</tr>
<tr>
<td>South Korea</td>
<td>Consumer can return ewaste free of charge to the retailers at the time of purchase of new product, or buy recycling stickers to pay for collection.</td>
<td>Collect ewaste from consumer and transport to designated centre; also collected illegally dumped appliances.</td>
<td>Achievement of mandatory collection/recycling target; construction of collection centres and recycling plants.</td>
<td>Recycling via producer consignment.</td>
</tr>
<tr>
<td>USA</td>
<td>Consumers can return ewaste to retailers at the time of purchase of new product or on a special drop of event, and also at municipal solid waste collection sites</td>
<td>Local government collect and transport ewaste to recycling centres</td>
<td>OEMs* collect ewaste from consumers</td>
<td>Recycling of ewaste and transport ewaste to recycling centre on special collection event</td>
</tr>
</tbody>
</table>

*original equipment manufacturers

Table 10-2: Participation of stakeholders in ewaste recycling systems
In all the countries we reviewed there is a national network of ewaste collection centres, although some still rely on special collection events. In some countries where retailers are required to take back old equipment with each new purchase, collection facilities have also been set up in the retail shop. The recycling approaches adopted in each country are similar, involving disassembly and separation of components with subsequent materials extraction in specialist recycling facilities. The main difference is between the large countries with manufacturing facilities where the materials extracted can be re-used directly in new products and the smaller countries where there are more limited opportunities for re-manufacture and materials need to be exported.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Collection process</th>
<th>Recycling approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>• National collective system run by non-governmental, not-for-profit companies set up and owned by trade associations, or • Competitive clearing house system with services provided by producers, recyclers and waste organisations</td>
<td>• Set recycling target • Disassembly of ewaste • Recovery/destuction</td>
</tr>
<tr>
<td>Sweden</td>
<td>• 650 ewaste collection centres. Smaller ewaste disposal points located in supermarkets. • Municipalities are involved in collection. They run hazardous waste collection vehicles. • Consumers can also call the municipality for hazardous waste collection from their houses. • Shops of EAF * members are also used as ewaste collection centres.</td>
<td>• Hazardous substances in ewaste are separated after collection. • Recovered plastics are used as raw material for new products. Plastic materials which cannot be recycled are incinerated for energy recovery. • Metals, copper, aluminium and Iron are recycled in smelting plants and are used as raw material for new products. • Gold and silver are recovered directly from printed circuit cards.</td>
</tr>
<tr>
<td>Switzerland</td>
<td>• SWICO has 600 collection points • Retailers are required to take back ewaste, irrespective of the brand or year of manufacture</td>
<td>• Hazardous substances in ewaste are separated after collection. • Recyclers make profit by material recovery, and by reimbursement of the recycled amount of ewaste from the SWICO/S.EN.S system • The rest from which material cannot be recovered goes to incinerator for energy recovery or landfill.</td>
</tr>
<tr>
<td>Ireland</td>
<td>• Retailers are required to take back ewaste from customers free of charge • Take back is on a one-for-one basis • Consumers can also drop off ewaste for free at local authority civic amenity sites</td>
<td>• Extraction of components and materials before recycling • Collected ewaste is initially prepared for processing/recycling and then exported for final reprocessing/recycling</td>
</tr>
<tr>
<td>South Korea</td>
<td>• Manufacturers have compulsory targets for ewaste collection • Consumers can dispose of ewaste at time of purchase of new products</td>
<td>• Specialist government-supported ewaste processing facilities for electrical and electronic equipment • Strong education element, with education centres at recycling plant • CRT processing includes separation of leaded from unleaded glass • Automated facilities for extracting scarce metals from circuit boards</td>
</tr>
</tbody>
</table>

*Continued on next page*
## International Approaches to E-waste Recycling

<table>
<thead>
<tr>
<th>Countries</th>
<th>Collection process</th>
<th>Recycling approach</th>
</tr>
</thead>
</table>
| **Japan** | • 380 e-waste collection centres  
• Mandatory take back by retailer or from kerbside  
• The PC collection by Japan Post | • Encourage recycling by setting recycling target  
• Appliance based recycling process  
• Development of eco design  
• 38 plants for recycling (Group A+B)  
• E-waste sorted, treated, dismantled and crushed  
• Materials like glass, aluminium, copper, and iron and certain type of plastics, are recovered with high level of purity using electromagnetic, centrifugal and gravity separation techniques. recovered materials are used in manufacturing of new products  
• Hazardous substances are recovered and destroyed through thermal or chemical process  
• Part of the e-waste collected for recycling in Japan is also exported to other countries |
| **USA** | • Permanent drop-off at municipal solid waste collection site  
• Special drop-off events that take place at retail stores  
• Curbside collection  
• Take-back and point-of-purchase collection model  
• Computer manufacturers have established ‘take-back’ collection system to collect e-waste. IBM, Dell, HP, and other manufacturers collect end of life computer and related products regardless of the brand. | • EPR2** encourages the recycling and reuse of diverse electronic equipment  
• Collected equipment divided in to two categories, reusable and recyclable  
• E-waste is sorted for three markets based on their economic value:  
  ▪ Equipment in first market is refurbished and are sold or donated to secondary users  
  ▪ The second market is for components that can be reclaimed, resold, and reused  
  ▪ Third market is for salvaged and recycled material  
• US is not a signatory to the Basel Convention and therefore the export of e-waste to developing countries is not illegal; increasing pressure from NGOs for USA to change this practice |

*EÅF: Swedish Association of Recycling Electronic Products  
**EPR2: Electronic Product Recovery and Recycling Project

**Table 10-3: Comparison of e-waste collection and recycling approaches**
10.7 RECYCLING STANDARDS

Most of the countries reviewed had established standards for monitoring and auditing existing ewaste recycling systems. A comparison of ewaste recycling standards in these countries is summarised below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>Regular control and monitoring system at every stage of ewaste recycling. Multiple level of independent control to check free riding and pilferage. Control on illegal import and export of ewaste. External auditors, mandated by the producer responsibility organisations, carry out at least one audit of each recycler. The third party auditors ensure greater transparency in the term of the quality of recycling.</td>
</tr>
<tr>
<td>Sweden</td>
<td>Must meet the WEEE Directive requirements</td>
</tr>
<tr>
<td>Japan</td>
<td>Adopted the RSR* and ‘RSR etc’ to evaluate the recycling of ewaste. Manifest system</td>
</tr>
<tr>
<td></td>
<td>Ticketing or voucher system for monitoring and tracking of end-of-life products.</td>
</tr>
<tr>
<td>South Korea</td>
<td>Illegal ewaste dumping is monitored by citizens groups (‘ssu-parazzi’), which receive monetary rewards for reporting cases of illegal dumping</td>
</tr>
<tr>
<td>Ireland</td>
<td>Independent audit for the environmental management costs; must meet the WEEE Directive requirements</td>
</tr>
<tr>
<td>USA</td>
<td>The US EPA has Responsible Recycling Practices (R2), a set of standards, for ewaste recyclers. The new certification system imposes ban on landfill-disposal or burning of certain materials.</td>
</tr>
</tbody>
</table>

*RSR=Recycling Standard Rates

Table 10-4: Comparison of ewaste recycling standards

10.8 EWASTE FUNDING

Funding is a major concern in the recycling of ewaste. As there is a net cost in responsibly recycling ewaste, each country must find a funding mechanism to cover these costs. Most have elected for product stewardship schemes where the producer (or importer) is financially responsible for covering their share of the costs of recycling (irrespective of brand). Some countries have an explicit ‘advance disposal fee’ added to the price of new products to cover recycling costs. The methods used by the countries we have reviewed for this report are summarised in Table 10-5.

<table>
<thead>
<tr>
<th>Country</th>
<th>Financer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>Producer (CPR)*</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Consumer (ARF)**</td>
</tr>
<tr>
<td>Ireland</td>
<td>Producer</td>
</tr>
<tr>
<td>Japan</td>
<td>Consumers***</td>
</tr>
<tr>
<td>Taiwan</td>
<td>Producer</td>
</tr>
<tr>
<td>South Korea</td>
<td>Producer****</td>
</tr>
<tr>
<td>California (USA)</td>
<td>Consumer (ARF)</td>
</tr>
<tr>
<td>Maine(USA)</td>
<td>Producer</td>
</tr>
<tr>
<td>Maryland (USA)</td>
<td>Producer &amp; government</td>
</tr>
</tbody>
</table>

* CPR = Collective Producer Responsibility  
** ARF = advance recycling fees  
*** In Japan consumers pay the recycling fee when they return the used electronic product to collection centres.  
**** In South Korea, if local governments collect the ewaste, consumers are required to pay the collection cost through a sticker system.

Table 10-5: Comparison of ewaste funding responsibilities
The concept of eResponsibility relies on all stakeholders in the supply chain, from producer to consumer, sharing responsibility for the costs of collection and recycling. The most common approach involves consumers bearing the cost of taking their ewaste to local collection centres, which in turn are at least partly supported by local government. Producers then cover the cost of transport from the collection centres to recycling facilities as well as recycling costs. A comparison of how these costs are shared amongst stakeholders in the countries we have reviewed are summarised below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Consumer</th>
<th>Local government</th>
<th>Producer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Collection cost</td>
<td>Recycling cost</td>
<td>Collection cost</td>
</tr>
<tr>
<td>Sweden</td>
<td>No cost</td>
<td>No cost</td>
<td>Total cost</td>
</tr>
<tr>
<td>Switzerland</td>
<td>Bear the final financial responsibility through the advance recycling fee (ARF) on new product purchases*</td>
<td>No cost</td>
<td>No cost</td>
</tr>
<tr>
<td>Ireland</td>
<td>Retailers required to show ‘environmental management fee’ separately on invoices for all new product purchases.**</td>
<td>Total cost</td>
<td>No cost</td>
</tr>
<tr>
<td>Japan</td>
<td>Total cost</td>
<td>Partial cost</td>
<td>Illegal-dumping collection cost</td>
</tr>
<tr>
<td>South Korea</td>
<td>No cost if buying new replacement item. Otherwise fee paid.</td>
<td>No cost</td>
<td>Illegal-dumping collection cost</td>
</tr>
<tr>
<td>California, USA</td>
<td>Bear the final financial responsibility through the advance recycling fee on new product purchases</td>
<td>No cost</td>
<td>No cost</td>
</tr>
<tr>
<td>Maine, USA</td>
<td>No cost</td>
<td>No cost</td>
<td>No cost</td>
</tr>
</tbody>
</table>

*In Switzerland consumers do not directly bear the cost of collection and recycling of ewaste. However, when consumers buy electrical products, they pay an advance recycling fee which is used to pay for the collection, transport and recycling of future ewaste.

** In Ireland, the ewaste recycling system is handled by two companies (WEEE Ireland and European Recycling Platform) which are financed by the system of Environment Management Cost. This cost is the part of the price that the consumer pays at point of sale.

Table 10-6: Comparison of cost sharing amongst stakeholders

91 China Corners Rare Metals Market, Industry Week, 15 November 2009 www.industryweek.com/articles/china_corners_rare_metals_market_20433.aspx


96 Background on universal waste and DTSC regulations, www.cawrecycles.org/issues/ca_e-waste/dtsc_background

11. Towards product stewardship in New Zealand

11.1 KEY POINTS

- Ewaste product stewardship schemes that are voluntary are not durable and have not succeeded anywhere in the world.
- The focused ‘co-regulatory’ approach to be adopted in Australia to ensure compliance and action by free-riders is a good compromise between the heavy-handed regulatory regime in some other countries and New Zealand’s current ‘no regulation’ voluntary approach.
- Industry participants in the IT/TV Product Stewardship Working Group feel let down by government in not addressing their free-rider concerns and are unwilling to commit further effort until government agrees to play its part.
- Existing supplier take-back schemes remain largely ineffective for everyone except large corporates.
- Leadership for product stewardship in Australia has come from the major brand suppliers of televisions and computer equipment.
- It makes sense for New Zealand to leverage this support from the major brand suppliers as most are represented in New Zealand.
- The establishment of a single industry Product Stewardship Organisation supported by NZICT and CEANZ ‘supplier’ members should be priority for New Zealand.
- Retailers can help promote good recycling practices by providing incentives for customers purchasing new equipment to dispose of their old equipment responsibly.
- Recyclers are reluctant to publish details of their recycling practices, citing commercial sensitivities; this will change once suppliers are meeting the costs of recycling, as they will demand transparency.
- Any scheme that relies on consumers paying at the time of disposal, such as the RCN e-cycle scheme, will not achieve the desired outcome in terms of diverting ewaste from landfills.
- An industry-wide product stewardship scheme has the advantage of addressing all ewaste, including historic and orphan products.
- The development of a joint Australia-New Zealand recycling standard is timely in supporting a future product stewardship scheme.
- The alignment of Customs tariff codes between Australia and New Zealand will reduce the costs of monitoring and compliance.
- There is support across the political spectrum in New Zealand for solutions to the ewaste problem.
- eDay has an important role to play in keeping the ewaste issue alive while ongoing collection facilities are established and product stewardship schemes implemented.

11.2 TOWARDS PRODUCT STEWARDSHIP

The Waste Minimisation Act (2008) encourages industries producing products that end up as waste to establish industry-led product stewardship organisations that would take responsibility for recycling or otherwise safely disposing of the waste when the products reach end-of-life. The legislation provides a framework for voluntary schemes, or in the event that these are not established, for the nomination of priority products where the government can prepare regulations to enforce compliance.

Our research has revealed that ewaste product stewardship schemes that are voluntary are not durable and have not succeeded anywhere in the world; all permanent solutions which recover and recycle significant volumes have required some degree of government intervention through intelligent regulation.

The focused ‘co-regulatory’ approach to be adopted in Australia to ensure compliance and action by free-riders seems a positive way forward, avoiding the heavy-handed approach of initiatives such as the WEEE Directive in Europe, while at the same time giving importers and suppliers the freedom to innovate and share responsibility for handling all ewaste. This includes effectively dealing with historic and orphan products.

Efforts were made some years ago by the IT/TV Working Group to develop product stewardship schemes for televisions and computer equipment.

11.3 IT/TV WORKING GROUP RESULTS

In September 2006, the Ministry for the Environment facilitated the establishment of the IT/TV Product Stewardship Scheme Working Group. The purpose of the working group was agreed as:

To propose an industry-supported, efficient, effective, nation-wide takeback solution that will minimise the environmental impact of end-of-life computers and home entertainment equipment.

The working group had just under one hundred representatives, including TV and IT suppliers,
distributors, retailers, recyclers and other interested parties, with around 20 – 30 people attending each monthly meeting.

The group agreed to limit the scope of the scheme initially to computer equipment and TVs, but recognised that this could be extended to include other product categories in the future.

**Products to be included:**
- Computer monitors – all types
- Computers – desktop units (central processing units)
- Computer accessories (keyboards, mice, power cords, speakers, web cams, external memory storage).
- Computer peripherals (personal scanners, printers, fax machines, multi function devices (MFDs). (Equipment that is portable and can be carried by a person).
- Television sets – all types
- Laptop/notebook computers

Simple classification: computer equipment and televisions.

**Suggestions for product categories to be considered at a later date:**
- Other home entertainment products – DVD players, video players, cameras, game boxes, audio equipment, home theatre, MP3s, set-top boxes, radios
- Other ‘brown goods’ such as microwaves, toasters, kettles.
- Photocopiers
- ‘Smart electronics’ (programmable electronics, such as whiteware with input & display screens that form part of an integrated system within a home or building).
- Other consumer electronics.

**Products NOT to be included:**
- Computers/electronics fixed in vehicles or other types of products not otherwise in scope.

**Key principles for an IT/TV product stewardship scheme were agreed as:**
1. Fair and equitable for all stakeholders.
2. Simple, comprehensive and accountable – all industry stakeholders able to understand the system and are clear about the goals and targets, users find the system convenient and accessible.
3. Follows the ‘least cost’ model to meet the goals of the product stewardship scheme and allows for competition (avoids monopolies).
4. Achievable – ensures that solutions/infrastructure are available before collection is begun and that the targets are able to be achieved.
5. Consistent and complies with environmental, health & safety and recycling standards.
6. The system and methodology must be flexible to be able to deal with a variety of products – historic, orphan and future products.
7. The scheme development must be timely – start now and keep going.
8. Shared responsibility across all stakeholders – including business, government and consumer and means more than just financial responsibility.
9. The product stewardship scheme will be supported by central government. This could be in the form of a clear regulatory framework, endorsement of products linked to government procurement decisions, enforcement, import licences and/or economic instruments to incentivise scheme membership.
10. Knowledge-supported approach – learn from good practice, do not reinvent the wheel.
11. The scheme must be independent of any one stakeholder or stakeholder group – for the wider good of the public and not unduly influenced by any one company.
12. The scheme must be able to account for exit/entry of businesses and products from the market and/or from the scheme to ensure a level playing field and compliance by new businesses.
13. The scheme must include education and awareness-raising of both industry and consumers.
14. The scheme should focus not only on disposal solutions, but improvements in the whole lifecycle, such as Design for Environment initiatives.

During the course of the Working Group meetings it became clear that consensus was emerging for the TV sector but there were quite different views between the major international computer brand suppliers and local New Zealand assemblers.
below marked with an *) as well as the Retailers Federation. Acer New Zealand
Farmers Trading Co
Foodstuffs New Zealand
L M Rankine Trading Co*
LG New Zealand
Melco Sales Ltd
Monaco Corporation* (Pioneer/Toshiba)
Panasonic New Zealand*
Philips New Zealand Ltd*
Progressive Enterprises
Radiola Corporation Ltd*
Samsung
Sharp Corporation Ltd*
Sony Australasia*
Uniden New Zealand
Warehouse New Zealand

Their scheme was modelled broadly on proposals by the Australian sector, but with some simplifications applied to reduce potential costs to industry. It involved a pre-market charge or levy (Advance Payment Levy) which is used to provide for the recycling costs on a rolling basis, i.e. levies collected now will apply to products being recycled now. The scheme would cover the recycling of all televisions, independent of brand, and including orphan products. The advance levy would be applied at the time of import, based on agreed Customs tariff codes. The levy would be collected by Customs and passed on to an industry product stewardship organisation (PSO), less any administration charges. At the time the proposal was advanced, Customs had not agreed to collect the levy, and subsequently indicated a reluctance to do so unless required by regulation.

An alternative suggested by the sector was for Customs to provide information on all imported televisions and the name of the importer, so that the PSO could take responsibility for collecting the levy. Any goods for re-export, e.g. to Pacific Island countries, would either be held in a bonded area (effectively outside the New Zealand border) and not attract the levy, or if imported and then re-exported, the party involved could claim a re-export credit. The group recommended a start-up levy of $30 for each television, with a $5 premium for non RoHS compliant equipment. It is probably worthwhile reviewing current imports to determine the level of non-compliant televisions; if all are now compliant this would be one less complication with Customs tariff codes.

The PSO would be responsible for awarding contracts to recyclers and for ensuring compliance to accepted recycling standards. It was undecided whether the best approach for New Zealand would be an open market competitive model, where recyclers compete with each other for end-of-life equipment or if a single recycler should be appointed based on a tender process for an agreed term. The former model suffers from the disadvantage of fragmenting what is already a small market (in global terms), while the latter would tend to create a monopoly.

A fundamental assumption made in the proposal was that government would regulate to ensure participation by all parties. When it became clear that the government had no plans to regulate, the TV industry representatives lost interest in any further development of this scheme (or any other for that matter).

The IT sub-group, including representatives from Canon, Hewlett Packard, IBM, Lenovo, Lexmark, Panasonic, Renaissance and Ingram-Micro, was assigned to develop a scheme for IT equipment and they produced a draft scheme in June 2008. As for televisions, the IT product stewardship scheme was designed to recognise all IT equipment imported into New Zealand regardless of brand or importer. All importers would be required to become registered participants in the scheme and would assume a financial obligation for funding the future ewaste stream. However, unlike the TV scheme where every importer contributes at the time of importing, the IT group suggested two funding mechanisms:

1. Branded Waste Arising Payment. Payable by major brand owners at the time of waste processing – contracted recyclers would invoice the brand owner for waste arising;
2. Advance Disposal Fee. Payable by local assemblers at the time of importation.

On 7 August 2008, the full IT/TV working group met for the 16th and final time. The TV scheme was welcomed and broadly supported, while the IT scheme was seriously challenged by representatives from local assemblers. They could not understand how the dual funding scheme with one group paying up front and the other on disposal met the first product stewardship principle of being ‘fair and equitable’. Those paying an advance disposal fee on import would be paying 100% of their share, as every item would be counted. But those paying on the waste arising model would only be paying for
equipment deposited with the contracted recycler. Any branded equipment dumped in landfills or disposed of through other channels would escape the fee. This would create a serious distortion in supplier incentives to promote recycling through the accredited scheme. There was no resolution to this dilemma at the meeting.

Just over a month later, on 25 September 2008, the Waste Minimisation Act 2008 came into force, providing an excellent legislative framework for product stewardship. But there were no accompanying regulations. An effort was made by the Ministry for the Environment to consult on priority products, which was understood at the time to be the first step towards the development of regulations for industries unwilling to pursue voluntary schemes. However, with the change of government in November 2008, the appetite for developing regulations appeared to be lost.

Now, almost three years later, no voluntary product stewardship schemes for electronic products have been developed, and we have been advised by representatives of the industries concerned that as there is no incentive, nor any legal requirement, for a product stewardship scheme, no-one is willing to commit any further effort.

In fact, some suppliers suggest there is a disincentive to develop a scheme. Not only would they face the cost of establishing the scheme and obtaining accreditation, they are then subject to compliance checking and potential fines for non-compliance. The concern about free-riders remains paramount. A recent NZICT meeting recorded its concerns about the problem of parallel importers, who, without regulation, would almost certainly escape paying a contribution to recover end-of-life recycling costs. Without an imperative to establish a product stewardship scheme, it simply does not make business sense.

11.4 SUPPLIER TAKE-BACK SCHEMES IN NEW ZEALAND

Dell claims to lead the industry by being the first to offer a free worldwide recycling programme for consumers. They also provide recycling of any brand of used computer or printer at no charge, with the purchase of a new Dell computer or printer. This equipment is recycled in an environmentally responsible manner using Dell’s stringent global recycling guidelines. In Australia, Dell customers can arrange the free collection of their old equipment by completing an online form, but it is not clear if this service is available in New Zealand.

HP offers recycling services to its small and medium business customers as well as individual customers. HP takes back and recycles end-of-life HP branded personal computers, printers, scanners, fax machines, monitors, handheld devices, batteries and associated external components. HP provides collection points for customers in six main centres – Auckland, Wellington, Christchurch, Hamilton, Palmerston North and Dunedin - to drop off used HP hardware products. Freight charges apply for collections in other centres.

IBM’s Global Asset Recovery Solutions provides reuse and recycling services for its corporate customers. Lenovo used to operate a take-back programme for businesses only to dispose of old computers and monitors and receive cash back for purchasing new computer equipment. However, there is no information about this scheme on the Lenovo website, which suggests the scheme may no longer be operational.

Apple has taken a strong position globally with environmentally-friendly recycling. Its environment report-card tracks the greenhouse impact of every product during its lifecycle. In the US, Apple has a comprehensive take-back recycling programme, but support in New Zealand is rather weak. Their website claims that New Zealand customers can properly recycle Apple-branded waste electronic equipment free of charge but the only information given about how to do this is a phone and email contact for Li Tong Recycle in Hong Kong.

These schemes are ineffective and largely irrelevant for individuals and small businesses. This is no different to what we found in 2006. It is quite a challenge to find details about these schemes on the respective company websites. The Dell scheme has progressed a little as it now offers free freight for the return of old equipment and the HP scheme does advertise its drop-off locations, although the details have not been updated for the last 10 months and at least one of the drop-off locations no longer exists. The Apple scheme is ridiculous.

Our conclusion is that the representatives of the major brand owners of computer equipment in New Zealand do not see recycling as a priority, despite the claims of their international masters, and as a result they will not make any efforts to implement a local product stewardship scheme until they are compelled to do so (either through government regulation or by direction from their international brand owners).
11.5 DEVELOPMENTS IN AUSTRALIA

In November 2009, all state, territory and federal environment ministers of the Environment Protection and Heritage Council (EPHC) agreed that TVs and computer products would be the first products to be regulated under the Product Stewardship Framework legislation which was approved by both houses of parliament in June 2011. At the same time that the legislation was introduced into Federal Parliament in March 2011, the Federal Government released a consultation paper on the proposed regulations for ewaste, including suggested recycling targets and penalties for free-riders.

The objective is to have both the legislation and the regulations for the National TV and Computers Product Stewardship Scheme in place by the end of the winter sitting of Parliament (June/July 2011). This will subsequently enable the Scheme and industry’s collection and recycling services to begin in most if not all capital cities by the end of 2011.

One of the strong incentives to ensure this timeframe is met is the digital switchover of TV broadcasts, which have already started in some areas of Australia. It is noteworthy that the Australian Government is proceeding with both the legislation and regulations for ewaste in parallel, and that there is widespread acceptance by the TV and computer suppliers of the need to participate in a product stewardship scheme, including accepting financial responsibility.

Leadership for the developments in Australia has come from the TV and IT sectors through the efforts of Product Stewardship Australia (PSA) for TVs, and the Australian Information Industry Association (AIIA) for IT equipment.

Another significant development in Australia is the planned merger of PSA and the Environmental Special Interest Group (ESIG) of the AIIA to create a single Product Stewardship Organisation (PSO). This was agreed in principle at a joint meeting in March 2011. ESIG includes representation from the largest IT suppliers in Australia and has had responsibility for the Byteback pilot programme in Victoria. We think there is a real opportunity for a similar collaborative approach in New Zealand from the Consumer Electronics Association (representing TV suppliers) and the computer suppliers who are members of NZICT.

Like Australia, New Zealand imports all its TVs and computer equipment, and not surprisingly both countries have the same supplier brands. In some cases, equipment for New Zealand is supplied from factories in Asia. In other cases equipment is supplied direct from factories in Asia. However in most cases that we have discovered to date, environment and recycling policies and programmes are primarily determined in Australia or by parent companies in the USA, Asia or Europe. Most New Zealand suppliers appear to have limited decision-making authority for end-of-life equipment and funding of national product stewardship programmes. We think this provides a strong case to press for appropriate alignment between Australian and New Zealand product stewardship initiatives. Some retail chains import product directly and not through a New Zealand based brand owner or distributor and this is why the focus on importers is important.

Further details about the development of product stewardship schemes in Australia were covered earlier in the chapter on ewaste recycling in Australia.

11.6 NZICT GROUP POSITION

The NZICT Group did not exist in 2006 and was therefore unable to play a role in the product stewardship discussions at the time. The absence of a strong New Zealand IT industry voice was certainly a factor contributing to the rather confused proposal that came forward from the IT sector in 2008. The proposal reflected the interests of the major brand suppliers, who in fairness were doing their best to achieve alignment with developments in Australia and in particular the Byteback scheme in which they were participating. However Australia has moved on, as recorded elsewhere in this report. And we now have a strong thriving industry organisation in the form of the NZICT Group. Representing over 300 companies in the ICT and hi-tech industries, NZICT has carved out a position of respect and now provides a strong voice on matters of common interest for a rather disparate and highly competitive industry. NZICT has identified four priorities:

1. Stimulate social and economic change through broadband connectivity;
2. Maximise ICT and hi-tech employment opportunities for young New Zealanders;
3. Support government productivity and innovation through clear communication of the roadmap and opportunities;
4. Build a sustainable high quality domestic ICT industry and grow the sector to be the largest export earner.

Unfortunately, it is not immediately obvious where
ewaste fits into these priorities, nor is it obvious where ewaste fits into NZICT’s proposed 10 leadership positions for 2011. A closer examination of the membership of NZICT perhaps explains why. Only six of the 300 members are directly involved in the supply of computer equipment:

- Dell
- Fuji Xerox
- Hewlett Packard
- IBM
- Lenovo
- Sharp Corporation of New Zealand

Our suggestion to NZICT is that an environmental sub-group be formed, similar to the Environment Special Interest Group (ESIG) in NZICT’s sister organisation in Australia, the AIIA (Australia Information Industry Association). NZICT members with a direct involvement in the supply of IT products could then be invited to be part of this sub-group.

Efforts would also need to be made to engage other IT brand owners and businesses involved in the import of IT equipment, as all would need to buy into any product stewardship scheme. A good start would be to engage the following 11 companies who are already part of AIIA’s ESIG and 5 of whom are also members of NZICT:

- Acer
- Apple
- Canon
- Dell*
- Epson
- Fuji Xerox*
- HP*
- IBM*
- Lenovo*
- Lexmark
- Toshiba

**NZICT should form an environmental special interest group.**

**CEANZ believes the product stewardship ball is now firmly in the Government’s court, and has been since the end of November 2007, when their draft scheme was tabled.**

Current members are as follows:

- Black Diamond Technologies Limited (Mitsubishi)
- LG Electronics Australia Pty Ltd
- Monaco Corporation (Pioneer/Toshiba)
- Panasonic New Zealand Ltd
- Philips New Zealand Ltd
- Radio Corporation Ltd (Samsung)
- Sharp Corporation of New Zealand Ltd
- Sky Television
- Sony Australasia Pty Ltd
- TV3 Network Services

A key focus is on ensuring that changes in technology are not inhibited by regulations that are out of date or standards that do not include the changes or newer technology. Current issues include product stewardship, the change to digital TV and energy efficiency requirements.

CEANZ played a lead role in the IT/TV product stewardship discussions in 2006-2008 and was instrumental in securing industry agreement on an outline product stewardship scheme for televisions (discussed elsewhere in this report). CEANZ believes the product stewardship ball is now firmly in the Government’s court, and has been since the end of November 2007, when their draft scheme was tabled. The scheme relies on government regulations to authorise Customs to collect an import levy and also to ensure compliance by all importers.

In November 2004, the Consumer Electronics Suppliers’ Association (CESA) in Australia formed Product Stewardship Australia Ltd (PSA), as a not-for-profit company to manage and promote the end-of-life disposal of TVs in an environmentally sound manner. PSA has actively lobbied for the introduction of national product stewardship schemes and is currently assisting the Australian government to introduce the necessary legislative and regulatory frameworks as part of a joint government-industry product stewardship implementation working group. PSA membership includes companies that together account for 70% of all televisions imported into Australia (6 of these brand suppliers are represented on CEANZ*):

- Toshiba Australia Pty Ltd*
- Dick Smith Electronics Pty Ltd
- LG Electronics Australia Pty Ltd*
- Panasonic Australia Pty Ltd*
- TEAC Australia

**11.7 CONSUMER ELECTRONICS ASSOCIATION NEW ZEALAND (CEANZ)**

CEANZ is a trade association for companies who manufacture, import and supply consumer electronics such as television, audio visual and peripheral equipment. Members include brand owners as well as agents for brand owners. As an industry organization, CEANZ advocates and lobbies on issues that are in its members best interests.
Bush Australia Pty Ltd (Grundig, Bush)
HiSense Australia Pty Ltd
Hagemeyer Brands Australia Pty Ltd (JVC)
Sharp Corporation of Australia Pty Ltd*
Sony Australia Ltd*
Sanyo Oceania
Samsung*

The significant overlap of the major brand owners in both PSA and CEANZ suggests an opportunity for alignment and collaboration.

11.8 INDUSTRY SUPPLY CHANNELS

New Zealand suppliers typically import IT equipment and televisions directly from the place of manufacture, mainly in Asia, although in some cases equipment transits through parent organisations in Australia. Environment policies relating to the disposal of end-of-life equipment are typically promulgated by the brand owners, but implementation responsibility assigned to the individual countries. For small markets like New Zealand, this often means that the Australian-based suppliers have a strong influence on equipment disposal policies in New Zealand. This became very evident in the New Zealand IT/TV working group where major IT suppliers, IBM, Lenovo, Dell and HP were all represented by Australians.

We have been able to identify only a small number of New Zealand IT and TV suppliers who employ an environmental adviser.

Based on the close alignment of TV and IT products between Australia and New Zealand and the limited number of companies in New Zealand with dedicated waste minimisation or environmental staff, we have reached the conclusion that New Zealand suppliers should actively seek ways to align their approaches to product stewardship with their Australian counterparts.

11.9 THE RETAILERS

New Zealand IT and TV retailers have been somewhat reluctant to engage with ewaste. Their margins are tight and there is no flexibility to fund any of the costs of recycling. In 2008, one large retailer (Noel Leeming) did run a pilot take-back programme for computers and TVs working with recycler, RCN, but the costs and logistics were prohibitive and there is no evidence that this scheme has been continued.

Retailers also face a challenge in handling ewaste. It has been suggested to retailers that they place a shipping container outside their retail stores to collect ewaste, but this has been rejected both on the grounds of staff costs to supervise the packing of the container and that the spaces outside retail stores are typically not owned by the retailer but shared with a number of other stores.

Nevertheless, we do see retailers taking an active part in other countries. In the USA, nationwide chains including Target, Best Buy and Radio Shack all accept ewaste at their retail stores. There are charges for some ewaste but the stores typically provide a voucher for the same value to spend in their stores. There has also been controversy about at least one of these stores (Target) because they have been unwilling to disclose how the collected materials are being recycled.

Our conclusion is that retailers do have a role to play in helping to promote good recycling practice and helping where they can with incentives to encourage people to return their old equipment, but we also recognise that they have neither the funds nor the space (and probably not the skills required to safely handle ewaste) to provide ewaste drop-off points.

11.10 THE RECYCLERS

Like the retailers, the recyclers are part of the meat in the product stewardship sandwich. There are some materials of value in electronic waste. Some are inexpensive to extract; others are difficult and costly to extract and then there are the residual materials that have a negative value that someone has to pay to ensure they are safely recycled.

In 2006, we reported on a number of efforts by commercial recyclers and community recycling groups to tackle this challenge. For the most part the commercial efforts were experimental and the community efforts only addressing part of the problem. Most ewaste in 2006 was being exported to Australia or Singapore, where recycling processes were better developed, including the extraction of rare metals from circuit boards.

During the last five years we have seen increased interest from community recyclers. These recyclers have a history of recycling non-electronic materials such as paper, cardboard, glass and plastic, but little experience with electronic equipment. In 2006, Trash Palace in Porirua, Earthlink in Upper Hutt and the Abilities Group in Auckland were highlighted as examples of community organisations providing employment for people with disabilities while generating a small return from extracted materials (copper, plastics, metals) to help cover
their costs. Since 2006 we have seen other community groups such as Cargill Enterprises in Dunedin, Southland Disability Enterprises in Invercargill and St Vincent de Paul in Hawkes Bay start to tackle ewaste. The limitation of these enterprises was (and still is) that they are unable to provide a comprehensive recycling service, with the most hazardous materials such as the CRT tube typically ending up in landfills.

At the commercial end of the scale we have seen a number of new entrants joining the more established national and international players such as the RCN Group, Sims Recycling Solutions, and TES-AMM. They include Computer Recycling (Auckland), Recytech, Upcycle/CRTNZ, iTrecycler, PC Recycling (Palmerston North), Computer Recyclers (Tauranga) and E-Recycling.

There is little information in the public domain about the recycling practices of most of these organisations; their websites make bold claims about how they are recycling responsibly, but little if any information is presented about what and how they are recycling. Requests for details about recycling practices are generally met with a ‘commercially confidential’ response.

In the absence of any recycling standards, it is hard to be critical of community or commercial organisations attempting to address the ewaste challenge. It can be argued that it is better to do part of the job and extract some materials than dump all the ewaste in landfills. But there is perhaps a need for more honesty amongst ewaste recyclers. Those who are just cherry-picking the easy-to-get-at materials for profit and dumping the hazardous components are, in effect, shifting a cost to future generations who may well need to bear the cost of rubbish dump cleanups. We continue to bear the cost of the damage to our environment caused by our ancestors 50 years ago, who unwittingly dumped hazardous materials such as asbestos and lead into New Zealand landfills.

We challenge all recyclers to publish on their website details of their recycling processes and report exactly what happens to the ‘recycled’ materials.

When product stewardship schemes are operating and suppliers are funding the costs of recycling, there will be a new imperative for openness and trust. Recyclers need accreditation and this will only be given to those who can demonstrate practices that meet international standards. The remainder will need to redirect their energies to other recycling challenges.

11.11 RCN E-CYCLE

As part of the 2010 Waste Minimisation Funding round, the Government agreed to support a proposal submitted by the RCN Group, working in collaboration with the Community Recycling Network (CRN), to establish 20 permanent ewaste drop-off centres and two new recycling facilities in Wellington and Christchurch to complement the existing RCN facility in Auckland. While the Government has agreed to support some set-up costs, the sustainability of the scheme relies on consumers being willing to pay up to $20 per item to ensure their equipment is appropriately recycled. The survey of drivers participating in eDay 2010 revealed that 65% would not be willing to pay at the time of disposal, and even those who indicated a willingness to do this were not given any information about how much they might be expected to pay. (See Figure 11.1 on the next page.)

This finding is supported by overseas experience, in particular the 2009 study prepared for the Environment Protection and Heritage Council (EPHC) in Australia: Willingness to Pay for Ewaste Recycling.

There have also been a number of trials and pilot ewaste collection projects in New South Wales, Victoria and the Australian Capital Territory, where it has been clearly demonstrated that the presence of disposal fees has had a direct and negative impact on the rate of recycling. In simple terms, disposal fees reduce the recovery rate which undermines the fundamental environment goal of diverting ewaste from landfill and ensuring that resource recovery is viable and productive.

Any scheme that relies on consumers paying on disposal will simply not achieve the desired outcome in terms of diverting hazardous waste from landfills.

11.12 HISTORIC AND ORPHAN PRODUCTS

Our eDay 2010 brand survey indicated that 44% of
the waste dropped off was either unbranded or an obsolete brand. We believe that the national product stewardship scheme proposed for Australia addresses this issue without disadvantaging current suppliers; all suppliers contribute to the cost of recycling historic and orphan products based on current market share.

It is a model which has been proposed in Australia by the major TV and computer suppliers themselves and considered acceptable to relevant stakeholders including the Australian Government.

This has been a major stumbling block for the TV and IT industries in New Zealand, where individual brands have been understandably reluctant to put themselves at any competitive disadvantage without the support of government in ensuring a regulatory environment that guarantees a level playing field and avoids any free riders. Suppliers need to be confident that free-rider will not be allowed to escape their obligations and when it comes to issue of enforcement and penalties for non compliance, government regulation is viewed as the only way of achieving this.

11.13 RECYCLING STANDARDS

The other important complementary work that has just commenced is the development of a joint Australia-New Zealand standard for ewaste collection, transport and recycling. The first meeting took place in Sydney on 28 March. Standards will be important in awarding contracts to recyclers, as only those meeting the standard will be permitted to bid. Four New Zealanders have been appointed by Standards NZ to contribute to this work – Jonathon Hannon from the Zero Waste Academy at Massey University (and a trustee of the eDay Trust), Sandi Murray from the Auckland Regional Council, Trevor Munro from the Scrap Metal Recyclers Association and Helen Bolton from the Ministry for Environment. We understand that the Consumer Electronics Association and a representative from the RCN/CRN e-cycle initiative are also participating.

The Waste Management Institute of New Zealand (WasteMINZ) is currently working on producing a set of Health and Safety Guidelines for the solid waste and resource recovery sector. The first two sections covering relevant legislation and regulations as well as generic good practice and waste collection have been published for consultation. Other modules, including resource recovery parks and material recovery facilities, transfer stations and landfills are planned. It is not clear from the material published to date whether these modules will address the specific issues in transporting, handling and processing ewaste.

11.14 CUSTOM TARIFF CODES

The success of the product stewardship scheme
EWASTE IN NEW ZEALAND — FIVE YEARS ON

in Australia relies on a cost-effective and trusted method of providing reliable data on equipment volumes being imported into Australia. The PSO will use this data to apportion the costs of recycling amongst its members. A detailed comparison of the tariff codes proposed in Australia with those currently used in New Zealand is included in the Appendix. The tables below provide a summary:

11.14.1 Printers (HS Code 8443)

<table>
<thead>
<tr>
<th>Australia</th>
<th>New Zealand</th>
</tr>
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<tbody>
<tr>
<td>Customs code</td>
<td>Description</td>
</tr>
<tr>
<td>8443.32.00.71</td>
<td>Printers, inkjet</td>
</tr>
<tr>
<td>8443.32.00.72</td>
<td>Printers, dot matrix</td>
</tr>
<tr>
<td>8443.32.00.74</td>
<td>Printers, laser</td>
</tr>
<tr>
<td>8443.32.00.61</td>
<td>Multifunction device, ink jet</td>
</tr>
<tr>
<td>8443.32.00.62</td>
<td>Multifunction device, dot matrix</td>
</tr>
<tr>
<td>8443.32.00.64</td>
<td>Multifunction device, laser</td>
</tr>
<tr>
<td>8443.31.15.00</td>
<td>MFDs, other</td>
</tr>
</tbody>
</table>

*Our interpretation of the more formal Customs classifications

Table 11-1: Customs tariff codes for printers (Australia – New Zealand)

11.14.2 Computers (HS Code 8471)

<table>
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<tr>
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<tr>
<td>Customs code</td>
<td>Description</td>
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<td>8471.30.00.20</td>
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<td>8471.41.00.27</td>
<td>Computer desktops</td>
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<td>8471.50.00.69</td>
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<tr>
<td>8471.50.00.67</td>
<td>Complete PCs with display</td>
</tr>
</tbody>
</table>

*Our interpretation of the more formal Customs classifications

Table 11-2: Customs tariff codes for computers (Australia – New Zealand)

11.14.3 Televisions & monitors (HS Code 8528)

<table>
<thead>
<tr>
<th>Australia</th>
<th>New Zealand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customs code</td>
<td>Description</td>
</tr>
<tr>
<td>8528.72.00/8528.73.00.35</td>
<td>Televisions, colour Televisions, B&amp;W</td>
</tr>
<tr>
<td>8528.51.00.32</td>
<td>Computer monitors (flat panel)</td>
</tr>
<tr>
<td>8528.41.00.10</td>
<td>Computer monitors (CRT)</td>
</tr>
<tr>
<td>8528.51.00.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Our interpretation of the more formal Customs classifications

Table 11-3: Customs tariff codes for televisions & monitors (Australia – New Zealand)
For the purpose of assessing market share, it may not be necessary to gather data at the level of detail suggested in the table above. Aggregation at the HS code level may be adequate.

**11.15 THE POLITICAL ENVIRONMENT**

2011 is an election year for New Zealand. It is unlikely that the ewaste issue will make it to the election ‘hot issue’ list. Nevertheless, eDay has enjoyed strong political support from all parties, with Ministers and government MPs as well as opposition MPs and local authority mayors and councillors taking an active part at each eDay for the last four years. MPs Nicky Wagner (National) and Charles Chauvel (Labour) have also been playing an important role in keeping the issue alive in Parliament by directing questions about eDay and the disposal of ewaste to the Minister for the Environment, the Hon Dr Nick Smith.

In 2010, eDay enjoyed the unprecedented support of Dr Smith, who despite the eDay bid for Waste Minimisation funding being turned down, announced in Parliament that eDay simply had to proceed. He explained that there was too much community goodwill in supporting eDay to just drop the annual collection event. He personally supported eDay by participating in the collection event in Nelson, in his electorate. At the same time he made it clear that he wanted to transition from the one-day eDay collection event towards an ‘every day’ solution, supported by industry. He expressed the hope that the RCN/CRN user-pays scheme would provide a long term solution and that further eDays might not be necessary.

The National ‘Blue-Greens’ group led by Christchurch MP, Nicky Wagner, has turned out in force to support local eDay events throughout the country.

In the previous Labour Government, the Minister for the Environment, the Hon Trevor Mallard, supported eDay by officiating at the launch and by organising a local community collection with his van.

The co-leader of the Greens, Russel Norman, MP, has also demonstrated his support by attending the Wellington collection event.

Local body politicians have also provided strong support for the event with local mayors and councillors attending most of eDay sites. Some just come for the photo opportunity, but others turn up ready to work by directing traffic, helping with the surveys or unloading equipment from cars.

While it is clear that there is strong cross-party political support for the annual eDay event, it is less clear how much political will there is to follow through on the Waste Minimisation legislation and insist on product stewardship schemes for electronic goods. The Government’s preference for voluntary schemes is understandable, as this eliminates the need for (and cost of) regulations. But as we have explained in other sections of this report, the industry has failed to progress a scheme during the last three years and continues to use the lack of government support as a reason for not even considering a scheme. Faced with this clear market failure, government must intervene and create the right incentives for industry to participate.

**11.16 ROLE OF EDAY**

eDay is essentially about public awareness raising – to alert communities to the potential threats to our environment of inappropriate disposal of computer equipment and also of the opportunities for recovering valuable materials through good recycling practices.

eDay was introduced as a pilot project in Wellington in 2006 and subsequently expanded to a national programme in 2007. The number of centres participating has grown steadily to a total of 60, including one Pacific island country (Cook Islands) that participated in 2010.

At each eDay we make an effort to survey people dropping off equipment to understand their preferences for dealing with ewaste. Key findings from the 2010 survey (based on 10,000 surveys) were:

- Over 50% participated in eDay because they perceived this to be good for the environment.
- In the absence of eDay, 12% would have taken their ewaste to a recycling centre; 36% would have dumped in a landfill or put in the household rubbish.
- 25% have a TV set waiting for recycling.
- Only 35% indicated a willingness to pay on disposal and this is expected to be much lower when prices of $10-20 are mentioned.

eDay was introduced to plug a gap while product stewardship schemes were put in place. After five years little progress has been made in implementing widespread ewaste schemes. The eDay Trust believes that even when permanent ewaste collection centres are established there will be an ongoing need for a public awareness ‘reminder’ day for a number of years.

While some ewaste collection options are emerging in the larger centres, many of the smaller communities, especially in low socio-economic areas, still rely on an annual eDay collection event.
communities, especially in low socio-economic areas, still rely on an annual collection event.

The eDay Trust has submitted another bid to the Waste Minimisation Fund to secure support for another national eDay event to be held in November 2011. We were successful in 2010 only after Minister Nick Smith intervened to encourage us to continue with eDay until other options were in place. For eDay 2011, we are proposing to extend our collection model to include TV sets, to address the challenge New Zealand is facing over the next two years with the ‘Going Digital’ switch from analogue to digital TV programme.

We will be seeking matching support from industry and communities to meet the financial challenge. We will be approaching the major brand owners for funding support based on the brand mix of equipment collected in 2010. We see this as a significant step towards a product stewardship scheme fully funded by industry.

Our total budget for eDay 2011 is $2 million, of which we expect 35% ($700,000) to be funded through in-kind contributions. We will be seeking $200,000 in cash support from sponsors and have requested $860,000 from the Government through the Waste Minimisation Fund. We will also require up to $250,000 from brand owners to contribute towards the costs of recycling their branded equipment based on the brand mix of equipment collected in 2010. We will develop a more detailed brand mix based on the inclusion of TV sets and recognising the different costs associated with recycling different computer items. For example, recyclers are generally able to cover most if not all of the costs of recycling desktop and laptop computers from the sale of component materials, while printers, monitors and TV sets incur a net cost. The prices advertised by e-cycle are indicative:

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRT computer monitors</td>
<td>$14</td>
</tr>
<tr>
<td>CRT TVs</td>
<td>$20</td>
</tr>
<tr>
<td>LCD and plasma TVs</td>
<td>$20</td>
</tr>
<tr>
<td>LCD computer monitor</td>
<td>$6</td>
</tr>
<tr>
<td>PCs</td>
<td>$5</td>
</tr>
<tr>
<td>Printers</td>
<td>$11.50</td>
</tr>
<tr>
<td>Photocopiers</td>
<td>$46</td>
</tr>
<tr>
<td>DVD players, VCRs, stereo systems</td>
<td>$6</td>
</tr>
</tbody>
</table>

Table 11-4: Sample e-Cycle take-back prices (May 2011)

Figure 11-2 below summarises the brand mix of computer equipment collected in 2010, including PCs, monitors and printers.

Figure 11-2: eDay 2010 ewaste mix by major brand
A suggested set of principles for developing a collaborative industry product stewardship scheme are:

- New Zealand-wide implementation
- No free-riders
- Must include historic and orphan products
- Must be free to consumer at disposal

- Level of industry contribution towards costs to be based on market share (as measured by import statistics)
- Establish a single PSO for TVs and computer equipment
- Agree clear recycling targets and timeframes
- Agree recycling standards
- Recycling contracts only awarded to companies meeting recycling standards

**Stakeholders include but not limited to:** manufacturers, retailers, government (central and local), consumers, importers, assemblers, re-users (including ‘free-riders’).

**Accountable includes, but not limited to:** financial transparency (recognition), measurable objectives/targets and clear, open reporting.

**Occupational Health & Safety, Resource Management Act etc**

**Product Stewardship New Zealand, Televisions: the proposed advance fee scheme to fund recycling and recovery of televisions in the New Zealand market, Version 2, 30 November 2007.**

**An orphan product is any product that is already in the market but no longer has a manufacturer or importer that would take responsibility for recycling costs.**

**RoHS: Restrictions of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment. In 2007, it was envisaged that non-compliant sets would soon disappear once the penalty premium was applied.**

**The proposed scheme for recycling and recovery of information technology products in the New Zealand market, Version 3, June 2008**

**This is the basis on which the Byteback scheme in Victoria, Australia has worked for a number of years. Brand suppliers who are part of the scheme contribute to the costs based on their waste arising, while Environment Victoria pays all other costs. This has proved a costly option for the Victorian Government.**


**IBM Recycling in NZ: www-03.ibm.com/financing/nz/gars/tradein.html**

**Apple and the Environment www.apple.com/environment/reports/**

**Apple Recycling in New Zealand www.apple.com/recycling/nationalservices/asiapacific.html#new Zealand**

**NZICT: www.ict.org.nz/**

**CEANZ website www.ceanz.org.nz/index.html**

**Product Stewardship Australia, Organisation launched to manage TV recycling, Canberra, 3 November 2004.**


**One distributor has advised that its margin is only $20 on a desktop computer and there is no opportunity to contribute towards the cost of recycling.**

**David Pogue, Gadgets are garbage, Scientific American, May 2011, p.36**


**Trash Palace: www.trashpalace.co.nz/**

**Earthlink: www.earthlink.org.nz/**

**Abilities Group: www.abilities.co.nz/**

**Cargill Enterprises: www.cargillenterprises.co.nz/1.htm**

**Southland Disability Enterprises: http://www.sde.org.nz/index.html**

**St Vincent de Paul subsequently withdrew and the business was taken over by Frank Newrick, who rebranded as Ewaste Recycling Hawkes Bay.**

**RCN Group: www.rcn.co.nz/ewaste/**

**Sims Recycling Solutions: http://apac.simsrecycling.com/contacts-and-locations/new-zealand**


**Computer Recycling: www.computerrecycling.co.nz/**


**CRTNZ www.crtnz.co.nz/**

**IT Recycler www.itrecycler.co.nz/**

**Palmerston North PC Recycling www.recycle.co.nz/recycle.html**

**Computer Recyclers Tauranga www.computerrecyclers.co.nz/**

**E-Scrap Recycling www.escraprecycling.co.nz/**

**Toxic suburb? Residents told test results on site of**
old rubbish dump, Dominion Post 2 April 2011, p.1. The test found lead at a level of 7300mg/kg – nearly 10 times the guidelines for residential properties as well as arsenic and cadmium above safe levels. While computers could not have been responsible, as these materials were dumped 30 years before the computer was invented, lead, arsenic and cadmium are all present in computers and CRT screens.

135 WasteMINZ, Health and safety guidelines: for the solid waste and resource recovery sector, 11 April 2011. Feedback on the draft guidelines was requested to be submitted by 16 May 2011.


137 www.e-cycle.co.nz/price-list/
12. Roadmap for product stewardship in New Zealand

Given the current product stewardship developments in Australia, and the close relationship that New Zealand suppliers of IT and TV equipment have with their Australian counterparts, we believe that New Zealand has a unique opportunity to coat-tail on Australia and solve the ewaste problem permanently.

There is no need to replicate the work of the IT/TV Product Stewardship Working Group from 2006-2008; the principles and outcomes are well understood. The Australians are doing the heavy lifting in terms of developing a workable set of regulations; our job in New Zealand should be to simply scale the Australian solution to fit our market. Our suggested approach:

Step 1: Form an alliance of stakeholders to support the call for urgent action on computer and TV recycling through co-regulatory product stewardship

The alliance, to be called the ‘ewaste Alliance’, should initially include the major stakeholders in each of the following sectors – ewaste recycling, local government and green groups. The eDay Trust has already received strong support from local authorities for the eDay programme and although local green groups such as Greenpeace, World Wildlife Fund (WWF) and Forest and Bird have not been particularly vocal to date about the issue of ewaste, their counterparts in other countries have played a significant role in influencing public opinion and bringing pressure to bear on suppliers and governments to address the issue. We believe the major recyclers, including the evolving RCN e-Cycle network, will also welcome the development of a product stewardship scheme, as this will provide the necessary ongoing funding to sustain their business model.

The need for such an alliance comes from the widespread sense of frustration at the lack of progress by industry and government in agreeing on an industry and nationwide approach. We believe the time has come, after three years of inaction, to raise the profile of this issue and permanently solve the ewaste crisis in New Zealand.

Step 2: Secure a commitment from New Zealand TV and computer suppliers/importers to pursue a co-regulatory product stewardship approach for ewaste.

The industry has been somewhat reluctant to pursue the development of a product stewardship scheme, after feeling let down by government following the work of the IT/TV product stewardship working group in 2006-2008. Some industry representatives have made it quite clear that they will not invest any further effort until government agrees to regulate for free-riders, including parallel importers. The Australian experience has demonstrated that a commitment to product stewardship from industry is an essential component. It could be argued that industry took the lead in 2006-2008 and now it is government’s turn to respond with a commitment to regulate. However, given the passage of time and the change in government in 2008, we believe it is critical for industry to reaffirm its commitment to product stewardship.

Step 3: Secure a commitment from Government to support an industry-developed product stewardship scheme with the necessary regulations to ensure compliance by all suppliers/importers

We believe the co-regulatory approach being pursued in Australia is appropriate for New Zealand, especially because of the close alignment between the major brand suppliers in our two countries. These suppliers have been collaborating and lobbying for an industry-wide product stewardship scheme for nearly a decade. Having now persuaded the Australian Government to progress with regulations to ensure a level playing field, it could not be expected that New Zealand suppliers will agree to any scheme without the same level of commitment from government.

Even though the current government has expressed a firm preference for voluntary product stewardship schemes, we believe the weight of evidence presented in this report, especially the economic analysis, will be sufficient to convince the Minister that we are facing a clear situation of market failure and that if industry steps up to the mark to fund the costs of recycling ewaste, the least we can expect from government is some regulatory support to prevent free-riders or any other attempts by suppliers to escape their responsibilities as well as provide the necessary support by Customs to share data on electronic equipment imports.

We think a strong signal would be for government to strengthen its IT procurement policies to exclude suppliers who are not part of the industry PSO within an agreed timeframe. This would help to build confidence amongst suppliers that the government is serious about addressing the ewaste problem.
Step 4: New Zealand TV and computer suppliers/importers agree to form a Product Stewardship Organisation (PSO), the New Zealand Electronics Suppliers PSO (NZES PSO), and commit the necessary resources to develop a product stewardship scheme, supported by all members of the PSO. This should ideally be fully funded by the establishment members in proportion to their market share, based on the value of imports during the previous 12 months. However the costs involved in extracting trusted information on market shares could well exceed the total proposed budget and therefore a more expedient approach to sharing costs could be based on company turnover (similar to the way that NZICT levies it members). For example, companies with a turnover of $75m or more could be asked to contribute $10,000; companies with a turnover between $15m and $75m, $5000, and those below $15m, $1000. Alternatively the two major industry organisations – NZICT and CEANZ – may wish to contribute all or some of the budget.

There will naturally be some reticence amongst suppliers in committing resources to the development of a collaborative industry approach, given the failure of the IT/TV Working Group in...
2006-2008 to implement a workable scheme. This is where a government commitment (Step 3) will make the difference.

**Step 5: NZES PSO establishes a co-operative relationship with the Australian PSO**

Agreement was reached between AIIA and PSA on 22 March 2011 to establish a single PSO representing both television and computer equipment suppliers. The structure and form of this organisation is still evolving but indications are that there is considerable goodwill in engaging with New Zealand suppliers as the product stewardship scheme develops in Australia. Consideration was given to suggesting 'seventh state' recognition for New Zealand in addressing ewaste, with New Zealand suppliers simply signing up to become members of an Australasian PSO. However, advice from both sides of the Tasman indicates that the creation of a single legal entity across two sovereign states has many hidden complications. While this could be considered at some time in the future, at least for today the Australians are keen to focus on getting their own PSO up and running, without introducing any additional complications. Nevertheless, they have expressed a strong willingness to collaborate wherever possible and certainly share information and ideas. A formal co-operative relationship, expressed in the form of a memorandum of understanding, between the New Zealand and Australian PSOs would be a good first step.

**Step 6: The Government initiates a regulatory impact statement for ewaste, drawing on the recent work in Australia**

In 2009, PricewaterhouseCoopers was commissioned by the Australian Environment Protection and Heritage Council (EPHC) to prepare a Consultation Regulatory Impact Statement and prepare a Decision Regulatory Impact Statement for televisions and computers. The Consultation Statement was published in July 2009 and the Decision Statement in October 2009. This comprehensive review was sufficient to persuade the Australian Federal Government that there was a net benefit to the community from the development and implementation of regulations. In November 2009, the Minister for the Environment at the time, the Hon Peter Garrett, announced that agreement had been reached with the premiers of each state and industry to proceed with the development of a national approach to ewaste, including Federal regulation.

The process in New Zealand before any new government regulations can be introduced is similar, i.e. a regulatory impact statement is required to determine that there is a net community benefit before work on the regulations can commence.

We believe that the work carried out by PricewaterhouseCoopers (PwC) in Australia and the economic analysis prepared by NZIER as part of this report, is quite conclusive about the benefits, but we recognise that some further work may be required to quantify the economic benefit for a country with 20% population of Australia (and presumably only 20% of the ewaste). We recommend that NZIER or PwC be contracted to draw on our report for market sizing and review the assumptions used in the Australian work to reflect the New Zealand situation. Our isolation from ewaste processing facilities in Australia and Asia and the potentially higher transport costs is one factor that would need to be taken into account.

**Step 7: The Ministry of Economic Development commences work to align the Customs tariff codes used for televisions and computer equipment with the codes used in Australia**

The Customs tariff codes used in New Zealand for televisions and computer equipment differ, at the detailed level, from those used in Australia. If these codes are to be used as the basis for monitoring market share of imports (and hence the respective contributions of suppliers/importers in funding the product stewardship scheme), as is intended in Australia, then it is critical they be applied rigorously and consistently across all product codes. Suppliers must have confidence that the codes are being used consistently across all products of each type.

The codes used in New Zealand appear to have evolved over time as new products have been introduced. We understand that the Ministry of Economic Development is the only organisation empowered to review and amend codes. This work should commence as soon as possible to be ready for the introduction of the product stewardship scheme.

While it is not essential for New Zealand to use identical codes to those used in Australia, it would certainly simplify things a great deal for a future harmonised product stewardship scheme if products are classified in the same way.
Step 8: NZES PSO recognises the interim industry standard for ewaste recycling presented to the joint Standards Australia – Standards New Zealand ewaste working group

Standards New Zealand and Standards Australia recently established a joint working group to develop recycling standards for ewaste. Their first meeting was held in Sydney in March 2011. It is expected it will be up to two years before a standard is agreed. In the meantime suppliers in Australia have tabled an interim standard that they have proposed be adopted in the meantime.

We strongly suggest the New Zealand PSO also adopt this standard as an interim one. It could be applied immediately to review the practices of existing ewaste recyclers and help those who do not currently meet the standard to consider what actions they need to take before the product stewardship scheme is implemented. It is fully expected that only recyclers accredited to the agreed standard will be eligible to tender for ewaste processing funded under the product stewardship scheme.

Step 9: NZES PSO recognises and supports efforts in New Zealand to reduce the amount of ewaste being sent to landfills, including eDay and the RCN e-cycle initiative, while a product stewardship scheme is being developed

The Australian product stewardship journey has been a long one – almost seven years since Product Stewardship Australia was formed by the television suppliers, and there is still distance to go. It will be at least three years since the Peter Garrett announcement in November 2009 before a scheme is implemented with the necessary government regulations. New Zealand has one big advantage over Australia – it already has the legislative framework in place, but no work has been carried out on the scope of possible regulations. Australia is currently progressing both the legislative and regulatory frameworks in parallel and expects to have both in place by November 2011.

By coat-tailing on Australia, New Zealand may be able to shorten up this timeframe, but of course the two to three years is just the time it will take to reach the start of an ewaste product stewardship scheme. Australia expects it will then take at least five years to start directing 50% of its ewaste into a recycling channel and a further five years to reach the target of 80%.

It will be important therefore to continue to support current efforts, including eDay, the RCN e-cycle scheme and the other ewaste collection and processing initiatives. The focus should be on improving capabilities and recycling practices of these initiatives so that New Zealand develops a robust ewaste recycling industry that can compete with the big international players.

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140 PSA & CESA, Minister Garrett delivers e-waste solution & action, Joint media statement from Product Stewardship Australia (PSA) and the Consumer Electronics Suppliers Association (CESA), 5 November 2009.
A special feature of eDay 2010 was the inclusion of one Pacific Island country as part of the event. The Cook Islands had been making inquiries for some years about how New Zealand could assist with their e-waste, as they had increasing concerns about the risk to their environment of dumping e-waste. This was highlighted in a report prepared by Teariki Rongo in 2009. Other Pacific Islands had expressed a similar concern from time to time and a meeting of Pacific Island Ministers in Tonga in June 2010 endorsed a Framework for Action on ICT for Development in the Pacific (FAIDP) that formally recognised e-waste as a key issue for the region. The Ministers’ meeting asked the Secretariat for the Pacific Community (SPC) and the Secretariat of the Pacific Regional Environmental Programme (SPREP) to take the lead in addressing e-waste management in the region.

The support of the regional agencies was helpful but in the end it came down to a core team in Rarotonga “grabbing the ball and running with it”, with administrative and most funding support being provided by the eDay NZ Trust. Participation in eDay was offered to the Cook Islands on the same terms as communities around New Zealand, i.e. a local team to organise and manage the collection event, with eDay NZ taking responsibility for transport and recycling.

In the case of the Cook Islands, the transport dimension brought new challenges because of established protocols for the transborder movement of hazardous materials, including e-waste, between Pacific Island countries and New Zealand. Both the Cook Islands and New Zealand are signatories to the Waigani Convention, which bans the transboundary movement and management of hazardous wastes within the region.

eDay Cook Islands was held on 8 December 2010 and proved to be a huge success. A total of 41 tonnes of e-waste was collected at the Rarotonga based event, filling seven 20’ shipping containers and two additional pallets. This e-waste came from the island of Rarotonga only; in the future efforts will be made to collect from other islands as well. The eDay Trust took responsibility for arranging the necessary transborder movement document and securing the approval of the two governments. This involved the following steps:

1. Letter of endorsement from relevant PICT authority
2. Notification for transboundary movements/shipments of waste
3. Environmental contract between exporter and importer
4. Public liability insurance
5. Evidence of recycling
6. Permit for import
7. Container weights
8. Fumigation
9. Movement document for transboundary movements/shipments of waste
10. Customs clearance
11. MAF inspection
12. Recycling reporting

The inaugural meeting of Ministers of Energy, Information and Communication Technology (ICT) and Transport held in Noumea, New Caledonia in April 2011 endorsed a regional approach based on the eDay model. Other Pacific Island countries and territories (PICTs), including Tonga, Tuvalu and Vanuatu have already started to organize their own e-waste collection days.

The Cook Islands eDay project was able to secure in-country and regional sponsors as well as volunteers to cover most of the local costs for collecting and packing e-waste into shipping containers, but did not have the funds to transport or recycle the e-waste. The in-country costs for running eDay represent around one-third of the total costs. Up to NZ$2,000 per tonne of e-waste is required to cover the other costs, such as shipping and recycling. A breakdown of the costs for eDay Cook Islands is summarised in figure 13-1 on the next page.

When product stewardship schemes are in place, these costs will be covered by the equipment suppliers, but in the meantime PICTs will need to rely on aid support, as they simply don’t have the resources. It also seems appropriate for countries like Australia and New Zealand to step up and provide this assistance as most, if not all, of the electronic equipment in the PICTs would have come from Australia and New Zealand in the first place.

There is a strong interest in the Cook Islands in making eDay an annual event; the eDay committee reconvened in early May 2011 to start planning...
the next event, with the intention of including the outlying islands as well. Other Pacific Island countries have also started to collect ewaste and store it in containers, hoping that external funding support can be secured to cover the costs of shipping and recycling.

An approach has been made to NZAID to explore possibilities of funding support for future Pacific eDays. Two specific funding schemes appear to be relevant:

**Sustainable Development Fund (SDF)**

The guidelines for this fund describe sustainable development as:

Sustainable development is about working with partner countries to help them meet communities’ economic, social, and environmental needs today without compromising the ability of future generations to meet their own needs.

The SDF is open to registered, voluntary, not-for-profit non-government New Zealand-based organisations that are accredited to the SDF. The next funding round is expected to be open for applications after July 2011.

**State Sector Development Partnerships Fund (SSDPF).**

NZAID runs a scheme for providing funding assistance (generally $30,000 – $500,000) for New Zealand government agencies to support initiatives in Pacific Island countries. The scheme draws on expertise in government agencies that can be applied to assist Pacific Island countries; the fund effectively covers staff time and other costs relating to the project.

The two agencies with expertise that would be of value to PICTs in addressing ewaste issues are the Ministry of Economic Development (MED) and the Ministry for the Environment (MfE), that latter having already participated in a SSDPF scheme for scrap metal.

MED plays an important role in regulating and monitoring the trans-border movements of ewaste and for the Cook Islands eDay pilot, MED played a significant role in terms of professional assistance in ensuring compliance with the Waigani Convention. The Pacific Islands challenge is how to move the ewaste safely (and legally) from their countries to New Zealand or another country where the materials can be appropriately recycled. In order to achieve this, they need the level of support and expertise that MED provided for the Cook Islands pilot.

The challenge will be the reluctance of MED and MfE to release their already stretched staffing resources to provide this form of assistance.
141 Teariki Rongo, Report: To implement the electronic and electric waste (e-waste) project in the Cook Islands, National Environment Service, 2009.


144 Deyna Marsh, Robert Matheson, Maureen Hilyard and Pua Hunter, Report on eDay Cook Islands, 8 December 2010.


146 Secretariat of the Pacific Community, Communiqué, Inaugural Regional Meeting of Ministers of Energy, Information and Communication Technology (ICT) and Transport, Noumea New Caledonia, 4-8 April 2011, Annex 1, Item 9.

147 Including CITC, Ports Authority, Reef Shipping, Telecom, Computer Man.

148 Including SPREP and SPC.

149 For example, Tuvalu, Vanuatu and Kiribati.
14. Ewaste recycling standards and compliance

14.1 KEY POINTS

- The Ministry for the Environment has published useful guidelines for managing health, safety and environmental issues associated with the collection, re-use and recycling of ewaste.
- New Zealand is expected to increasingly align with international trends and divert all ewaste from landfills; this will bring into greater focus the need for agreed ewaste recycling standards.
- What has been considered to date as a threat to the environment from dumping ewaste is now shifting to an OSH issue for ewaste recyclers.
- Recyclers are not currently required to comply with any ewaste recycling standards, apart from those covered by general occupational, safety and health (OSH) legislation.
- The current decision by the Minister for the Environment, to not utilise the provisions of the Waste Minimisation Act to declare ewaste a priority product for mandatory product stewardship, is out of step with international precedent and public opinion in New Zealand.
- We have a serious information deficit when it comes to knowing exactly what is happening to our ewaste.
- It is highly debatable whether, as a whole, New Zealand is exercising the level of OSH and environmental responsibility in respect of ewaste that is expected by the public.
- A fresh look at the unit standard, qualification and training requirements for the ewaste recycling sector is needed, as ewaste was not on the radar when the current generic recycling industry training structures were developed.
- The initial commitment to develop a joint Australia/New Zealand standard for ewaste recycling is a positive move. This standard needs to be widely endorsed, empowered and embedded by government, the ewaste processing sector and the public as the universal minimum baseline.
- The real value of standards will only be apparent if they are authentically and universally applied and when that application is transparently verified by an independent, qualified third party.

14.2 OSH CONSIDERATIONS

14.2.1 Background:

When reflecting on the issues associated with the fundamental nature of ewaste and hence the requirement for appropriate occupational safety and health, the following quotes from the literature review on the environmental and health impacts of waste electrical and electronic equipment (ewaste – usually called ‘WEEE’ in Europe) undertaken by RMIT and the Centre for Design for the New Zealand Ministry for the Environment (MfE) provide a useful starting point.

- Electronic and electrical products have a significant impact on the environment when they are manufactured, when they are used and when they reach the end of their life and are discarded.
- Hazardous substances can be found in all groups of products, although their presence and identity are difficult to ascertain owing to the frequent lack of environmental product information sheets.
- Toxic and hazardous materials are present in IT and telecom products. The use of some toxic and hazardous materials in each unit is declining, but this is being offset by sales growth in these sectors and the introduction of new uses for toxic and hazardous materials (e.g. beryllium).
- There is a risk that toxic or hazardous materials present in IT and telecom products will be released to the environment during recycling, landfilling or incineration.

14.2.2 Mandatory approaches and drivers for compliance:

In the European Union (EU) context (27 member countries – population approx 500 million) the Waste Electrical and Electronic Equipment (WEEE) regulations are in force. These regulations are “designed to minimise the environmental impact of electronic and electrical goods, by increasing the collection, re-use, recycling and recovery of WEEE and reducing the amount going to landfill. This is producer responsibility’ legislation which means that producers are responsible for financing the collection, treatment and recovery of WEEE and retailers are obligated to take back WEEE from householders free of charge.”

Within the EU, concern about the consequences and impacts of landfilling and incineration of ewaste has resulted in the adoption of a mandatory approach to dealing with ewaste via the enactment of two key related EU Directives:

- Waste Electrical and Electronic Equipment (EU WEEE)
- Restriction of Hazardous Substances (EU RoHS)
These two directives oblige “industry and other stakeholders to play a more significant role in maximising the environmental performance of EEE while simultaneously reducing risk, toxicity and hazard impacts associated with WEEE.”

Time will tell whether the EU’s mandatory approach will achieve its intended purpose. In contrast New Zealand successive governments have held to a ‘voluntary only’ mantra in respect of ewaste. New Zealand’s Waste Minimisation Act (WMA: 2008) contains a mix of economic and policy instruments, including legislative and regulatory provision for product stewardship (PS).

14.2.3 Drivers for change in New Zealand – the Waste Minimisation Act (WMA:2008) and the policy and operation of the Ministry for the Environment (MfE):

The Ministry for the Environment website contains the following thumbnail outlining this hallmark piece of green legislation.

The Waste Minimisation Act 2008 encourages a reduction in the amount of waste we generate and dispose of in New Zealand and aims to lessen the environmental harm of waste. This Act also aims to benefit our economy by encouraging better use of materials throughout the product life cycle, promoting domestic reprocessing of recovered materials and providing more employment.

However, at this point the Minister has declined the option of declaring any ‘priority products’ (i.e. the trigger point, enabling the WMA provisions for a mandatory product stewardship (PS) approach to kick in). So while New Zealand generally shares the EU’s environmental aspiration, we are charting a different path to getting there. However, it is worth noting there are significant differences between a NZ and EU context (i.e. we only produce a limited amount of electronic goods locally and in effect we import the influence of RoHS via EEE imports).

In New Zealand context hazardous materials are covered by the Hazardous Substance and New Organisms (HSNO) Act 1996. The purpose of the act is to, “protect the environment and health and safety of people and communities by preventing or managing the adverse effects of hazardous substances and new organisms”. A substance is considered to be a hazardous substance’ when it has a level of hazard greater than the threshold(s) for one or more of the following intrinsic properties: 1-explosiveness, 2-flammability, 3-oxidising capacity, 4-corrosiveness, 5-toxicity, 6-ecotoxicity.

In New Zealand the Environmental Risk Management Authority (ERMA) is the government agency responsible for protecting the environment and the health and safety of people and communities by preventing or managing adverse effects of hazardous substances and new organisms, (specifically ERMA operates under the HSNO Act).

Given that it has been clearly identified that hazardous substances are embodied in many electronic and electrical equipment, a key question then is, once this electrical equipment has reached its end-of-life and hence becomes ewaste, is this material then considered a hazardous substance that comes under the jurisdiction of HSNO?

This designation is critical as if a substance comes under the jurisdiction of HSNO it both requires official approval and ‘controls’ are placed upon their use, so the risks of the substances can be safely managed. Controls are rules put in place to prevent or manage the adverse effects of hazardous substances. Examples include:

- Hazardous substances must be appropriately packaged and labelled
- People handling certain hazardous substances in the workplace must wear personal protective clothing
- Certain highly hazardous substances must be under the control of an ‘approved handler’.

So then, if ewaste were to be officially a hazardous substance under HSNO then, what is done, by whom and how this material is handled would be strictly controlled? The ERMA publication, Information Sheet #11: Manufactured Articles: Deciding when a substance which is part of a manufactured item is or is not covered by the HSNO Act provides the necessary guidance.

The definition of substance does not make any further reference to manufactured articles (sic beyond detonators, flares or fireworks) in the context of any other type of hazardous property. The implication of this is that manufactured articles containing or incorporating hazardous substances with properties other than explosiveness are not considered to be substances under the HSNO Act.

So, in spite of containing hazardous substances, ewaste as a manufactured article is not covered.
by HSNO and the mandatory provisions such as the requirement for staff associated with this material to, for example, hold ‘Approved Handlers’ certification **do not apply**. Whilst it is clear in respect of ewaste that HSNO is not New Zealand’s enforcement tool, other legislative provisions (Health and Safety in Employment Act 1992) and government departments provide coverage in respect of handling ewaste in a workplace context.

In the section of the Ministry for the Environment (MfE) website160 entitled Health and safety considerations when reusing or recycling WEEE it notes that the Department of Labour provides good practice information and guidance to help New Zealand businesses with health and safety in the workplace. This requires employers to take “all practicable steps” to ensure the safety of their employees while they are at work. The Department of Labour inspects workplaces to check on safety and health arrangements, investigate accidents at work, and ensure employers and employees comply with health and safety legislation. So, in as much as ewaste interacts with New Zealand workplaces, the OSH implications of its handling and treatment are covered by this legislative framing.

The Waste Management Institute of New Zealand (WasteMINZ) has been actively examining generic OSH issues associated with the recycling and waste management sector, of which ewaste is a subset. In 2006 WasteMINZ led the development of the *Health and Safety in the Waste Industry Strategy*,161 an industry-led attempt to significantly reduce accidents and deaths. In 2011, WasteMINZ is consulting with the industry as it develops health and safety guidelines for the solid waste and resource recovery sector. When completed, these information resources will provide guidance and leadership to help the ewaste sector move towards good practice in health and safety management. They will also help managers, supervisors and employees understand how to meet their legal obligations.

The Government has not yet fully enacted the provision in the WMA for mandatory product stewardship for any waste type. However, it has, via MfE’s policy and funding, exercised compulsion over the handling of ewaste recycling under its direct control.

For example, MfE drew on its own *Waste Electrical and Electronic Equipment (WEEE): Guidance for Collection, Reuse and Recycling*162 when specifying requirements of tender documents for the recycling phase of material collected in the 2010 eDay. The ‘standard’ applied in this tendering process ultimately determined which organisations processed material collected on the eDay, which was funded by the Waste Minimisation Fund (WMF). MfE’s e-resource provides a “step-by-step easy to use resource on proposed general standards and guidelines that should be adopted in managing health, safety and environmental issues, and where to get further information and advice.”

Also, as subsequently discussed, MfE has provided funding in support of a succession of eDay events and in 2010 funded (via the WMF) both eDay and a further hybrid private (RCN)/community (CRN) sector investment in a seminal national network collection and processing capacity. The RCN/CRN collaboration offers an ewaste recycling network based upon the ‘user pays’ model. The project report for this initiative has not yet been published, but project information can be found from various online sources.163 The Government’s immediate rationale for using the WMF in the context of ewaste has been stated124 as, “to support eDay 2010 to help co-ordinate collection and raise the profile of ewaste but also to fund a new initiative to ensure better recycling and processing of the waste.” The second grant of $400,000 is a joint venture between the RCN Group and the Community Recycling Network towards developing a nationwide network of 20 permanent depots for ewaste as well as recycling facilities in Auckland, Wellington and Christchurch. “We need to move beyond just eDay to a permanent solution for New Zealand’s electronic waste where we have the capacity to collect and recycle all year round,” Dr Smith said.”

These statements don’t really indicate what WMF funding strategy may be employed in further WMF funding rounds i.e. 2011 and beyond. The provision of information resources/guidance documents and the exercise of influence via funding selected ewaste collection and processing initiatives could be considered as precursor activities, intended to catalyse and/or act as a foundation for an eventual product stewardship scheme for ewaste in New Zealand. If this is the case, what further roles, direct or otherwise, the Minister and the work of the MfE will perform in engineering this outcome will emerge over time.

**14.2.4 Other ewaste-focused OSH information resources**

In 2007 as part of an ewaste recycling / research project, Dr Kirsten Olsen from the Centre for Ergonomics, Occupational Safety and Health (CErgOSH) at Massey University,165 was employed
to commence a literature review of OSH issues related to computer and television recycling. Early on, this work encountered the reality that there were very few publications that dealt with occupational health and safety issues related to recycling of computer waste. One reason for this could be that in this relatively new sector, improving environmental performance has taken precedence over health and safety matters.

At one level it appears the environmental argument has now largely been accepted. Internationally as well as locally, computer and TV waste has been recognised as an increasing problem because it contains hazardous materials which are toxic to the environment and human health. As a result of growing public awareness, there are now various government and private business interventions to better manage the computer waste problem.

Within New Zealand there is a growing proliferation of end-of-life ewaste recycling schemes. Our free market (some would argue dysfunctional and interventionist) approach has given us a disparate range of public and private sector ewaste recycling schemes. In terms of quality assurance and environmental performance, these operations range from international standard to what could be described as back-yard, off the radar. The latter organisations tend to cherry-pick items of value before sending residues – including toxic materials – to landfill. They may also contribute to the more global issue of rich countries exporting “an unknown quantity of ewaste to poor countries, where recycling techniques include burning and dissolution in strong acids with few measures to protect human health and the environment.”

The ewaste recycling services on offer in New Zealand are varying (according to technological propensity and market prices) combinations of refurbishment for re-use – through to export / local partial disassembly / recycling / treatment / disposal.

It is likely, because of overarching factors that, irrespective of government policy and timescale, New Zealand will broadly follow international trends and increasingly divert all forms of ewaste from landfill via recycling. Because of this, occupational safety and health considerations in the industry should be given increasing consideration.

14.2.5 Ewaste – OSH – New Zealand

Within New Zealand the OSH issues associated with ewaste can be examined along the following alternative viewpoints:

The ‘chain of custody’ from:

1. The consumer who had purchased and used the product (for example a TV or computer) until it reached the end of its life; to
2. the point of collection (which may for example be a drop-off centre or public collection event); to
3. the first stage disassembler/recycler (who may separate out the key components for sale); to finally
4. the final processor/refiner – whose industrial processes return the raw commodities in to a form ready for reincorporation into new products. In New Zealand’s case most of this final phase is undertaken via offshore export.

The ‘type of organisations involved’:

In New Zealand, it is possible to categorise the organisations involved in ewaste recycling along the following lines (albeit there is a certain degree of overlap):

1. **The scrap metal recycling industry** that purchases and handles all forms of metal (and some general recyclables). Because this sector has always handled items containing metal, to one degree or another they have always been involved in ewaste, which by definition is electrically powered and hence contains metal. As such, ewaste has become a recognised subset of scrap metal recycling industry activity.

2. **Dedicated ewaste recyclers.** In recent years a number of organisations have developed partial or complete ewaste recycling processes. These organisations often started out refurbishing for re-use. Latterly, as the value of computers has declined and re-use has been less of an option, they’ve also had to provide complete end-of-life operations. These commercial operators mostly charge to receive end-of-life equipment that with no re-use value.

3. **The community sector and small business operators.** There is a comprehensive network of community based, general recyclers spread around New Zealand. Many, including the large number of second hand shops and dealers, also handle ewaste. Many belong to the community recycling network (CRN). Because these enterprises operate out of recycling depots/drop-off centres, which can be in isolated rural areas, they have become logical places where ewaste gets ‘donated’ (dropped off) by the community. They often pass TVs and computers on to other dedicated recyclers. However, as the...
local skill base and market awareness among these organisations has grown, they may do some disassembling to extract the maximum value locally.

Looking across this spectrum it becomes clear that the potential scope and severity of OSH issues varies considerably. For example, at the point of collection and consignment, manual handling and ergonomic risks will predominate. Final processors are likely to face more complex issues stemming from shredding grinding machinery (i.e. noise and dust) and potentially dangerous chemical processes which extract precious metals.

Similarly the complexity of OSH issues will vary considerably – from the context of small community recycler storing and consigning a few units, through to a large networked scrap metal dealer handling and disassembling thousands of units per year. In the case of, for example, scrap metal businesses involved in ewaste, the Scrap Metal Recycling Association of New Zealand’s website\textsuperscript{106} notes that the scrap metal recycling industry in New Zealand is governed by the Second-hand Dealers & Pawnbrokers Act 2004. This act refers to copper, which is a common item of theft. What it does mean for ewaste processors is that members of the Scrap Metal Recycling Association are accustomed to having their activities monitored for compliance with the Act. This may not be the case for others in the ewaste recycling sector.

While the scrap metal fraternity may take issue with being lumped in with second hand dealers,\textsuperscript{109} this illustrates that the sector is already subject to significant regulation and scrutiny. Most scrap metal operations will also already be operating under a range of general environmental (i.e. discharge consents under the RMA) and OSH management systems. This point illustrates the value of having encompassing ewaste standards which clearly define what can and cannot happen along the entire chain of custody, irrespective of what type of organisation is involved or what form of recycling process is involved.

In Chapter 6.4 of the CANZ Trust’s 2006 eWaste in New Zealand report, the question of the environmental toxicity of ewaste in landfill was explored. This section highlighted:

- Three key principles: ‘precautionary’, ‘prevention is better than cure’ and ‘polluter pays’;
- a requirement for more research; and
- as outlined in figure 6, the “Environmental impacts of selected materials used in computer production.”

Five years on from this report, and in the context of some of the ‘further research’ that has been undertaken since then, we note some interesting insights:

**Foremost** must be the realisation that, in spite of the urgency, optimism and ideas contained in the 2006 report, New Zealand has by and large failed to create the envisaged national system of collection and environmentally appropriate treatment that would see ewaste diverted from landfill. Therefore, combining whatever the exact figure of computers and televisions that have, since 2006, ended up in landfill with whatever the exact environmental consequence of this action, provides us with the actual negative environmental heritage we have left for futures generations.\textsuperscript{170}

**Secondly** the nature of some of the problems described in the 2006 report has changed. Some of this change has – along the lines of ‘prevention is better than cure’ – been positive. For example, in 2003, the European Union enacted the ‘Restriction on Hazardous Substances’ Directive (RoHS - 2002/95/EC), limiting the concentrations in homogeneous electronic materials of lead, mercury, and chromium IV, polybrominated biphenyls and polybrominated diphenyl ethers to 1000 mg/kg, and cadmium to 100 mg/kg.\textsuperscript{173} While, RoHS, which took effect on 1 July 2006 and was required to be enforced and become law in each Eu member state, has been met with some resistance by manufacturers due to compliance costs and technical problems,\textsuperscript{172} there is no doubt that, because of this measure, future ewaste will be less toxic.

However, some changes have resulted in new problems being recognised. (NB: In part, this is also because of what we include under the term ewaste has broadened). Robinson’s paper, *E-waste: an assessment of global production and environmental impacts*,\textsuperscript{173} offers the following insight into the design-led changing nature of ewaste:

E-waste composition is changing with technological development and pressure on manufacturers from regulators and NGOs. The replacement of CRT monitors with LCD displays will reduce the concentration of Pb in E-waste, as each CRT tube contains some 2 kg Pb.\textsuperscript{174} However, LCD displays contain Hg\textsuperscript{175}, In, Sn and Zn\textsuperscript{176} (respectively: Mercury, Indium, Tin and Zinc). Similarly, fibre optics, which may replace some Cu wires,\textsuperscript{177} can contain F, Pb, Y and Zr (respectively: Copper, Fluorine, Lead, Yttrium and Zirconium). Rechargeable battery composition has also changed dramatically, from old Ni–Cd, to Ni metal hydrides, to Li ion batteries (respectively: Nickel, Cadmium and Lithium).
By way of summarising the broadening in our understanding of the potential environmental/OSH issues associated with ewaste since 2006, Robinson on-published the following table sourced from *Hazardous substances in e-waste: a knowledge base for the sustainable recycling of e-waste. (E-Waste: A Swiss E-Waste Guide; 2009).* Aside from the mention of PVC (i.e. cabling) and hexavalent chromium (mostly phased out), this includes and expands on the earlier information previously published as Table 6 – page 36 of the 2006 CANZ report. Along with the previous citation, this serves to illustrate how design, in combination with better research, is growing our understanding of what is at stake when choosing not (resulting environmental risks/costs) or conversely choosing to, (consequent OSH considerations) appropriately handle and recycle ewaste.

<table>
<thead>
<tr>
<th>Contaminant</th>
<th>Relationship with ewaste</th>
<th>Typical ewaste concentration (mg/kg)&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Annual global emission in ewaste (tons)&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polybrominated diphenyl ethers (PBDEs), polybrominated biphenyls (PBBs), tetrabromobisphenol-A (TBBPA)</td>
<td>Flame retardants</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polychlorinated biphenols (PCBs)</td>
<td>Condensers, transformers</td>
<td>14</td>
<td>280</td>
</tr>
<tr>
<td>Chlorofluorocarbon (CFC)</td>
<td>Cooling units, insulation foam</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polycyclic aromatic hydrocarbons (PAHs)</td>
<td>Product of combustion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polychlorinated aromatic hydrocarbons (PAAH)</td>
<td>Product of low-temperature combustion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs)</td>
<td>Product of low-temperature combustion of PVCs and other plastics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Americium (Am)</td>
<td>Smoke detectors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antimony</td>
<td>Flame retardants, plastics (Ernst et al, 2003)</td>
<td>1700</td>
<td>34,000</td>
</tr>
<tr>
<td>Arsenic (As)</td>
<td>Doping material for Si</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barium (Ba)</td>
<td>Getters in cathode ray tubes (CRTs)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beryllium (Be)</td>
<td>Silicon-controlled rectifiers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cadmium (Cd)</td>
<td>Batteries, toners, plastics</td>
<td>180</td>
<td>3600</td>
</tr>
<tr>
<td>Chromium (Cr)</td>
<td>Data tapes and floppy disks</td>
<td>9900</td>
<td>198,000</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>Wiring</td>
<td>41,000</td>
<td>820,000</td>
</tr>
<tr>
<td>Gallium (Ga)</td>
<td>Semiconductors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indium (In)</td>
<td>LCD displays</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>Solder (Kang &amp; Schoenung, 2005), CRTs, batteries</td>
<td>2900</td>
<td>58,000</td>
</tr>
<tr>
<td>Lithium (Li)</td>
<td>Batteries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>Fluorescent lamps, batteries, switches</td>
<td>0.68</td>
<td>13.6</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>Batteries</td>
<td>10,300</td>
<td>206,000</td>
</tr>
<tr>
<td>Selenium (Se)</td>
<td>Rectifiers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Silver (Ag)</td>
<td>Wiring, switches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tin (Sn)</td>
<td>Solder (Kang &amp; Schoenung, 2005), LCD screens</td>
<td>2400</td>
<td>48,000</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>5100</td>
<td>102,000</td>
<td></td>
</tr>
<tr>
<td>Rare earth elements</td>
<td>CRT screens</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 14-1: Potential environmental contaminants arising from ewaste disposal or recycling


<sup>a</sup> Morf et al, 2007

<sup>b</sup> Assuming a global ewaste production of 20 million tonnes per year.
**Thirdly, while unfortunately it must be noted that globally, “most Ewaste is currently landfilled”** and “of that which is collected, some 80% is exported to poor countries,” due to the increasing, NGO led, public scrutiny, the mass balance will increasingly in future, swing in favour of environmentally appropriate ewaste processing solutions. An instrumental, direct driver (in the EU context), and more broadly global political signal, has been the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC (linked closely with RoHS), which sets collection, recycling and recovery targets for electrical goods as part of a groundbreaking EU legislative initiative to solve the problem of huge amounts of toxic ewaste.

In practical terms the implications of this unfolding policy – in practice a paradigm shift – is that the full weight of what was considered a ‘potential’ threat to the environment will now shift into being 100% realised as an occupational, safety and health (OSH) issue for the ewaste recycling workers engaged with processing this enormous material flow.

In the following diagram Robinson explores the phenomena of ‘contaminant fluxes’ switching between environmental (incineration/landfill) to OSH (recycling/treatment) contexts or sinks, whilst usefully including broader consideration of consequent interactions can switch between developed country (high–tech recycling) vs poor country (low-tech recycling).

In managing ewaste, there is increasing awareness of occupation safety and health issues as well as threats to the environment.

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**Figure 14-1: Illustration of potential pathways via which ewaste contamination may trans-locate, resulting in differing environmental and human health outcomes**

In the conclusions to his paper, Robinson highlights the net outcome of allowing contamination fluxes to flood down to the lowest economic denominator. “Contamination associated with Ewaste has already caused considerable environmental degradation in poor countries and negatively affected the health of the people who live there. Cleansing of such large contaminated sites is probably unfeasible, since they have been heavily contaminated with numerous contaminants, many of which are poorly studied.” His section summarising the reported human health impacts in recipient poor communities make interesting, though extremely sobering reading.

Since 2006 a body of pre-emptive work has been undertaken, evidently in response to this emerging issue of ewaste workplace OSH. The previously-mentioned work by Olsen has been incorporated with other government initiated review/resources, such as the previously commissioned *A literature review on the environmental and health impacts of waste electrical and electronic equipment* by Dr R E Horne and J Gertsakis. Another is the recently released resource on the MfE website,
Waste electrical and electronic equipment (WEEE): guidance for collection, reuse and recycling. These guidelines provide any willing user with a step-by-step easy to use resource on proposed general standards and guidelines that should be adopted in managing health, safety and environmental issues (along with advice on where to get further information), when undertaking any form of ewaste recycling. Key sections are:

1. Guiding principles for managing and handling WEEE
2. Collecting, transporting and storing WEEE
3. Guidelines and recommendations for WEEE re-use and recycling operators
4. Re-use of EEE
5. Recycling WEEE
6. Exporting hazardous WEEE
7. Overview of other WEEE good practice guidance/advice and standards
8. Health and safety considerations when reusing or recycling WEEE
   - Health and safety advice for New Zealand businesses reusing or recycling WEEE
   - Health and safety considerations for all WEEE operators
   - Recommended health and safety good practice
   - Employer and employee responsibilities under the Health and Safety in Employment Act 1992
   - Working with overseas operators

This government-funded repository of information is in itself comprehensive, as well as acting as a portal to numerous other national (previously discussed – for example DoL, OSH, ACC) and international information sources.

The above sections of the guidelines differentiate issues stemming from the collection transport/consolidation functions (2 above) vs the re-use/recycling functions (3 above), as well as distinguishing advisory information including checklists relating to re-use (4), recycling (5) and export (6).

Usefully in its table 13, this resource summarises the main health and safety risks associated with the re-use and recycling of computer and TVs, which then leads to generic listing of recommended OSH practices. Tables 14 and 15 give an outline of employer and employee responsibilities in the New Zealand OSH legislative context.

The MfE’s web-based ewaste related information and guideline is a valuable centralised resource, which appears adequate for New Zealand’s current policy settings and state of ewaste sector development. The following are a number of key related issues that will need to be considered for the future of ewaste OSH in New Zealand.

14.2.6 Information dynamics:

As international ewaste processing systems and technologies are developed and are studied, our understanding of OSH issues will continually evolve. A recent example of emerging new information was jointly reported by Eco-systems and the National Institute for Research and Security (INRS) after conducting a study on the treatment of cathode ray tube screens (CRTs), to establish collective preventive measures. This study found that:

...the different stages of processing CRTs (including the dismantling of the apparatus used, the separation of the anti-implosion band, cleaning the tube and depollution) are the source of dust emissions and toxic compounds (lead, luminescent powder, barium, other metals) need to be both monitored and reduced. The document published by INRS and Eco-system only deals with the chemical hazards, one of the main risks in this sector.

It addresses applicable regulations and identifies the various stages of processing, combining work situations and risks for employees, offering solutions to reduce them. For example, it is clear that the process should focus on the work enclosure (containment of pollutants). Otherwise, dust and other pollutants must be received on or near their source. For measurements taken during the cleanup of the CRT, the booklet addresses the two types of processes used: the first is based on cutting the tube, the second on a grinding the whole item. In the latter case, the grinding must definitely be undertaken mechanically, and not manually.

It is not yet clear how important this specific new information may be for New Zealand. This is because it is not yet clear what, if any, nationally organised approach will be generated to deal with the CRTs. It is apparent that both on-shore and export options have been variously explored.

14.2.7 Relativity and cost

The following table, outlining the relative process elements and pros and cons of automatic vs hand disassembly of CRTs, serves to highlight how much OSH issues vary according to recycling methodology and associated equipment. There is no one size fits all approach to OSH for ewaste collection and
Under the New Zealand construct, any given organisation's OSH programme developed in response to the hazards identified must be tailored to its unique, location, infrastructure, processes and people. This makes ewaste OSH an expensive undertaking, over time likely to favour large players able to draw upon investment synergy and economies of scale.

<table>
<thead>
<tr>
<th>CRT processing options</th>
<th>Process outline</th>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
</table>
| Hand disassembly         | • Manually remove plastic casing  
                          • Depressurize tube  
                          • Remove and separate metals  
                          • Separate funnel from panel  
                          • Separate leaded panel from non-lead panel  
                          • Remove phosphors  | • Glass to glass recycling | • Very labour intensive  
                          • Worker safety and exposure potential  
                          • Limited markets for CRT glass recycling  
                          • Labour intensive, so expensive  
                          • Low overall throughput |
| Automatic processing     | • Load monitors onto conveyor belt  
                          • Shredding and processing in a controlled environment  
                          • Ferrous metals removal via magnets  
                          • Pulverizing and automatic separation of glass from plastics and non-ferrous metals  
                          • Eddy current separation of plastics and nonferrous  | • Labour cost friendly  
                          • Worker safety issues minimized  
                          • Controlled processing environment  
                          • Processing cost per unit is very low relative to hand disassembly  
                          • High overall throughput | • Glass to smelter  
                          • Recycling reduces value of glass |


Table 14-2: CRT processing options

14.2.8 Carrot and a stick?

In the New Zealand context, workplace OSH is dealt with via a carrot and stick approach. The OSH website\textsuperscript{190} notes: “Enforcement is used as a complement to other strategies such as engagement, education and enablement.” The Government’s numerous guidance resources and support opportunities represent incentives for compliance (carrots), while the HSE Act\textsuperscript{151} provides for the following enforcement interventions (sticks): written warnings by the inspector – improvement notices – suspension notices – prohibition notices – revocation of registration, certificated, exemptions and approvals – application for a compliance order from the Employment Relations Authority – infringement notices – prosecutions.

In respect of the latter, there have been a number of avoidable fatal and serious accidents associated with the waste and recycling industry (of which ewaste is a sub-sector), which have resulted in Department of Labour investigations and prosecutions. It remains to be seen, in the unique context of ewaste processing, whether this balance of the carrot and stick and stick approach will be sufficient.

New Zealand’s reluctance to more broadly apply the same balanced carrot and stick approach to the overarching issue of actually diverting ewaste from uncontrolled disposal either via landfill or via regulated (under the Basel Convention) and or unmonitored illegal export, is incongruous. In a pre WMA2008 report\textsuperscript{192} published in 2006, the New Zealand Parliamentary Commissioner for the Environment said it was concerned about:

...the Government’s apparent preference, reinforced by vocal sectors of society, for using voluntary
measures to manage contentious resource and environmental management issues...The weight of evidence suggests that, where a significant shift in public behaviour is needed, voluntary measures are not enough.

At this point the Minister for the Environment has decided not to use the provision in the WMA for mandatory product stewardship, via the declaration of ewaste as a ‘priority product’. This appears both out of step with international precedent and in direct conflict with public opinion. MfE’s own summary of consultation on this matter noted:

Most submitters saw the need for priorities to be established. Of products that should be made priorities, the most frequently mentioned were agricultural chemicals, waste oil, tyres, ewaste and packaging.

14.2.9 Exporting responsibility?
New Zealand, in maintaining the current voluntary-only approach, in effect, maintains the presiding economic competitiveness of two default pathways for ewaste material:

- Ewaste flows into landfill – the lowest cost disposal option (with quantified negative environmental impact).
- Ewaste flows to illegal export – the lowest cost processing pathway (which exports the negative environmental impact).

Robinson explores the outcome of this reality:

Re-use is ultimately the source of some Ewaste in many poor countries that accept donations of equipment considered obsolete in rich countries. Old yet functional electronic equipment is often shipped to developing countries by well-meaning donors in the West. Unscrupulous organisations in rich countries use donations of obsolete electronic equipment as a loop-hole in the Basel Convention to export both functioning and non-functioning electronic equipment. Brokers who arrange the export of functioning products often pad shipping containers with irreparable waste, which may account for up to 75% of deliveries. Most of this ends up in landfills and informal dumps. China receives some 70% of all exported ewaste, while significant quantities are also exported to India, Pakistan, Vietnam, the Philippines, Malaysia, Nigeria and Ghana, and possibly to Brazil and Mexico. Due to the semi-clandestine nature of these operations, the actual mass of Ewaste being exported is impossible to quantify.

The grey area between equipment for re-use and ewaste was the basis of the legal challenge brought against the eDay 2009 recycling partner in 2010. Robinson makes a good point – even working equipment shipped to countries without good recycling practices could be considered as exporting responsibility for its disposal. This point has also been made by Pacific Island countries. Well-meaning organisations in New Zealand often feel they are helping our Pacific Island neighbours by donating computer equipment for re-use, without any consideration of what might happen to the equipment when it reaches end of life.

14.2.10 Information deficit
Robinson’s final comment is salient for New Zealand. We simply have not exercised the ability (included in the WMA) to monitor and measure and as a result do not know, at an overarching level, what is happening with our ewaste. Both at a general and specific level, information deficits hamper policy development, its implementation, monitoring and compliance. For example, often exporters do not have the resources to constantly monitor ewaste to its final destination and must rely on the integrity of their international partners. This is where internationally agreed recycling practices and standards become important. In spite of (at one level) plenty of good quality guidance, in terms of quantifying the national big picture, there is a significant information deficit. Three years into its implementation, the central tenet in the rationale for the WMA:2008, i.e. to ensure adequate information in order to support appropriate management, has not been realised for ewaste.

WMA:2008 allows for “regulations to be made making it mandatory for certain groups (for example, landfill operators) to report on waste to landfill, where the $10/tonne waste levy is now being collected. The reality seems to be that that none of the relevant departments – New Zealand Customs, MED and MfE – are adequately resourced or equipped to monitor, or control what happens to ewaste. Where to from here – follow the leader? We are arguing in this report that a more assertive – less voluntary – approach is needed if we are to adequately deal with ewaste in New Zealand.

“Most submitters saw the need for priorities to be established. Of products that should be made priorities, the most frequently mentioned were agricultural chemicals, waste oil, tyres, ewaste and packaging.” (MfE website)

We don’t really know enough about what is happening to our ewaste
number of firms within the industry with frequent entry and exit) and behavioural (i.e. fierce price competition that exists between market participants) market characteristics of e-product retail markets.

The CANZ 2006 report, e-Waste in New Zealand, and the subsequent work\(^\text{102}\) of the ITTV product stewardship group, suggests that provided a ‘level playing field’ exists, there is a willingness by key industry stakeholders to participate in some form of organised national product stewardship scheme. Given the fact there is a strong ITTV brand correlation between New Zealand and Australia alongside the nature and progressiveness of Australian ewaste PS developments, indicates that, past positive industry sentiment is unlikely to have changed.

In Australia it was brand owners (via the eventual Product Stewardship Australia/Australian Information Industry Association alliance) which created a burning platform under this issue, leading to Australia’s adoption of a co-regulatory based national ewaste product stewardship programme (targeted for start-up in 2011). The disparity between the Australian and New Zealand governments’ respective willingness to co-regulate, now acts as direct barrier to leading international brand owners expressing, within New Zealand, the same level of e-responsibility they are proactively exercising in other markets.

NZIER’s systematic “will not work” opinion, in respect of New Zealand’s current ewaste policy setting, appears likely to apply to ewaste OSH as well. Because of the interaction of a range of complicating factors, it debatable that New Zealand as a whole, is exercising the level of OSH and environmental responsibility in terms of ewaste, that the public expects.

### 14.2.11 Ewaste OSH recommendation

New Zealand needs to follow the EU and Australian examples in establishing a more mandatory approach and framework for product stewardship for our ewaste, including OSH standards. As yet, an unused provision exists for this, in the WMA. There is widespread support for ewaste to be declared a ‘priority product’ under the WMA. There is also support for the Government to exercise leadership and balanced involvement alongside other stakeholders in developing a solution that would work in our unique New Zealand context. It is generally accepted that a mandatory (or as the Australians are proposing, aco-regulatory) approach is the best framework for ensuring all the necessary programme elements are delivered – such as cost effectiveness, quality assurance, fairness, high levels material capture, innovation, transparency/monitoring, maximisation resource efficiency and local economic benefit, minimisation of the risk of harm to the environmental and human health (and in respect of this section OSH compliance).

### 14.3 TRAINING FOR EWASTE WORKERS

The following indicators point to an increasing requirement for and recognition of the importance of appropriate ewaste training

- The ewaste guidelines published by the New Zealand Ministry for the Environment note the following recommendation for: “Specific training – Continuous employee training – management has a role to ensure each employee has a clear understanding of safety requirements, and that this is refreshed regularly.”
- The OECD Council recommendation on ‘environmentally sound management’ (ESM) of waste (2004 - amended in 2007, notes, among core performance elements\(^\text{103}\) that: “The facility should have an appropriate and adequate training programme for the personnel.”
- The Australian AIIA E-SIG/PSA interim industry standard\(^\text{206}\) for the collection, transport and recycling of end of life televisions and computers notes that: “All people involved in carrying out the identified activities shall be trained to a level of competence and their competence shall be assessed periodically in accordance with the severity of the risk.”\(^\text{206}\)

It appears clear that as more organised and environmentally responsible processes for handling ewaste develop around the world, a big step-up will be required in training. This appears justified given the fact the ‘ewaste recycling sector’ is rapidly emerging as a distinct entity within – what is the already well established general recycling / scrap metal recycling industry. What approach should ewaste training take?

In the UK context, ewaste treatment facilities typically provide some form of health and safety training for staff. Guidance produced by the Chartered Institute of Wastes Management and

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The New Zealand Government should align with the Australian co-regulatory approach, to ensure that leading international brandowners practice the same level of e-responsibility that they do in other markets.
National Household Hazardous Waste Forum notes: “…regarding training for staff coming into contact with hazardous waste (The Hazardous Waste Guide 3) states that: ‘The Environmental Permitting (England and Wales) Regulations 2007, the Pollution Prevention and Control (Scotland) Regulations 2000 and the Pollution Prevention and Control Regulations (Northern Ireland) 2003 require that operators of relevant waste activities are competent to hold an environmental permit.’ An important element of staff training is the technical competence of staff. Operators are required to demonstrate technical competence through an approved industry scheme.”

These WRAP-supported recommendations, then go on to describe a variety of UK based National Vocation Qualifications (NQVs) and Certificates of Technical Competence, which may have relevance to the context of ewaste training.

For example: “It is recommended that all on-site supervisors and operatives should hold a Level 2 NVQ which requires that they demonstrate competence in areas including H&S measures, emergency procedures and team working, (e.g. NVQ Waste Management Operations Level 2 or NVQ Recycling Operations).”

The New Zealand counterpart of the UK NVQs is our system of unit standard-based NZQA accredited; Limited Credit Programmes (LCP), National Certificates and Diplomas registered on the National Qualification Framework (NQF).

14.3.1 New Zealand recycling industry training – where does ewaste training fit?

New Zealand now has a comprehensive recycling industry training system, having started from a blank sheet of paper in 2004. In that year, NZQA/TEC awarded the Extractive Industry Training Organisation (EXITO) coverage for “waste metal recovery, resource recovery, waste management (excluding water), recycling, and zero waste industries.” This consists of 200 purpose-written unit standards and 20+ new recycling and waste qualifications now registered on the National Qualification Framework.

This development has been jointly led by EXITO and the formation of ‘Resource Recovery’ Strategic Advisory Group. The advisory group is made up of representatives from the Waste Management Institute of New Zealand (WasteMINZ), the Recycling Operators of New Zealand (RONZ), Scrap Metal Recycling Association of NZ, Community Recycling Network (CRN) and the Zero Waste Academy.

New Zealand now has a comprehensive suite of NZQA accredited structures covering all dimensions of the recycling and waste industry, namely: resource recovery operations, recycling, zero waste scrap metal, composting/vermin-culture, resource efficiency, solid waste disposal, hazardous waste – including, at a rudimentary level, ewaste (albeit via its designation as a hazardous/special waste).

Recently, given there has been so much movement in the regulatory (EU WEEE directive) and standards (commitment to a joint Aust/NZ ewaste standard – see below) space, we need to take a closer look at how well these existing educational structures cover where we are likely to be heading with ewaste in the future.

It is clear that, during the initial recycling industry training development phase, what constituted good practice in ewaste collection and processing was not yet on the radar. Nor was the full complexity of recycling ewaste well understood. We need to take a fresh look at what is necessary, based upon what we now know of international best ewaste recycling practices.

Additionally, now that New Zealand and Australia are committed to a joint ewaste standard, there is potentially real value if this same current shared/collaborative model could flow on into the development of specific ewaste industry training. Any such development would need to encompass three elements:

1. The necessary unit standards to encompass all the tasks involved in collection and processing of ewaste.
2. Relevant, nationally recognised qualification structures – made up of combinations of existing and new – compulsory and elective unit standards.
3. Then high quality user-friendly training programmes orientated to build capacity and competence for workers to achieve the qualifications.

We believe that from the outset the ewaste sector should commit to a formal unit standard – national qualification based approach. Advantages of this would include:

- Consistency and quality assurance for all parties (regulators, businesses, employees and the public).
- Fit for purpose outcomes from a model based on a thorough and consultative design process.
- NZQA training structures are subject to cyclical review so they maintain relevance over time and changes in technology and practice.

When industry training was first developed for the recycling industry, specific requirements for ewaste were not considered.
• NZQA training and assessment is subject to a requirement for formal independent moderation processes.

• The conceptual model (so-called ‘supermarket’ approach) underpinning (at least NZQA) industry training is fully flexible. This is important as, for example, it means specific unit standards may be incorporated into a range of diverse qualification options (i.e. an existing retail or transport or recycling or management qualification) on an as-required basis, with synergy – but without significant change. Equally, a dedicated new ewaste qualification might be created which used dedicated ewaste unit standards whilst also drawing upon, (general existing unit standards for example, customer service – information management – communication - H&S – transport – storage – etc) which cover relevant, but non-specific, workplace activities.

Once the background structures are established and registered on the National Qualification Framework, all subsequent training and assessment processes become eligible for standard government tertiary education funding, which makes everything much more cost effective for employers and employees.

14.3.2 Initial scoping of a potential approach to NZQA ewaste training:

As more New Zealand ewaste is diverted from landfill into standards-based ewaste recycling, employment opportunities and training needs will also grow. Because this will be an evolving process over time, a phased development approach is warranted.

The following two options have been explored for discussion purposes:

A. To immediately develop and pilot a named and dedicated introductory ‘ewaste handlers’ limited credit programme, using existing unit standards.

B. To begin consultation on the formation of a named and dedicated fit-for-purpose ewaste national certificate type qualification (see following excerpt for proposed design for a NC ewaste recyclers – L4 – C148) which will meet the needs of this sector into the future, across all levels of activity).

In reference to option A, a new limited credit programme could be requested and created rapidly. Training could be developed immediately and be up and running quickly. As a response measure the strategy would be analogous to the strategy for (and operation of) the draft AIA E-SIG/PSA interim ewaste standard, which has been put in place in Australia pending the development of the fully fledged joint Australia/NZ, ISO based, ewaste standard.

A proposed qualification design outline is given below. They incorporate suggested new ewaste unit standards and draw on other standards, for example, scrap metal and general recycling unit standards.

**OPTION A: DRAFT - INTRODUCTORY ‘EWASTE HANDLERS’ LIMITED CREDIT PROGRAMME**

Level two unit standards

- 22631 Demonstrate basic knowledge of classifications for recoverable resources and residual waste (5 credits).
- 23340 Describe a type of special hazardous waste and explain safe methods for its collection and storage (3 credits).
- 22675 Describe zero waste (2 credits)

Level three unit standards

- 24249 Sort plastics for recycling at a resource recovery facility (1 credit).
- 22649 Identify and separate ferrous metals for scrap metal recycling (5 credits)

**OPTION B: DRAFT - NATIONAL CERTIFICATE IN EWASTE RECYCLING**

Level two unit standards

- 22631 Demonstrate basic knowledge of classifications for recoverable resources and residual waste (5 credits).
- 23340 Describe a type of special hazardous waste and explain safe methods for its collection and storage (3 credits).
- 22675 Describe zero waste (2 credits)
- 24249 Sort plastics for recycling at a resource recovery facility (1 credit).
- 22649 Identify and separate ferrous metals for scrap metal recycling (5 credits)
• 22650 Identify and separate nonferrous metals received for processing at a scrap metal yard (12 credits).
• 1277 Communicate information in a specified workplace (3 credits)

Level three unit standards
• 23335 Receive and contain hazardous waste at a specified site (2 credits)
• 23341 Recover resources from hazardous waste and prepare the recovered hazardous resource for trade (6 credits).
• 23564 Demonstrate knowledge of health, safety, and environmental controls for handling solid waste (2 credits).
• 8081 Collect data for a specified purpose (8 credits).
• 22636 Relate the principles of environmental sustainability to resource recovery (6 credits).

Level 4 unit standards:
• 22617 Supervise customer service and operations in a drop-off area at a resource recovery facility (10 credits).
• 22622 Demonstrate knowledge of, and supervise, a resource recovery sorting process (8 credits).

Level 5 unit standards:
• xxxx5 Demonstrate knowledge of a relevant international standard or guideline for the collection and processing of end of life electronic goods (ewaste). (L5C20?)
• xxxx6 Apply relevant an international standard or guidelines for the collection and processing of end of life electronic goods (ewaste) in a work place. (L5C20?)

Total credit value of possible National Certificate Ewaste Recycling - 148 credits - Level 4?

NB: where a question mark ? has been designated, the level and credit values are only examples offered as a prompt for further discussion.

Training for worker health and safety and environmental quality assurance in the ewaste recycling sector is an immediate need and a need that will only grow over time. The recycling sector is now seeing significant and growing government and private sector investment, partly driven by waste levy funding. So far, however, little of the investment has been applied to human capital, which underwrites everything the recycling sector seeks to achieve.

The recycling industry (including the ewaste sector) is a diverse and knowledge-rich industry, populated by a passionate ‘green-collar’ workforce whose true economic and environmental value is yet to be fully recognised. The recycling industry’s environmental services are increasingly being recognised as being of critical importance in the management and conservation of energy, emissions, water and scarce physical resources. Hence these services are fundamental to New Zealand’s aspiration for improved sustainability. The industry merits significant and long term investment, especially in education and training for its human capital.

New Zealand has a comprehensive suite of recently developed recycling industry unit standards and qualifications registered on the National Qualifications Framework. However, there is a glaring omission in coverage in respect of ewaste collection, handling, processing, data management, etc. Whilst New Zealand is still in the early stages of adequately fronting up to our responsibilities, in terms of ewaste, looking forward, there are strong indicators that eResponsibility will shift from the periphery to becoming a mainstream expectation and normative activity. As this transition into e-responsibility gains momentum there is mass balance shift in risk from, one to the environment (uncontrolled disposal) to the ewaste recycling workplace.

Appropriate training is one of the key risk mitigation measures in dealing with hazardous materials. Ewaste falls outside the coverage of the Hazardous Substances and New Organisms Act, so any mandatory and standardised training needs will have to be tied to something else. In other countries, requirements for ewaste training have been included in regulatory framework and implementation measures associated with national product stewardship programmes. It seems logical that New Zealand should do the same.
14.3.3 Ewaste training recommendation
To cover the existing and future needs of the ewaste processing sector, New Zealand needs to start talking about additional dedicated ewaste unit standards and qualifications, and develop pre-moderated assessment and training programmes. This is likely to require additional resources and some form of mandatory requirement (flowing through to employer/employee certification of completion/competence). Given the collaboration already underway between Australia and New Zealand in developing a joint ewaste standard, and the similarity between respective industry training systems, it appears logical to expand this cooperation to training.

14.4 INTERNATIONAL STANDARDS
The International Organisation for Standardisation (ISO) is a global network that:
1. Identifies what international standards are required by business, government and society;
2. Develops them in partnership with the sectors that will put them to use;
3. Adopts them by transparent procedures based on national input; and
4. Delivers them to be implemented worldwide.
ISO is the world’s leading developer of international standards. A non-governmental organisation, it is a federation of the national standards bodies of over 150 countries. ISO standards:
- Ensure vital features such as quality, ecology, safety, economy, reliability, compatibility, interoperability, efficiency and effectiveness.
- Facilitate trade, spread knowledge, and share technological advances and good management practices.
- Specify the requirements for state-of-the-art products, services, processes, materials and systems, and for good conformity assessment, managerial and organisational practice.
- Are designed to be implemented worldwide.
- Distill an international consensus from the broadest possible base of stakeholder groups. Expert input comes from those closest to the needs for the standards and also to the results of implementing them.

Though voluntary, ISO standards are widely respected and accepted by public and private sectors internationally. ISO 9000 and ISO 14000 are among ISO’s most widely known standards. ISO 9000 and ISO 14000 standards are implemented by thousands of organisations in 161 countries. ISO 9000 has become an international reference for quality management requirements in business-to-business dealings, and ISO 14000 is well on the way to achieving as much, if not more, in enabling organisations to meet their environmental challenges.

Standards Australia: Standards Australia was established in 1922 and is recognised through a memorandum of understanding with the Commonwealth Government as the principal non-government standards development body in Australia.

Standards New Zealand (SNZ): The Standards New Zealand mission is: “To boost New Zealand’s economy and advance the well-being of New Zealanders through standards.” Standards play an important role in ensuring safety, prosperity, quality and convenience for all New Zealanders.

What are Standards? The definition offered by Standards New Zealand is that:
- Standards are specifications which define materials, methods, processes or practices.
- Standards provide a basis for determining consistent and acceptable minimum levels of quality, performance, safety and reliability. For example, the format of the credit cards that enables them to be used anywhere in the world is defined by an ISO International Standard.
- Standards are generally voluntary compliance documents and become mandatory only if called up in legislation or in contracts.

Aside from the official ISO approach to standards, the New Zealand MFE website (in the online Table 12) outlines and discusses good-practice guidelines, standards and accreditation schemes. “Good practice guidelines and advice – provide specific advice to a particular sector and are detailed about
how to design and operate to meet customer or legal requirements.

- “Standards tend to be stricter standards, which a company must be able to prove it meets through its operational processes.”

The MfE website is an excellent repository of information on international standards and guidelines. This contains two key sections:

- Guidelines and recommendation for WEEE reuse and recycling operators.
- Overview of other WEEE good practice guidance/advice and standards.

The first section identifies and explores generic information which applies in the context of ewaste. Namely: environmental, health and safety, and quality management systems (OECD and ISO:14001), insurance, business plan (WRAP treatment facility planning), legislative compliance (i.e. New Zealand employment, OSH, vehicle licensing and ‘second hand dealers’ law, the RMA and Basel Convention), staff training (NZQA recycling industry training via EXITO), disposal chain responsibilities (e.g. New Zealand Business Council for Sustainable Development (NZBCSD), Sony, Electronic Industry Code of Conduct (EICC) and HP), design of physical facilities (OECD - Technical guidelines for Environmentally Sound Management (ESM) of Specific Waste streams: Used and Scrap Personal Computers, WRAP resources and other source of information), health and safety risk assessments (OECD, ISO, International Precious Metals Institute (IMPI) and British Standard Occupational Health and Safety Standard (OHSAS-18001:2007), verification of processes and data collection (particularly in the context of re-use), information exchange programme (WRAP WEEE guides).

MfE’s second section provides the online ‘Table 12:’ which lists ‘Good practice guidelines/advice and standards’, reviewed for a New Zealand context. The table on the next page combines this with international information from Appendix 3 of the AIIA E-SIG/PSA - Draft Interim Industry Standard Standards.

What does this tell us? It shows that there is a comprehensive body of knowledge in wealthy countries on how ewaste should be correctly handled. Yet globally, most ewaste is still sent to landfill and 80% of collected ewaste is exported to poor countries. One might conclude that we are far better at talking about what we need to do, than actually getting on and doing it.

The following quotes from Pascal Leroy, secretary-general of the WEEE Forum and project manager of WEEELABEX (the ‘WEEE LABel of EXcellence’) illustrate the clear directive and no-nonsense approach undertaken in the EU and also the likely international influence of the EU’s work.

We expect authorities in Europe to acknowledge and provide support to the implementation of the standards.” and “But the standards will probably resonate globally as well. Operators in other parts of the world will likely wish to adhere to the same high level set of principles.

Creating and implementing standards anywhere contributes to a globally rising tide of quality assurance that eventually ‘lifts all boats’.

The WEEELABEX standard

In this vein the WEEELABEX standard seeks to “take the sustainable WEEE management business to the next level.” This standard has been developed by the WEEE Forum which is a European non-profit association speaking for 38 electrical and electronic equipment waste collection and recovery organisations. These organisations are alternatively referred to as ‘producer responsibility organisations’ (PROs) and ‘WEEE systems’. The WEEE Forum is the biggest organisation of its kind in the world. In 2010, its member organisations reported collection and proper de-pollution and recycling of more than two million tonnes of ewaste.

The WEEE Forum’s mission is to make WEEE systems a platform for co-operation as well as a set of standards and benchmarking tools, which in turn would help users optimise their operations. WEEELABEX has been the most important standardisation project, both in terms of financial resources and scope, run by the WEEE Forum. The project aims, on the one hand, to design a set of European standards re the collection, sorting, storage, transportation, preparation for re-use, treatment, processing and disposal of all kinds of WEEE. On the other hand, it provide a harmonised set of rules and procedures that can be used to verify conformity.

A further significant point regarding the inherent nature of standards is provided in the rationale for the publication of the WEEELABEX ‘Watchlist’, along with the standard itself.

Standards and normative documents can never be considered carved in stone for eternity.
9.0 of the WEEELABEX normative documents will not undergo modifications for a period of 18 months, i.e. until 1 October 2012. This ‘watchlist’ will be a tool to allow the WEEELABEX project management to prepare a review of the documents.” So standards need to be seen as a moving target, which is flexible and responsive to changes, such as in regulations and processing technology. Standards are also subject to interpretation, worldview

| International | United Nations Environmental Programme – UNEP x 2 |
|              | Organisation Economic Cooperation and Development – OECD x2 |
|              | Global e-Sustainability Initiative – GeSI & Electronic Industry Code of Conduct – EICC |
|              | International Standards Organisation – ISO |
| EU           | WEEELABEX version 9.0 |
|              | Institute for European Environmental Policy – IEEP |
|              | RAL (Quality-mark, De-manufacturing refrigerants) |
| UK           | Department of Business Enterprise and Reform |
|              | Department of Environment, Food and Rural Affairs – DEFRA |
|              | Waste Resource Action Programme – WRAP |
|              | Furniture Re-use Network – FRN |
|              | Industry Council for Electronic Equipment Recycling – ICER |
|              | Resource Futures (formerly known as SWAP) – REI |
| USA          | Environmental Protection Authority – EPA, multi-stakeholder (R2) |
|              | Maine Government |
|              | International Precious Metals Institute – IPMI |
|              | American Green Electronics Council, Electronic Products Environmental Assessment Tool – EPEAT |
| Canada       | Electronics Product Stewardship Canada |
| Australia    | Australian Council of Recyclers – ACOR |
|              | Australasian Cartridge Remanufacturers Association – ACRA |
|              | Blue Environment |
| New Zealand  | Ministry for the Environment |
|              | Auckland Regional Council – ARC & Scrap Metal Recycling Association, New Zealand – SMRANZ |
|              | Computer Access New Zealand – CANZ 212 |
| Corporate    | HP |
| NGO/industry association | Basel Action Network – BAN (e-stewards) |
|              | Basel Convention initiative - Partnership for Action on Computing Equipment – PACE. |
|              | International Association of Electronics Recyclers – IAER |
|              | Institute of Scrap Recycling Industries ISRI (RIOS) |

Table 14-3: Ewaste-related guidance
and are a highly and hotly contested space. The WEEE-LABEX standard is an example of a standard which has developed over time. Some standards such as the Basel Action Network’s (BAN) e-Stewards programme have been developed by the environmental NGOs which have been active in exposing ‘toxic export’ and ‘trashing’ of underdeveloped and hence, vulnerable economies.216

Other standards have been developed by ewaste processing industry associations as a way of distinguishing themselves to the public, regulators and their customers as quality assured processors who are above criticism. The ‘certified electronic recycler’ programme offer by the Institute of Scrap Recycling Industries (ISRI) is one such example, which combines the R2 and RIOS programmes.217 The following quotes218 illustrate these characteristics and aspirations.

Responsible Recycling (R2) Practices were developed over several years by a broad-based stakeholder group for the electronics recycling industry. Developed by the EPA, states, manufacturers, recyclers, trade groups, and NGOs, R2 is the de facto standard adopted by the industry to recognize quality, responsible recyclers”...

Designed for the recycling industry, the Recycling Industry Operating Standard (RIOS)® provides a framework for a comprehensive, integrated management system that includes key operational and continual improvement elements for quality, environmental and health and safety (QEH&S) performance.

Our R2/RIOS certification program is designed to be the blueprint for reputable companies that want to be recognized as a CERTIFIED ELECTRONICS RECYCLER® in today’s challenging marketplace. We are very proud to offer this premium standard for electronics recyclers throughout the world. ⏩ Robin Wiener, President, Institute of Scrap Recycling Industries, Inc.

The outcome of these contrasting viewpoints is illustrated in the Appendices. E-Steward’s self-published ‘factsheet’ (Appendix 5) highlights four key attributes that it believes makes its programme superior – restrictions covering export to developing countries and or prison recycling and incineration and land-filling and worker health and safety. The R2/RIOS factsheet in Appendix 6 similarly highlights the supposed benefit of one system when compared to another.

The high number of standards and guidelines that been published globally likely stems from a legitimate need for such resources to be locally appropriate.

This requirement has been part of the driver behind the decision to develop a joint Australian New Zealand ewaste recycling standard.

There appears, in a New Zealand context at least, that at this point there is ample published guidance for people and organisations on how to apply good practice in handling ewaste. The proposed joint Australia New Zealand ewaste standard only strengthens this information base.

New Zealand’s key challenge is not, however the good operators, but rather the backyard and outright illegal operators who, in the absence of a mandatory framework, flout the rules.

Good operators who adhere to recognised standards take on board the burden of additional costs. In certain circumstances this market penalty undermines their competitiveness and ultimately their financial ability to maintain innovation and ongoing compliance to standards. In adopting the current ‘hands off’ approach, the result for New Zealanders is twofold:

- In reality, there is no uniform baseline minimum ewaste standard operating to protect ewaste workers, the environment and sustain public confidence.
- The facilitation of an, in effect, ongoing market subsidy supporting substandard operators.

The current market settings in respect of ewaste in New Zealand are dysfunctional, lacking in fairness and actually, in effect, penalise good operators seeking to raise standards.

### 14.4.1 Standards recommendation

Standards without compliance have little value; the nearest analogy is the concept of ‘greenwashing’. New Zealand needs to find a way to engineer a uniform minimum standard of ewaste processing. This will ensure that points of differentiation among service providers are positive business attributes such as customer service, full cost price competitiveness and actual (independently accredited) quality assurance.

### 14.5 Joint Australia/New Zealand ewaste standard development

In late 2010 Standards New Zealand219 extended an invitation for interested parties to join a New Zealand/Australia standard committee which would collaborate with Standards Australia220 in formulating an ewaste recycling standard.

The proposed standard seeks to set guidelines for the collection, storage, transport and treatment of end of life televisions, computers and other electrical and electronic equipment.
The first meeting of the Standards committee on ewaste took place in Sydney on 28 March 2011. The committee comprises broad stakeholder representation from government, industry and interested parties to promote balanced views and consensus-based decision making. New Zealand’s representatives are:

- Helen Bolton – New Zealand Ministry for the Environment (MfE)
- Trevor Munroe – Scrap Metal Association of New Zealand (SMRANZ)
- John Thornhill and/or Sue Coutts – RCN/CRN e-Cycle collaboration
- Jonathon Hannon – eDay New Zealand Trust
- Sandi Murray – Auckland Regional Council

14.5.1 Project background:

The Australian Government proposes to introduce regulation and introduce a ‘National Television and Computer collection and Recycling Scheme’ in late 2011. An Australian & New Zealand Standard and associated certification programme is needed to provide guidance to those involved in recovery of ewaste and establish a benchmark to ensure:

- Industry members meet the required standard for occupational health and safety and environmental performance and;
- Provide a high level of transparency to the community, giving confidence that best practice in collection, handling, storage, transport and treatment is being achieved.

The project objectives are:

- Develop and publish Australian & New Zealand Standard by late 2012.
- Develop a standard which will allow a certification scheme to be set up by a certification body.
- Align with the:
  - Australian National Waste Policy: Less waste, more resources, which was agreed by all Australian environment ministers in November 2009.
  - New Zealand Waste Strategy 2010 ‘Reducing Harm, Improving Efficiency’ (NB: in both national contexts the standard is not trying to create something separate, but to align with the respective national policy directions)

The project scope is to cover ewaste as a generic term and not specific products. The following headings were agreed to be included in the standard:

- General requirements
- Collection of ewaste
- Storage of ewaste
- Transport of ewaste
- Processing of ewaste
- Handling of ewaste
- Re-use of ewaste

Two initial sub groups were formed to deal with drafting of:

- Collection, storage and transport of ewaste
- Processing, handling and re-use of ewaste

14.5.2 What is driving the creation of this new ewaste standard?

Australia is now progressing rapidly towards the creation of a national ewaste recycling programme, which is targeted to be operating towards the end of 2011. Product Stewardship Australia, in an alliance with the Australian Information Industry Association, led this development. In concert with a wide group of stakeholders, it created a ‘burning platform’ for the issue.221

Under Strategy 1 of the Australian National Waste Policy: Less waste, more resources, which has been endorsed by the Council of Australian Governments, Australian and state and territory governments have agreed that:

The Australian Government, with the support of state and territory governments, will establish a national framework underpinned by legislation to support voluntary, co-regulatory and regulatory product stewardship and extended producer responsibility schemes to provide for the impacts of a product being responsibly managed during and at end of life.

Specifically with respect to ewaste:

Following extensive consultation and consideration of a regulation impact statement, in 2009 all Australian State Governments agreed that televisions and computers would be the first products regulated under the proposed product stewardship legislation.

Currently the Department of Sustainability, Environment, Water, Population and Communities is preparing “regulations to underpin arrangements for collecting and recycling televisions and computers under the National Television and Computer Product Stewardship Scheme.”222

The commitment by the Australian Government to introduce regulation to underwrite a national television and computer collection and recycling scheme, has thrown up the requirement for what has emerged as a joint Australian & New Zealand
Recycling of End of Life (EOL) Televisions and Industry Standard: Collection, Transport and Recycling of End of Life (EOL) Televisions and Computers (ISO affiliated) standard and associated certification program. In this respect New Zealand is a ‘trickle down’ beneficiary of Australia’s pro-activity.

It is evident that some form of interim guidance will be needed in the period between Australia’s national ewaste recycling programme begins to operate (late 2011) and when the joint Australian & New Zealand ewaste standard would be completed and become fully operational (late 2012). As a result, the AIIA E-Sig/PSA - Interim Industry Standard: Collection, Transport and Recycling of End of Life (EOL) Televisions and Computers has been developed and will be used to fill this gap.

The preface of the interim standard notes:

Electrical and Electronic Products contain a complex mix of materials, components and substances, and many components in EOL Televisions and computers are classed as hazardous waste once removed when the products are dismantled. Dismantling, crushing, recycling or reprocessing EOL Televisions and computers, if poorly managed, has the potential to release hazardous substances into the environment and to endanger human health. In addition, the management of EOL Televisions and computers involves health and safety issues associated with the manual handling, storage and transport of heavy and bulky items that must also be taken into consideration.

It is essential that the environmental and health and safety risks are identified and proactively managed by those involved in the collection, transport and recycling of EOL Televisions and computers. This interim industry standard has been developed to address those risks and will be used by the TV and IT Product Stewardship Arrangement Administrator, while an official Australian and New Zealand Standard is being prepared through the Standards Australia/Standards New Zealand consensus process.

It is clear that the existence of this resource will benefit and streamline the official Australian and New Zealand standard development process. The more so, given that the interim industry standard has been prepared by Australian TV and IT industry members (many of whom are present in the New Zealand market) in consultation with a broad group of stakeholders.

Both in the interim and into the future, the public should be reassured that ewaste collection and processing will be managed in an environmentally and social responsible manner – given that the interim standards development process drew on a number of international ewaste standards (particularly on the Electronics Product Stewardship Canada - Electronics Recycling Standard 2009) and that, at least in Australia, the standards are likely to be mandatory.

The other driver for the adoption of recycling standards will be the establishment of industry-wide product stewardship organisations. For today, a number of individual computer brand suppliers have established trusted relationships with recyclers, after carrying out extensive due diligence on their recycling processes and chain of custody reporting. They then use their claims of good environmental processes as part of their marketing strategy. All members of collaborative product stewardship organisations will need reassurance that recyclers contracted to process their branded products will meet agreed standards in an open and transparent way.

14.5.3 ANZ ewaste standard recommendation
The soon-to-be joint Australia New Zealand ewaste standard needs to be endorsed, empowered and embedded by government, the processing sector and the public as the universal minimum baseline standard. In order to extract maximum value, New Zealand needs this prescription to become the new normal business practice, as it will be in Australia. In Australia the national product stewardship organisation/producer responsibility organisation will, in effect, make the voluntary ISO standard mandatory. In the absence any comparable national framework in New Zealand what is the plan? We need a plan.

14.6 ACCREDITING AND MONITORING STANDARDS COMPLIANCE
Irrespective of which of the many standards might be selected by an ewaste recycling organisation, the real value of standards only comes when they are applied and can be transparently verified by an independent, qualified third party.

In seeking to irrefutably establish their credentials, the promotional material relating to the Basel Action Network’s e-Stewards programme illustrates and reinforces this point. Under the heading ‘Independent Accreditation & Certification’ they note:

BAN has developed a global standard that raises the bar for the electronics recycling industry, and requires those who meet it to be formally recognized by the established, accredited third party certification system....

Accreditation of the e-Stewards Certification Bodies is currently provided by ANSI/ASQ National Accreditation Board (ANAB), which is internationally recognized through its membership and leadership within the International Accreditation Forum and
through bilateral and multi-cooperative agreements with other leading national accreditation bodies.

The certification bodies that are authorized to participate in the e-Stewards program are all ISO 14001 accredited and have demonstrated background in both the electronics and recycling industries. All have capacity, capability and qualification to operate globally. Each qualifies through a series of independent and ongoing reviews, audits, and witnessed assessments as meeting the rigorous e-Stewards accreditation requirements.

Certification body accredited by ANSI/ASQ National Accreditation Board (ANAB), or other future BAN-designated accreditation body Certification body meets all criteria set by BAN and employs specially trained and qualified auditors.

All auditors employed by e-Stewards Certification Bodies are individually certified to perform environmental management system audits internationally within the accredited third party system. Furthermore, each one has been trained through a course specially developed by SAI-Global - the premier training organization in the industry.

Whether as ISO, R2/RIOS or e-Stewards, all reputable quality assurance standards seek to achieve and maintain their reputation by marking out the higher ethical and moral ground. However, it is important to note that once the developers and hence owners have created standards these often become part of an ongoing business/operation model.

Significant costs apply in aligning with and becoming accredited to any given standard. The additional cost of environmental and OSH quality assurance is the cost of choosing to do the right thing vs settling for illegal and or inferior processing systems.

While many people will be prepared to pay extra to know they have exercised environmental responsibility, most will default to the least cost option if they can get away with it. This unfortunate reality is perhaps why many international jurisdictions have adopted a mandatory approach to dealing with ewaste. For example, the EU in directing that producers take responsibility for the creation of national product stewardship system with, at a minimum, free end-of-life public drop-off for ewaste, has systematically undercut any incentive, based upon perceived cost, for illegal fly tipping. This EU policy structure systematically maximises ewaste collection, thereby engineering economies of scale to minimise overall cost.

The EU, via the comprehensive WEEELABEx standard, has ensured that once ewaste is collected it is processed in an environmentally sound manner. This policy structure ensures that for a minimal embedded cost the public have environmental responsibility exercised on their behalf by large professional producer responsibility organisations. In effect the enormous value modern consumers enjoy from electrical goods does not come at the expense of human and environmental health.

14.6.1 How the Australia/New Zealand ewaste standard accreditation/certification system is likely to operate

In Australia and New Zealand the Joint Accreditation System (JAS-ANZ) is the government-appointed body responsible for accrediting conformity assessment bodies (CABs) in the fields of certification and inspection. JAS-ANZ is a signatory to a number of bilateral, regional and international agreements. These agreements provide international recognition and acceptance of JAS-ANZ accredited certificates and inspection reports.

JAS-ANZ has a similar consensus-based process for developing the requirements for a new certification scheme as the 'standards development process' i.e. it is a multi stakeholder consultative process. In the case of the envisaged ewaste standard certification it is likely the scheme would be developed on the back of the ISO 14001 accreditation process and based on the US and European accreditation programs.

The preface to the AIIA E-SIG/PSA – Draft Interim Industry Standard shows how this standard and its soon-to-be replacement will function:

The interim industry standard will be supported by education, certification and audit programs. It will be a contractual requirement that any recycler engaged by the Arrangement Administrator will be certified as complying with the international benchmark for environmental management ISO 14001, and this interim industry standard.

The certification will not be performed by the Arrangement Administrator but by any independent certification bodies who are accredited as competent to do so by the government appointed Accreditation body for Australia and New Zealand, JAS-ANZ (Joint Accreditation System Australia and New Zealand).

Under the contractual arrangements, collection locations will be required to self assess and certify compliance with the standard to the arrangement administrator at specified periods. The Arrangement Administrator will periodically audit a sample of collection locations, transport providers and recyclers for compliance with the standard, including the records required to be maintained. For recyclers this may be done in conjunction with their certification.
The AIIA E-SIG/PSA – Draft Interim Industry Standard provides the following further illustration as to the likely process and alignment of responsibility in the formation of a formal standards accreditation scheme. Once the joint Australia New Zealand ewaste standard has been developed and registered, a range of pre-established independent compliance auditing protocols kick in. There is a range of pre-existing organisations who will be willing and able to add ewaste standard compliance checking to their portfolio or services. The key will be to ensure the same rationale which culminated in the decision to develop the joint Australia New Zealand ewaste standard, i.e. need for: situational appropriateness, local buy-in/ownership and in particular, cost effectiveness, also flows through in the establishment and function of compliance.

Compliance with the joint Australia New Zealand ewaste standard needs, should be able to be independently accredited via a simple and cost effective mechanism. This will require greater internal commitment from New Zealand than simply ‘hitchhiking’ on the standards development process initiated out of Australia.

The most cost effective compliance accreditation regime will occur with maximum participation. Under this scenario economies of scale will kick in and drive the cost of participation down. This is unlikely to emerge out of the current voluntary-only policy setting. Under a voluntary only approach, the few good operators who seek compliance will

![Diagram of Proposed environmental assurance process for national ewaste recycling scheme]

Figure 14-2: Environmental assurance process for ewaste

ANZ standard/s for ewaste collection, treatment and disposal (prepared through Standards Australia).

Certification program for collection, logistics and recycling providers (prepared through JAS-ANZ). It is likely that this would be an add-on to ISO 14001 certification.

Certification body is accredited by JAS-ANZ to audit providers and certify that they meet the ANZ standard for collection treatment and disposal of ewaste.

Certification body employs trained environmental auditors to periodically audit that the provider complies with the ANZ standard.

Collection, logistics, recycling provider is certified to ISO 14001 and ANZ ewaste standard.
face excessive costs over what they would if the whole ewaste sector was mandated to comply with a uniform baseline standard of operation.

14.6.2 Compliance recommendation

The joint Australia/New Zealand ewaste standard needs to be the compulsory baseline for all ewaste operations in New Zealand. This scenario will minimise the cost and maximise the social and environmental benefit to New Zealanders.


181 It is not clear to what degree this statistic applies to New Zealand ewaste volumes as in theory we are not permitted to export to non-OECD countries.


183 WEEE Directive became European law in February 2003, but progressively introduced into legislation of EU member countries, e.g. in the UK, regulations were introduced into law in January 2007.


185 Available from www.mfe.govt.nz/publications/waste/weee-literature-review-jun06/weee-literature-review-jun06.pdf


188 Information sources from the Resource Recovery Forum, RRF Email News Service, France – dealing with used CRTs, (4/05/2011)


190 Sourced and adapted from www.osh.govt.nz/services/engagement.shtml

191 HSE Act: Health and Safety in Employment Act, 1992


198 J Puckett, S Westervelt, R Gutierrez and Y Takamiya, op cit.


201 NZ ITTV working group publication, The Proposed Advance Fee Scheme to Fund Recycling and Recovery of Televisions in the New Zealand Market.


204 Ibid. Section 4.2 Risk Management

205 After considerable discussion, the Resource Recovery Strategic Advisory Group determined that the term ‘Resource Recovery’ provided the most useful umbrella term to encompass the diversity of worldview and terminology in this industry.

206 The term pre-moderated follows on from the fact that all assessment of NZQA based training in New Zealand is moderated for quality assurance purposes. Pre-moderation of a written assessment tool occurs when the relevant ITO quality assures the assessment prior to their use in assessing the competency of trainees.

207 Information sourced and adapted from: www.iso.org

208 Information sourced and adapted from: www.standards.org.au

209 Information sourced and adapted from www.standards.co.nz

210 NB: which, via the our commitment to the development of a joint Australian New Zealand ewaste standard will be the approach adopted nationally.

211 www.mfe.govt.nz/issues/waste/weee-guidelines

212 Sourced and adapted from the WEEELABEX FAQ section – www.weeeforum.org/index.php?page=weeeforum

213 Established in 2000 - see www.weeeforum.org

214 The 38 PROs are based in Austria, Belgium, Czech Republic, Denmark, Italy, Germany, Greece, France, Hungary, Ireland, Lithuania, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the
United Kingdom.
215 See: www.e-stewards.org and www.electronicstakeback.com
217 From Become a CERTIFIED ELECTRONICS RECYCLER, published by www.isri.org
218 See www.standards.co.nz
219 www.standards.org.au
220 ‘Burning platform’: a business lexicon that emphasises immediate and radical change due to dire circumstances.
221 Sourced from the Department of Sustainability, Environment, Water, Population and Communities website
223 The International e-Stewards® Certification Program see http://e-stewards.org/certification-overview/
224 Fly-tipping (also known as “fly dumping”), is a British term for dumping waste illegally instead of in an authorised rubbish dump. It is the illegal deposit of any waste onto land, i.e., waste dumped or tipped on a site with no license to accept waste.
15. Conclusions and recommendations

15.1 CONCLUSIONS

In preparing this report, we have reached a number of conclusions and made a variety of recommendations. The purpose of this section is to draw together these conclusions and recommendations into a form that they can be easily acted upon.

We are somewhat disappointed that of the 12 key recommendations in our 2006 report, less than half were acted upon, and even those that were, efforts were not sustained until outcomes were achieved.

Five years on, despite the lack of progress in establishing product stewardship schemes for televisions and computer equipment, we continue to believe this is the right direction for New Zealand. In 2006 we had the opportunity to take a leadership role in our region in developing an industry-wide product stewardship scheme. At that time our Australian colleagues had spent nearly a decade thinking about ewaste issues, but had achieved little in securing a national approach. The difficulty of aligning individual state governments in the absence of a unified federal approach was politically and organisationally very challenging.

Towards the end of 2009, the Australians took a giant leap forward when the Hon Peter Garrett, the then Federal Minister for the Environment, announced that he had secured the agreement of all state premiers to implement a unified national approach in handling ewaste. By the end of 2011, just two years after the watershed announcement, it is expected that the first product stewardship schemes for ewaste will be operational.

Meanwhile New Zealand has been sitting on the sidelines with the national one day eDay event being the only significant national effort attempting to address the ewaste challenge. What started in 2006 as a small scale ‘awareness-raising’ effort in Wellington has expanded into a large national programme involving 60 collection centres. The only other significant development has been the commitment by RCN to establish 20 permanent collection centres by the middle of 2011. The success of these centres is as yet unknown, but as they rely on a user-pays (on disposal) model, they are unlikely on their own to provide a final endpoint solution.

We remain more convinced than ever that the only long-term sustainable solution is an industry-wide and New Zealand-wide product stewardship scheme, with most of the collection and recycling costs being met by the companies importing electronic equipment. This will only be achieved when government agrees to partner with industry and implement the necessary regulations to prevent free-riders and ensure that all importers pay an equitable allocation of costs, based on their market share.

New Zealand has the legislative framework in place in the form of the Waste Minimisation Act (2008) and in this regard we are three years ahead of the Australians, but without accompanying regulations, the product stewardship aspects of the Act are of little practical benefit.

To move this forward, we believe government needs to provide the leadership, with the support of industry. Between 2006 and 2008 the industry worked collaboratively in developing draft product stewardship schemes, but when it became evident that government would not support these efforts with free-rider legislation, the schemes were effectively shelved.

The ball is now in the government’s court to acknowledge that there is a clear market failure in the development of voluntary product stewardship schemes and announce a timeframe for free-rider regulations to provide a motivation for the industry to re-engage.

Our recommendations are as follows:

15.2 GOVERNMENT

1. That the Minister instruct the Ministry for the Environment to commence a process for the development of ewaste regulations, either as a priority product or under section 23 of the Waste Minimisation Act (2008).

2. That wherever possible the development of a regulatory impact statement (RIS) draw on the ewaste RIS work carried out in Australia by PricewaterhouseCoopers and the analysis by NZIER, included as part of this report.

3. That the scope of the regulations should mirror those being discussed in Australia, including free-rider regulations, collection and recycling targets, obligations of industry, sharing of import data, any exclusion thresholds as well as responsibilities for monitoring and enforcing compliance.

4. That the Minister announce an indicative timeframe for the implementation of product stewardship schemes for computers and televisions.

5. That the Minister consider promulgating 1 July 2013 as the target implementation date.
6. That the Commerce Commission advise the industry on the development of the product stewardship scheme to ensure compliance with the Commerce Act or advise a course of action for the industry to secure the necessary authorisations.

7. That MED amend its ICT procurement strategy to exclude suppliers who are not part of an accredited PSO by this date.

8. That MED harmonise the Customs tariff classifications for electronic equipment with Australia.

9. That the new Environmental Protection Authority be assigned the task of compliance monitoring for recycling standards.

10. That the Minister continue to support eDay until such time that widespread accessible ewaste collection facilities are in place, where ewaste can be safely deposited at no charge.

11. That NZAID support eDay initiatives in Pacific Island countries through its SDF and SSDPF funding initiatives, or other aid budgets.

15.3 SUPPLIERS

1. That NZICT establish an environment special interest group (ESIG), including all members who are computer equipment brand suppliers or importers.

2. That NZICT-ESIG and CEANZ agree to form a single product stewardship organisation (PSO), the information technology PSO (ITPSO), mirroring developments in Australia.

3. That New Zealand ITPSO establish a working relationship with the new joint industry PSO in Australia.

4. That NZICT and CEANZ formally recognise the work of the joint Australia-New Zealand ewaste standards group (and adopt the Australian interim industry standard).

5. That brand owners and importers of IT and television equipment support the cost-sharing model for eDay as proposed by the eDay Trust as an interim measure until a PSO is established and regulations have been implemented.

15.4 RECYCLERS

1. That EXITO (Extractive Industries Training Organisation) develop unit standards specifically for ewaste.

2. That ewaste recyclers adopt the Australian interim industry standard for ewaste recycling until such time as a formal Australia – New Zealand standard is agreed;

3. That ewaste recyclers become accredited to recognised international standards for handling ewaste;

4. That in the meantime, ewaste recyclers agree an informal accreditation process and recycling procedures in order to increase transparency and build public confidence.

15.5 LOCAL AUTHORITIES

1. That local authorities unite in calling on government and industry to agree a co-regulatory approach to product stewardship to ensure a free ewaste drop-off service.

2. That local authorities support the establishment of permanent local ewaste collection centres where these are able to meet ewaste handling standards.

3. That local authorities continue to support ewaste awareness-raising events such as eDay until permanent free collection facilities are well established.
In the course of obtaining import statistics from Statistics New Zealand for electronic items, we had to separately obtain appropriate codes based on the international ‘harmonised’ classifications used by NZ Customs Department.\textsuperscript{227}

It is possible that computer items under a product stewardship scheme could be identified as they enter the country, via Customs Department entries based on the codes. It might also be useful if these could be harmonised with the Australian system, because of the closely-knit computer supply systems within Australasia.

Regrettably, harmonisation with Australia would not be possible at present. The internationally ‘harmonised’ customs classifications are only harmonised at quite high category level: the first two levels of a four-level system. Individual countries designate their own lower levels. Few if any of the final identifying Australian category numbers for computer equipment and TVs are the same as those used in New Zealand. Also, New Zealand has less categories than Australia, which is able to separate out peripherals, even down to the level of mice and power cords.

Changes to New Zealand’s classification codes would need to be pursued through the Ministry for Economic Development.

Below are New Zealand’s classification codes for computer equipment, TVs and some other electronic items. At the end of each section are equivalent Australian codes, taken from a 2009 report by the Australian Environmental Protection and Heritage Council.\textsuperscript{228}

### COMPUTER LAPTOPS AND DESKTOPS

The New Zealand list has a broad (internationally harmonised) \textbf{8471} category, defined as "Automatic data processing machines and units thereof, magnetic or optical readers, machines for transcribing data onto data media in coded form and machines for processing such data, not elsewhere specified or included."

#### Computers – desktop

In Australia, ‘laptops and portable’ is \textbf{8471.30.00.20}.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8471.41.00.10</td>
<td>Automatic data processing machines; comprising in the same housing at least a central processing unit and an input and output unit, whether or not combined, n.e.c.\textsuperscript{229} in item no. 8471.30</td>
</tr>
<tr>
<td>8471.49.00.13</td>
<td>Automatic data processing machines; presented in the form of systems, central processing units, n.e.c. in item no. 8471.30 or 8471.41</td>
</tr>
<tr>
<td>8471.49.00.15</td>
<td>Automatic data processing machines; presented in the form of systems, input or output units, n.e.c. in item no. 8471.30 or 8471.41</td>
</tr>
<tr>
<td>8471.49.00.17</td>
<td>Automatic data processing machines; presented in the form of systems, storage units, n.e.c. in item no. 8471.30 or 8471.41</td>
</tr>
<tr>
<td>8471.49.00.19</td>
<td>Automatic data processing machines; presented in the form of systems (other than central processing units, input or output units or storage units), n.e.c. in item no. 8471.30 or 8471.41</td>
</tr>
<tr>
<td>8471.50.00.10</td>
<td>Units of automatic data processing machines; processing units other than those of item no. 8471.41 or 8471.49, whether or not containing in the same housing one or two of the following types of unit: storage units, input units or output units</td>
</tr>
<tr>
<td>8471.60.00.00</td>
<td>Units of automatic data processing machines; input or output units, whether or not containing storage units in the same housing</td>
</tr>
</tbody>
</table>

The Australian desktop codes, in a general section called ‘computer desktops and similar’, are \textbf{8471.50.00.69} (‘CPU’), \textbf{8471.41.00.27} (not defined) and \textbf{8471.30.00.20} (‘complete PC’).

#### COMPUTER MONITORS

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>8528.49.00.10</td>
<td>Monitors; cathode-ray tube, colour, not incorporating television reception apparatus, (other than of a kind solely or principally used in automatic data processing system of heading no. 8471)</td>
</tr>
<tr>
<td>8528.49.00.19</td>
<td>Monitors; cathode-ray tube, black and white or other monochrome, not incorporating television reception apparatus, (other than of a kind solely or principally used in automatic data processing system of heading no. 8471)</td>
</tr>
<tr>
<td>8528.51.00.00</td>
<td>Monitors; not cathode-ray tube type, of a kind solely or principally used in automatic data processing system of heading no. 8471, not</td>
</tr>
</tbody>
</table>
incorporating television reception apparatus

**8528.59.00.10** Monitors; not cathode-ray tube type, colour, not incorporating television reception apparatus, (other than of a kind solely or principally used in automatic data processing system of heading no. 8471)

**8528.59.00.19** Monitors; not cathode-ray tube type, black and white or other monochrome, not incorporating television reception apparatus, (other than of a kind solely or principally used in automatic data processing system of heading no. 8471)

*The Australian codes for 'computer displays' are: 8528.41.00.10 ('CRT type') and 8528.51.00.32 ('flat panel')*

**PRINTERS**

**8443.32** Printing, copying, and facsimile machines; single-function printing, copying or facsimile machines, capable of connecting to an automatic data processing machine or to a network

**8443.32.01.00** Printing machines; single-function printing machines, capable of connecting to an automatic data processing machine or to a network, industrial ink-jet printing machines

**8443.32.15.10** Printing machines; single-function printing machines, capable of connecting to an automatic data processing machine or to a network, dot-matrix.

**8443.32.15.13** Printing machines; single-function printing machines, capable of connecting to an automatic data processing machine or to a network, ink-jet, other than industrial ink-jet printing machines.

**8443.32.15.19** Printing machines; single-function printing machines, capable of connecting to an automatic data processing machine or to a network (other than dot matrix, ink-jet or laser)

*The Australian document has three codes for MFDs: 8443.32.00.61 (ink-jet), 8443.32.00.62 (dot matrix) and 8443.31.00.64 (laser).*

**SCANNERS**

Standalone computer scanners are not separated out in the New Zealand codes. It appears they are considered to be optical readers classifiable in tariff item 8471.60.00 00A "Input or output units, whether or not containing storage units in the same housing". This group also includes bar code readers.

*Computer scanners are separated out in the Australian list, as 8471.60.00.95.*

**OTHER COMPUTER PERIPHERALS AND COMPONENT PARTS**

No other computer peripherals are separated out in New Zealand.

*Australia has the following categories: 8471.60.00.55 (keyboards), 8471.60.00.92 (mouse). 8471.70.00.74 (hard drives), 8518.29.90.23 (speakers), 8525.80.10.15 (webcams), 8544.42.19.02 (power cords), 8504.40.30.59 (internal power supplies), 8414.59.90.52 (fans), 8473.30.00.62 (miscellaneous/other parts).*

**CENTRAL PROCESSING UNIT (CPU)**

According to Steve Todd, National Tariff Advisory Unit, NZ Customs Service, there is no separate tariff code for this item. A separate code for this item would be useful for estimating 'whitebox' production in New Zealand.

*The Australian definition only mentions 'CPU' in the context of 'computer desktops as similar'. This is probably not the CPU on its own, but rather a desktop box on its own rather than as part of a*
complete system including keyboard, monitor and mouse.

**TELEVISION SETS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>8528.72.00</td>
<td>Reception apparatus for television, whether or not incorporating radio-broadcast receivers or sound or video recording or reproducing apparatus; incorporating a colour video display or screen</td>
</tr>
</tbody>
</table>

**Note:**

1. Statistics NZ did not include a black and white TV category, which the Australians do. However, Statistics NZ was only able to supply import numbers back to 2007 – a period during which black and white TV imports were minimal.

2. There is no distinction between CRT and flat panel TVs. However, minimal to no CRT TVs are now being imported. A more significant omission in the NZ codes is any distinction between the two main flat screen technologies: LCD and plasma.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tbody>
<tr>
<td>8528.72.00.10</td>
<td>Television receivers; colour, incorporating video recording or reproducing apparatus, designed to incorporate a video display or screen</td>
</tr>
<tr>
<td>8528.72.00.13</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size not exceeding 330mm</td>
</tr>
<tr>
<td>8528.72.00.15</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 330mm but not exceeding 360mm</td>
</tr>
<tr>
<td>8528.72.00.17</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 360mm but not exceeding 460mm</td>
</tr>
<tr>
<td>8528.72.00.19</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 460mm but not exceeding 510mm</td>
</tr>
<tr>
<td>8528.72.00.21</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 510mm but not exceeding 560mm</td>
</tr>
<tr>
<td>8528.72.00.23</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 560mm but not exceeding 660mm</td>
</tr>
<tr>
<td>8528.72.00.25</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 660mm but not exceeding 710mm</td>
</tr>
<tr>
<td>8528.72.00.29</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 710mm but not exceeding 760mm</td>
</tr>
<tr>
<td>8528.72.00.31</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 760mm but not exceeding 860mm</td>
</tr>
<tr>
<td>8528.72.00.33</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 860mm but not exceeding 900mm</td>
</tr>
<tr>
<td>8528.72.00.35</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 900mm but not exceeding 1000mm</td>
</tr>
<tr>
<td>8528.72.00.37</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, mounted in cabinets, with screen size exceeding 1000mm</td>
</tr>
<tr>
<td>8528.72.00.41</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size not exceeding 330mm</td>
</tr>
<tr>
<td>8528.72.00.43</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 330mm but not exceeding 360mm</td>
</tr>
<tr>
<td>8528.72.00.45</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 360mm but not exceeding 460mm</td>
</tr>
<tr>
<td>8528.72.00.47</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 460mm but not exceeding 510mm</td>
</tr>
<tr>
<td>8528.72.00.49</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 510mm but not exceeding 560mm</td>
</tr>
<tr>
<td>8528.72.00.51</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 560mm but not exceeding 660mm</td>
</tr>
<tr>
<td>8528.72.00.53</td>
<td>Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 660mm but not exceeding 710mm</td>
</tr>
</tbody>
</table>
| 8528.72.00.55 | Television receivers; colour, not
incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 710mm but not exceeding 760mm.

**8528.72.00.57** Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 760mm but not exceeding 860mm.

**8528.72.00.59** Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 860mm but not exceeding 900mm.

**8528.72.00.61** Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 900mm but not exceeding 1000mm.

**8528.72.00.69** Television receivers; colour, not incorporating video recording or reproducing apparatus, (not mounted in cabinets), with screen size exceeding 1000mm.

The Australians listed televisions as: 8528.72.00/ various; and 8528.73.00.35 (black and white). It is not known if the various codes under 8528.72.00 match those used in New Zealand.

**Other consumer electronics**

There is a wide variety of other consumer electronics, including cameras, camcorders, mobile phones, gaming devices, music players, home theatre, audio amplifiers, ebook readers, tablets (such as the iPad).

Not all of these may be capable of being separated out in the New Zealand customs classifications. We do have the classification for one area: DVD players/recorders:

**8521.90.00.00** Video recording or reproducing apparatus; other than magnetic tape-type.

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227 The Harmonised Commodity Description and Coding System of tariff nomenclature is an internationally standardised system of names and numbers for classifying traded products developed and maintained by the World Customs Organization (WCO) (formerly the Customs Co-operation Council), an independent intergovernmental organisation with over 170 member countries based in Brussels, Belgium. (From http://en.wikipedia.org/wiki/Harmonized_System)


229 n.e.c. = not elsewhere covered
17. Appendix 2: International ewaste developments

17.1 EUROPEAN UNION
Countries of the European Union dispose of about 6.5 million tonnes of ewaste per year with an estimated annual growth rate of 3–5%. In 2009 Britain was reported to be producing around 15 per cent of the EU’s total ewaste. More than half of the ewaste generated in Europe follows unofficial collection routes, sometimes leading to illegal export and improper treatments.

Awareness of ewaste has been increasing worldwide, for instance, Royal Society for the Encouragement of Art, Manufactures and Commerce (RSA) constructed the WEEE Man to highlight the growing problem of ewaste across the Europe and the volume of ewaste generated by each person’s lifetime.

17.1.1 Legislation and regulation
A number of pieces of legislation have been introduced to deal with ewaste that requires the manufacturers and other stakeholders to adopt an environment-friendly approach. The current end-of-life model in the European Union is based on the dual directives: (1) Waste from Electronics and Electronic Equipment (WEEE) directive and (2) Restriction of Hazardous Substances (RoHS).

17.1.2 The WEEE directive
Article 1 of the WEEE Directive states that: “the purpose of this Directive is, as a first priority, the prevention of waste electrical and electronic equipment (WEEE) and in addition, the re-use, recycling and other forms of recovery of such wastes so as to reduce the disposal of waste.”

The WEEE Directive shifts the entire responsibility of managing ewaste from governments to the original manufacturers of the product. Producers or importers in the member countries are required to take back their end-of-life products through retailers. Ewaste in this directive is grouped into 10 different categories:

Ten different categories of products included in the European WEEE directives:
1. Large household appliances (refrigerators, ovens, washing machines)
2. Small household appliances (vacuum cleaners, toasters)
3. IT and telecommunications equipment (phones, laptops)
4. Consumer equipment (DVD players, televisions)
5. Lighting equipment (lamps)
6. Electrical and electronic tools (drills, saws)
7. Toys, leisure and sports equipment (game consoles)
8. Medical devices (pulmonary ventilators, dialysis)
9. Monitoring and control instruments (smoke detector, thermostats)
10. Automatic dispensers (drink, money dispensers)

Producers finance the collection, treatment, recovery and disposal of the end-of-life product. A comprehensive overview of WEEE directives in European Union is shown in Figure 17-1 on the next page.

The WEEE Directive has been interpreted differently by individual EU states, which have their own legislation to deal with the ewaste. However, the broad objectives of the WEEE Directive are:
- Separate collection of WEEE
- Collection target: 4kg WEEE per capita per annum
- Consumer to return WEEE free of charge
- Retailers to offer WEEE take-back
- Producer pays from collection onwards
- Recovery and recycle to meet set standards
- Treatment based on agreed standards

17.1.3 RoHS directive
The directive on the restriction of use of certain hazardous substances in electrical and electronic equipment commonly known as the Restriction of Hazardous Substances Directive (RoHS) was adopted by the European Union in February 2003. The directive was effective from 1 July 2006, and had to be enforced by separate laws in member states.

The directive restricts the use of six hazardous materials (lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants) in the manufacturing of electronic and electrical equipment. Norway, which is not a member of EU, also implemented this directive as ‘super RoHS’ which has eight more chemicals than those in the EU RoHS directive.

17.1.4 EuP (energy using products) Directive
The energy using products directive, also known as eco-design directive, is the first product-related directive. It establishes a framework for setting...
up EU eco-design requirements for energy-using products with the aim of ensuring the free movement of those products within the internal EU market. Energy consumption is one of several aspects of the EuP directive, aiming at an overall environmental improvement of electrical and electronic products and increases the security of the energy supply.

17.1.5 REACH
REACH (registration, evaluation, authorisation and restriction of chemicals) is a chemical law adopted by EU which came into force on 1 June 2007. This is the single regulatory system for dealing with chemical substances and encourages the replacement of hazardous chemicals with safe ones. Under the regulation industries have to manage the risk of chemicals, and provide appropriate safety information to professional users. The regulation mandates the manufacturers to label the presence of the hazardous substances in their products.

17.1.6 Regulation on trans-boundary shipments of waste
The regulation on trans-boundary shipments of waste applied on 12 July 2007, with the aim to ensure that waste is handled in an environmentally-sound manner throughout the shipping process, including the recovery or disposal in the country of destination. It imposed a ban on exports of hazardous waste from the EU to developing countries. Member states are required to carry out inspections and spot checks, and report to the Commission about any illegal waste shipments.

17.1.7 Collection and recycling process
There are two main collective systems in EU:
- The national collective system
- The competitive clearing house system

17.1.7.1 The national collective system
This collective system is generally run by non-governmental, not-for-profit companies which are set up and owned by one or more trade associations. They are responsible for collection, recycling and financing of waste within the national boundaries. The main aim of the associated companies is to maximise efficiency of their recycling operations, to identify markets for recycled material and to re-use the products. The national collective systems

Figure 17-1: A simplified view of EU WEEE directives
have been adopted by the Netherlands, Belgium and Sweden.

17.1.7.2 The competitive clearing house system

In the clearing house system, services are provided by producers, recyclers, and waste organisations. The competitive clearing house model has been adopted by several member states, especially bigger countries. The main aim of this model is to avoid a monopolistic situation and to drive costs down.

17.1.7.3 Existing united approaches

Some member states as well as some non-member states like Norway and Switzerland had established ewaste take-back and recycling schemes before the EU Directive was put in place. The Netherlands and Switzerland have two systems of ewaste operation – ICT Milieu & NVMP, and SWICO & S.EN.S, respectively, while other countries have single systems such as Recupel in Belgium, El Kretsen in Sweden and El Retur in Norway. Recycling schemes, legislation and responsibilities of stakeholders in different countries of the EU are presented in the table below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Recycling scheme</th>
<th>Legislation</th>
<th>Responsibility</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switzerland</td>
<td>SWICO S.EN.S</td>
<td>Ordinance on the Return, Taking back and Disposal of Electrical and Electronic Equipment. (ORDEE)</td>
<td>Manufacturer/importer</td>
<td>Jul-98</td>
</tr>
<tr>
<td>Denmark</td>
<td>El Retur</td>
<td>Statutory Order from the Ministry of Environment and Energy No. 1067</td>
<td>Local govt.</td>
<td>Dec-99</td>
</tr>
<tr>
<td>Netherlands</td>
<td>NVPM ICT-Milieu</td>
<td>Disposal of White and Brown Goods Decree</td>
<td>Manufacturer/importer</td>
<td>Jan-99</td>
</tr>
<tr>
<td>Norway</td>
<td>El Retur</td>
<td>Regulations regarding Scrapped Electrical and Electronic Products</td>
<td>Manufacturer/importer</td>
<td>Jul-99</td>
</tr>
<tr>
<td>Belgium</td>
<td>Recupel</td>
<td>Environmental policy agreements on the take back obligation for waste from electrical and electronic equipment</td>
<td>Manufacturer/importer</td>
<td>Mar-01</td>
</tr>
<tr>
<td>Germany</td>
<td>EAR</td>
<td>Act Governing the Sale, Return and Environmentally Sound Disposal of Electrical and Electronic Equipment (ElektroG Act)</td>
<td>Manufacturer/importer</td>
<td>Mar-05</td>
</tr>
</tbody>
</table>

Table 17-1: Recycling schemes in different countries of EU
17.1.8 Financing
In the financial model, there are different opinions and preferences for the ‘brown’ and ‘white’ goods sectors and ICT sector. The brown and white goods sectors have a significant amount of historical waste (products without any brand or whose producer no longer exists), in contrast to ICT firms, which have fewer historic waste. The white goods sector supports visible fee schemes such as Recupel (Belgium) and NVMP (the Netherlands) while there are some schemes where fees are not transparent such as ICT Mileu (the Netherlands). However Norway (El Retur) and Sweden (EL-Kretsen) have both financing systems within a single organisation.\textsuperscript{243}

The Directive requires that each producer gives a financial guarantee for recycling when placing a product in the market, to avoid free-riders. Thus member states need to ensure that such guarantees are provided by all producers.

17.2 SWEDEN
Sweden, an EU member, has a well-developed recycling system. Swedish producers put a total of 245,000 tons of household EEE on the Swedish market in 2007.\textsuperscript{244}

17.2.1 Legislation and regulation
Ewaste is managed through a Producer Responsibility Ordinance introduced in 2001. An agreement between a producer organisation (EL-Kretsen) and the Swedish municipalities was concluded in 2001. Later, in 2008, another producer organisation, the Swedish Association of Recycling Electronic Products (EÅF) was launched.\textsuperscript{245} Swedish waste management regulations give municipalities a monopoly on collection of hazardous waste from households and producers are responsible for the management of collected ewaste. In January 2009 producers were given responsibility of collection, treatment, recycling, and disposal of all batteries regardless of when they appeared on the market.\textsuperscript{247} The new directive for batteries prohibits their dumping in landfills.

17.2.2 Collection and recycling process
The waste management systems in each of Sweden’s 290 municipalities are responsible for household collection. Consumers are entitled to return end-of-life products to municipalities and producers are responsible for management of ewaste. To deal with ewaste, producers and retailers in Sweden came up with a separate organisation, funded by member producers and retailers, called EL-Kretsen. In collaboration with local authorities, EL-Kretsen developed ‘Elretur’ for the management of ewaste. The local authorities, like municipalities, have funded and developed 650 centres that collected ewaste from consumers free of charge. EL-Kretsen was made responsible for transportation of ewaste from the collection centres to pre-treatment sites. EL-Kretsen has further contracts with various recycling companies for recovery of resources ewaste and final disposal, based on Swedish standards.

EAF members make their shops available as ewaste collection centres and then transport the ewaste to centralised pre-treatment sites. The detail ewaste management system\textsuperscript{206} in Sweden is shown in the figure below.

**Figure 17-2:**
Ewaste management system in Sweden

Solid arrows: flows of ewaste  
Green arrows: economic flow
There are some alternative collection schemes for hazardous waste in Swedish municipalities. Municipalities run ‘hazardous waste collection vehicles’ with fixed routes on fixed dates, when hazardous waste is collected directly from households. ‘Collection on demand’ is another option, where households can call the municipality to arrange collection of hazardous waste directly from their houses. The Government also offers smaller disposal points (collectors) located in supermarkets in city centres, where people can dispose of smaller types of hazardous waste.

Once the ewaste is handed in to the collection points, the producers are responsible for its safe treatment. Hazardous substances found in the ewaste are initially extracted and taken away. Plastics recovered during the process are used as raw material for new products while the plastic materials which cannot be further recycled are incinerated for recovery of energy for producing electricity. Metal recycling is carried out in smelting plants. Copper, aluminium, and iron are used as raw material for new products. Precious metals like gold and silver from printed circuit cards are recovered from e-product and potential pollutants during recovery are captured in the flue gas cleaning processes.

17.3 SWITZERLAND
Switzerland is a technologically advanced country with the highest per capita income and highest spending on electronic products in the world. In 2003, ewaste accounted for 2.6% of total municipal solid waste. Switzerland was the first country in the world to establish a formal system to manage ewaste. As in Sweden and other EU member states, Swiss ewaste management is based on an extended producer responsibility (EPR) system with defined roles and responsibilities for each stakeholder. EPR was introduced by the Swedish Ministry of Environment in 1990. According to the OECD, EPR has four principal goals:

- Source reduction (natural resource conservation/materials conservation).
- Waste prevention.
- Design of more environmentally compatible products.
- Promotion of sustainable development.

17.3.1 Legislation and regulation
The legislation regarding ewaste management in Switzerland was first introduced in 1998 through ORDEA law (Ordinance on the return, the taking back and the disposal of electrical and electronic appliances). It specifies that an exporter needs to provide documentary evidence that the final disposal of ewaste is done in an environmentally tolerable manner, and has prior consent of the importing country.

Switzerland has two main ewaste recycling systems, The Swiss Association for Information, and Organisation Technology (SWICO) and The Swiss Foundation for Waste Management (S.EN.S). SWICO initially collected office electronics and IT equipment and later expanded collection to include other ewaste such as mobile phones, consumer electronics and telephone switchboard systems, as well as dental equipment. S.EN.S was established in 1990 as a non-profit organisation that recovers selected ewaste on behalf of manufacturers, importers and retailers. Originally it started recycling of refrigerators and freezers only, but is now responsible for several other household appliances.

Responsibilities of different stakeholders in Swiss ewaste management system are summarised in the table on the next page.
EWASTE IN NEW ZEALAND — FIVE YEARS ON

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Roles and responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>Cantonal authorities play a part in the overall control and monitoring in their capacity as the licensing authority for recyclers.</td>
</tr>
<tr>
<td>Manufacturers/importers, producer organisations (SWICO and S.EN.S)</td>
<td>Have the role of managing the day-to-day operations of the system, including setting the recycling fees, as well as licensing and auditing recyclers</td>
</tr>
<tr>
<td>Distributors &amp; retailers</td>
<td>Bear a part of the physical and informational responsibility of the product. Are obligated to take back products in categories they have on sale, irrespective of whether the product was sold by them, or whether the consumer purchases a similar product as replacement. Are responsible for clearly mentioning the amount of the ARF in the customer invoice.</td>
</tr>
<tr>
<td>Consumers</td>
<td>Are responsible, and obligated by law, to return discarded appliances to retailers or designated collection points. Bear final financial responsibility through the recycling fee on new product purchases</td>
</tr>
<tr>
<td>Collection points (specifically designated locations)</td>
<td>Collect all kinds of ewaste free of charge and ensure the safety of the disposed products to prevent pilferage or illegal exports.</td>
</tr>
<tr>
<td>Recyclers</td>
<td>Must adhere to minimum standards on emissions and take adequate safety measures concerning employee health. Need authorisation to operate a recycling facility from the cantonal government, as well as a license from the producers’ organisations.</td>
</tr>
</tbody>
</table>

Table 17-2: Responsibilities of different stakeholders in the Swiss ewaste management system

17.3.2 Collection and recycling process
The collection and recycling of ewaste in Switzerland impose physical and financial responsibilities on the manufacturers and importers of electronic goods. SWICO and S.EN.S manage and operate the ewaste recycling system on behalf of their member producers with a combined approach of material flow analysis and life cycle assessment. In 2003, SWICO and S.EN.S had 520 official collection points in Switzerland. The number of collection points has increased; SWICO has currently 600 collection points. Besides these collection points there are 6000 distributors /retailer locations, where consumers can dispose of their ewaste free of charge, irrespective of the brand or year of manufacture. By having common, rather than brand-specific collection points, Switzerland is able to provide an all-inclusive ewaste solution that is consumer friendly and low-cost. A concise view of the recycling system is shown on the opposite page.

Materials from collection centres are further transported by SWICO and S.EN.S to pre-treatment facilities that manually dismantle the ewaste and separate the toxic components. Components containing toxic material pass on to recyclers who make profit by material recovery and by reimbursement for the recycled amount of ewaste from the SWICO/S.EN.S system. The balance material which cannot be recycled (generally less than 2%), goes to landfill, or incinerators for energy recovery. In 2009, about 113,000 tonnes of ewaste were collected and recycled in Swiss recovery system in which 41% includes office equipment, information Technology and telecommunication equipment.

17.3.3 Financing
Both systems of ewaste recycling are financed by an advanced recycling fee, known as ARF. These fees are cascaded to the distributors, the retailers and finally to the consumers, who pay
The Swiss advance recycling fee is a contract between appliances purchased in the past and those that will be purchased in the future. When setting fee levels, the system needs accurate estimations of how much waste will be generated and how many new products will be sold. Problems could arise if fees collected on new appliances are not enough to pay for recycling discarded appliances. Another drawback to the recycling fee system could be cross-subsidisation of products among different categories, for example, computer buyers may pay for recycling of tape recorders.

To avoid such discrepancies, both SWICO and SENS have distinctly categorised the products based on their approximate cost of recycling. Despite increasing volumes of ewaste processing, and the coverage of historical ewaste, SWICO has been able to keep reimbursement costs and the advance recycling fee low for most categories of electrical goods. This has been possible for two main reasons: first, the increasing volumes of ewaste allowed SWICO to organise collection, transport and recycling more efficiently, and second, the increase in metal prices resulted in high profits for recyclers.

17.3.4 Standards
The Swiss system imposes high safety and emission standards and emphasises regular control and monitoring systems at every stage of the material and financial flow. There are multiple levels of independent controls in the system which can check free riding and pilferage and maintain quality and environmental standards. The independent controls not only deter free-riders, but also give credibility to the entire system, and thereby ensuring the participation of retailers and consumers. Controls
also prevent the illegal import and export of ewaste to and from Switzerland. As a signatory to the Basel Convention Ban Amendment, Switzerland does not permit export of ewaste to non-OECD countries.224

External auditors, appointed by SWICO and S.EN.S, audit each recycler at least once a year. Unless the standards are complied with, the recycler’s licence can be revoked. This monitoring system ensures ewaste recyclers stay within the strict Swiss emission limits. Furthermore, the auditors also ensure that recyclers have no more than 20% of the incoming ewaste unprocessed at the end of the year. One study in 2001266 found very little ewaste in municipal waste.267 The structure of both the SWICO and S.EN.S systems makes it convenient for consumers to take end-of-life appliances to designated points. By making this return free of cost at the point of disposal, the consumer has no incentive to dispose the appliance illegally or in the regular municipal waste.

17.4 IRELAND

Ireland produces large quantities of ewaste. In 2007, 9kg of ewaste per person was – more than double the European Union target.268 The recycling structure for ewaste is generally underdeveloped in this country and there are no large-scale processing facilities that can handle that much of ewaste. Almost all the collected ewaste is initially prepared for processing/recycling and then exported abroad for final reprocessing/recycling.

17.4.1 Legislation and regulation

The Waste Management Acts 1996-2003269 gave the power to local authorities to regulate ewaste. It also allowed for the provision of producer responsibility obligations wherever found necessary. Under this law, all producers and retailers of electrical goods must comply with the ewaste regulations, and provide free in-store take-back of old electrical goods when people buy new equipment. (Retailers are also required to take back ewaste from consumers free of charge at the time of purchase of new product. The take-back is on a one-for-one basis only and the appliance returned must be of a same type.) Producers of electrical goods are also required to register with the WEEE Register Society. The Department of the Environment, Heritage and Local Government has responsibility for environmental matters, while enforcement of the regulations is done by the office of Environmental Enforcement at the EPA and the local authority officers.

17.4.2 Collection and recycling process

More than 100 collection centres and 64 local authority recycling centres are available in Ireland.270 Local authorities accept household ewaste at civic amenity sites, free of charge.271

The ewaste recycling system in Ireland is handled by two companies: WEEE Ireland and European Recycling Platform. These companies are working on a not-for-profit basis and they subcontract ewaste management to certified recycling contractors. There are two main types of recyclers: (1) those that collect ewaste for export to the countries with more advanced recycling facilities and (2) those that extract components and materials before sending of for recycling.

Due to the small population of the country, the recycling market is undeveloped and there are limited outlets for materials recovered from ewaste. The market is dominated by companies that act as waste brokers, facilitating collection and export to Europe for reprocessing. Responsibilities of different organisations in ewaste recycling system in Ireland272 are listed in the table opposite:

17.4.3 Financing

WEEE Ireland and European Recycling Platform are financed by the system of Environment Management Costs (EMC). These costs are set by the electronic and electrical industries which are further approved by WEEE Register Society Ltd. This system ensures that the fees collected for recycling are used only for recycling activities and the producers get their share of the recycling cost.273 The EMC is built into the price consumers pay for the product.274

17.5 JAPAN

“Japan is one of the world’s most wasteful societies, producing massive amounts of excessive packaging, and post-consumer wastes such as electronic waste”.275 Traditionally, Japan exports about half of its used and discarded electrical/electronic goods to other nations including Philippines, China, Cambodia, Malaysia and Afghanistan as second-hand goods.276 Every year more than 400,000 TV sets alone go the Philippines.277 The general composition of Japanese ewaste is shown on the opposite page:

17.5.1 Legislation and regulation

Japan’s 1991 Law for Promotion of Effective Utilisation of Resources (often referred to as the
Table 17-3: Responsibilities of stakeholders in the Irish ewaste management system

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Responsibilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumers</td>
<td>• Bring back waste electrical and electronic equipment and waste batteries to retailer free of charge (must be one-for-one and like-for-like).</td>
</tr>
<tr>
<td>Producers</td>
<td>• Finance the take back of ewaste and waste batteries.</td>
</tr>
<tr>
<td></td>
<td>• Register with the WEEE Register Society.</td>
</tr>
<tr>
<td></td>
<td>• Self-comply or join an approved compliance scheme.</td>
</tr>
<tr>
<td></td>
<td>• Mark products with crossed-out wheeliebin symbol for ewaste and batteries.</td>
</tr>
<tr>
<td>Retailers</td>
<td>• Register premises with local authority</td>
</tr>
<tr>
<td></td>
<td>• Display environmental management costs of specified electrical products.</td>
</tr>
<tr>
<td></td>
<td>• Comply with requirements regarding price display and statutory notices.</td>
</tr>
<tr>
<td></td>
<td>• Take back household ewaste free of charge.</td>
</tr>
<tr>
<td></td>
<td>• Dispose of, store and transport ewaste and waste batteries.</td>
</tr>
<tr>
<td>Local authorities</td>
<td>• Local enforcement responsibilities (particularly in relation to retailer obligations).</td>
</tr>
<tr>
<td>Environmental protection Agency</td>
<td>• Leads national enforcement of the ewaste and battery regulations.</td>
</tr>
<tr>
<td></td>
<td>• Promotion of eco-design and re-use of electrical products.</td>
</tr>
<tr>
<td>WEEE Register Society Ltd.</td>
<td>• Registration of producers of ewaste and batteries.</td>
</tr>
<tr>
<td></td>
<td>• Notify evidence of non-compliance.</td>
</tr>
<tr>
<td></td>
<td>• Determine categories/sub-categories of electrical products</td>
</tr>
<tr>
<td></td>
<td>• Verification of visible environmental management costs for electrical products.</td>
</tr>
<tr>
<td></td>
<td>• Determination of market share of individual producers.</td>
</tr>
</tbody>
</table>

Table 17-4: Composition of e-waste in Japan, 2009

<table>
<thead>
<tr>
<th>Item no.</th>
<th>Items</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Air conditioners</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>CRT TV</td>
<td>55</td>
</tr>
<tr>
<td>3</td>
<td>LCD and plasma</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Refrigerators and freezers</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>Washing machines and dryers</td>
<td>16</td>
</tr>
</tbody>
</table>

Recycling Promotion Law) is aimed to promote greater recycling of a variety of products and materials. One of the law’s major goals was promotion of product designs that facilitate waste reduction, easy-recycling, and re-use.

In order to reduce the impact of ewaste on the environment, Japan introduced the Home Appliances and Recycling Law (HARL) in 2001. The legislation was initially meant for recycling air conditioners, TVs, refrigerators and washing machines. In 2008 LCD and plasma TVs, and clothes dryers were also included in the legislation. As in Sweden, Switzerland and other EU countries, the programme here in Japan is also based on extended producer responsibility, under which manufacturers and importers are required to take back the discarded product, and are also responsible for dismantle and recovery of the components and materials from ewaste.

Recycling of end-of-life computers in Japan are regulated by the Recycling Promotion Law. Retailers are not responsible to take back the used computers from consumers. The law was revised later in 2001 when manufacturers were required to establish a recovery system for rechargeable batteries, including nickel-cadmium, nickel-metal hydride, lithium-ion, and small sealed lead-acid batteries.

17.5.2 Collection and recycling process

In the Japanese system, consumers can return end-of-life goods to retailers. Manufacturers and importers are obliged to take back the product, transport and recycle them according to standards set by the Government. Municipal offices also collect discarded appliances and transfer them to manufacturers or other independent bodies for recycling.

Under the recycling law, manufacturers were divided into two groups which provide technologies.
and economic structure for the collection, recycling and re-use of discarded appliances. Group A comprises 14 industrial corporations, including the Matsushita Electric Industry, Toshiba, the Japanese Victor Company, and the Daikin Industry. This group assigns 190 designated points for collection and 24 plants for recycling. Group B comprises 20 corporations, including Mitsubishi Electric, Sharp, and Sanyo Electric. This group also provides 190 collection points, plus 14 recycling plants.

The groups have adopted a standard recycling system: collection, then transportation of products to the recycling plants where ewaste is sorted, treated, dismantled, and crushed. Valuable materials such as aluminium, copper, iron, glass and certain types of plastics are recovered with a high level of purity using electromagnetic, centrifugal and gravity separation. Hazardous substances are recovered and destroyed through thermal or chemical processes. After recycling, the recovered materials are used in manufacturing of new products. The flow of ewaste during recycling process in Japan is shown below.

The computer collection system largely depends on Japan Post, acting on behalf of the Japanese Electronics and Information Technology Association. Collection of end-of-life computers takes place at about 20,000 post offices nationwide. The postal service also collects end-of-life equipment from private residences, sorts them by brand name and ensures they are transported to the appropriate recycling facilities.

17.5.3 Technology advancement

17.5.3.1 Appliance based recycling processes

In Japan manufacturers have developed appliance based recycling process with processing lines specially designed for each type of appliance. These recycling processes are designed in a similar way to the manufacturing process to gain high yield from recycled materials.

Manufacturers have also developed technologies to allow recycled plastic materials to allow their re-use in new plastic products. Some manufacturers have established a closed-loop recycling process especially for high-grade plastic, which can be further used in manufacturing of electrical appliances. To promote systematic closed loop recycling, the Japanese Government established an industrial standard in 2007 for identifying recycled plastic parts in manufacturing of electrical and electronic equipment.

17.5.3.2 Development of eco-design

Manufactures are directly involved in recycling of ewaste, therefore they develop eco-designed products to minimise the recycling process. For example, the Japan Association for Electric Home Appliances has established a disassembly identification system which was driven by demands from recycling plants. Some manufacturers have minimised the number of parts to be disassembled, which shortens the disassembly time. Japanese manufacturers of consumer electronics and computers have been world leaders in design for environment, particularly in eliminating hazardous substances such as lead and brominated flame retardants.
17.5.4 Financing
Consumers pay a recycling fee when they return used electronic products to the collection centres. The recycling fees are calculated based on the cost involved in primary transport (from consumer to retailer), secondary transport (from retailer to factory), and recycling process. The fee levied on consumers for recycling of CRT and Plasma TV were respectively, NZ$28 and NZ$44 (at NZ$1 = 64.6 Yen).285
There are two different financing systems present in Japan for recycling end-of-life computers:
- Recycling of computers purchased before October 1, 2003 are financed by fees ranging from NZ$33 to $45
- Recycling fee of personal computers purchased after October 1, 2003, are included in the price of the product.

The revised recycling law established Japan’s first extended producer responsibility programme for an electronic product that uses a front-end financing mechanism (in which recycling costs are included in the product price).

17.5.5 Standards
Japan has adopted the Recycling Standard Rates (RSR) and ‘RSR etc’ (as a supplement indicator to RSR) to evaluate the recycling of ewaste. RSR only includes recycling of material while RSR etc. includes both material recycling and thermal recovery.287

Ewaste management, from waste generation to final disposal, is integrated within a manifest system established in the Home Appliance Recycling Law. The system also clarifies the responsibilities of the relevant stakeholders. A ticketing or voucher system288 monitors and tracks of end-of-life appliances.

17.6 SOUTH KOREA
17.6.1 Legislation and regulation
South Korea introduced ewaste regulations when it adopted a ‘waste deposit-refund system’ in 1992. However, the system did not distinguish ewaste from other types of waste, such as containers and packaging. A review in 2003 led to the adoption of an extended producer responsibility system which imposed mandatory recycling rates on 21 products including home electric and electronic appliances, containers/packaging, tires and batteries.

In 2008, mandatory recycling of ewaste was introduced, covering 10 ewaste items (televisions, refrigerators, washing machines, air conditioners, personal, computers (including monitors and keyboards), audio equipment, mobile phones, printers, copying machines and fax machines.)

17.6.2 Collection and recycling process289
Retailers are required to take-back old equipment whenever a new item is purchased, at no cost to the consumer. If no similar type of new item is purchased, consumers are required to purchase a recycling sticker from their local council to attach to the equipment to cover collection costs. In 2009 this was the equivalent of NZ$30 for an average TV set. Large items are collected by contractors, with smaller items being dropped off at recycling collection points.

Each year the Ministry of the Environment sets recycling targets in consultation with the industry. Manufacturers or importers not meeting these targets are required to pay the Government for the balance at agreed rates, as well as up to a 30% penalty fine based on a sliding scale, depending on the size of the shortfall.

An ‘Association of Electronics Environment’ was established in 2000 at the direction of the Minister of Environment, “to preserve the environment through collection and recycling of electronic waste and to contribute to building a resource cycling society.”

Today, the network of e-waste collection centres has expanded to some 70 distribution centres with approximately 3300 sales branches and 232 ‘local autonomous organisations’. Government-funded recycling centres have been established in each of South Korea’s five geographic regions with a combined treatment capacity of 85,000 tonnes per year. These facilities are supported by a further 32 specialist recycling affiliates. The total volume of e-waste recycled in 2007 was 106,000 tonnes and this was expected to increase to 154,000 tonnes by 2011.

There are also five large government-funded facilities which both process ewaste and run community education programmes.

A diagram showing the general flow of ewaste in South Korea is on the next page.
17.7 UNITED STATES OF AMERICA

Electronic waste is the fastest growing component of municipal solid waste in the USA. In 2008 it was estimated that up to 80% of the US ewaste initially collected for recycling purposes is exported to developing countries for informal recycling procedures.290

17.7.1 Legislation and regulation

The United States has taken several initiatives for the recycling and re-use of end-of-life electronic products, based on an extended producer responsibility principle. Sponsored by the Environmental Protection Agency (EPA), the National Electronics Product Stewardship Initiative (NEPSI) was proposed in 1999 to finance a national ewaste recycling system. The programme mainly focused on the TVs and personal computers. Ewaste recycling was encouraged by bans on disposal and incineration of CRTs in Massachusetts in 2000 and in California in 2001.291 Maine and Minnesota have banned disposal of CRTs in landfills and all CRTs must be recycled in these states.292

In 2006, the Washington State Legislature created the Electronic Product Recycling Law which mandates the manufacturers/producers of electronic appliances to provide recycling services to households, small businesses, small local governments, charities and schools throughout the state at no cost.293

In 2006, Maine started a ewaste program covering monitors, TVs and laptops discarded by households.294 In this system the recycling responsibility is shared by municipalities which collect the ewaste and the manufacturers who transport and recycle the ewaste. Hawaii, Massachusetts, South Carolina and New Jersey have introduced bills to establish advance recycling fees.295 Some organisations such as the Northeast Recycling Council, Northeast Waste Management Officials’ Association and the Northwest Product Stewardship Council have been working on developing regulations at a regional, state and local community level. Some states are still in the process of adopting ewaste regulations and so far the US does not have a federal regulation that addresses the complete ewaste situation. The Basel Action Network (BAN) and the Silicon Valley Toxics Coalition (SVTC) are two non-governmental organisations that oppose the export of ewaste to developing countries.

17.7.2 Collection and recycling processes

In general, municipalities play the main role in e-waste collection and recycling programs in the US.296 There are several ewaste collection options available in the US including curbside collection, special drop-off events, permanent drop-off locations, takeback and point-of-purchase.

17.7.2.1 Curbside collection

In the curbside model, the collection of ewaste occurs either on a periodic basis like a general municipal waste collection or by request. In this collection system transport is provided by local government, a private recycler, or a third party. Though this model is the convenient for residents but its operating cost can be higher than other collection options.
17.7.2.2 Special drop-off event
This is a one or two day event that usually held over weekend to maximise resident participation. In this collection option, the quantity of devices collected depends on the extent of participation by consumers and the weather during the special event period. In the case of a special drop-off event, consumers need to bring their ewaste to the collection site. Local government or the recycler then takes responsibility for the transportation to the recycling processing site. A special drop-off event was considered as an ideal recycling program through involvement of experts from the repair industry, who can sort out the valuable items for resale, repair, and re-use.\textsuperscript{297} A pilot project by US Environmental Protection Agency (EPA) showed that special drop-off events were the most effective collection method in rural areas.\textsuperscript{298} Special drop-off events that take place at retail stores appeared to be the most successful collection method in terms of people participation or cost of operation.

17.7.2.3 Permanent collection option
Permanent-collection is a year-round collection activity in which municipal solid waste collection sites are used for collection of ewaste. In this collection method, residents are responsible for the transportation of ewaste to the collection sites, while the transportation of the collected ewaste to the processing site is the responsibility of the recycler. This collection system was found cost-effective; however, it might not be applicable to every community size.

17.7.2.4 Point-of-purchase collection model
Retailers of electronic products serve as the collection agency where consumers can return the ewaste to the retailer at the time of purchase of new electronic equipment. This collection option can be implemented as either a permanent or special drop-off event, depending on the retailer’s preference. The active participation of the retailer is essential for the success of this method.

Among these collection options, permanent collection (47%), special drop-off events (45%), and curbside collection (8%) are the most extensively used programs in the US. Several computer manufacturers have established take-back collection systems for collecting used electronic products from consumers. IBM, Dell, HP, and other computer manufacturers collect end-of-life computers and related products, regardless of the brand. Flow of ewaste recycling in the US\textsuperscript{299} is shown below.

---

**Figure 17-6: Flow diagram of ewaste recycling in USA**

---

Product collection

- Test/sort
  - Resale/reuse product
  - Resale/reuse parts
  - Disassembly
  - Disposal
  - Size reduction
  - Market
  - Separation by materials

Cathode ray tubes

---
17.7.2.5 Materials Recovery Facility (MRF) processing

Once ewaste is collected, they are transported to recycling facility or material recovery facility where it is further tested and sorted. In the US, the recovery process is an important step in ewaste recycling. Equipments collected during the process are divided into two categories, reusable and recyclable. Various steps in the MRF processing are shown below.

![Flowchart for recovery process of scrap metal](image)

**Figure 17-7: Flowchart for recovery process of scrap metal**

The equipment that can be re-used is sorted and the rest is recycled. During recycling, ewaste is sorted for three markets based on their economic values. Equipment in the first market is refurbished and sold or donated to secondary users. The second market is for components that can be reclaimed, resold, and re-used. The third market is for salvaged and recycled materials.

17.7.3 Financing

The State of California has a law charging consumer fees (advanced recycling fees), at the time of purchase of new products. The system covers monitors, TVs and laptops. In 2008 the value of the fee varied between US$6 and US$10. Collection and transport are the most costly steps in ewaste recycling – 2005 review estimated they represented more than 80% of the total cost of recycling.

In Maine, manufacturers pay for the recycling of televisions, computer monitors, portable computers and other ewaste.

17.7.4 Standards

In 2010 the Basel Action Network (BAN) introduced e-Stewards E-Waste Recycler Certification. Supported by Greenpeace USA, the e-Stewards standard requires recyclers to eliminate the export of hazardous ewaste to developing countries and prevent the dumping of ewaste in landfill or incinerators. The US EPA has the Responsible Recycling Practices (R2), a set of standards, for ewaste recyclers. The new certification system imposes ban on landfill-disposal or burning of certain materials.

17.8 TECHNOLOGICAL ADVANCEMENT FOR MINIMISING ENVIRONMENTAL IMPACT OF EWASTE

There are various groups in the world who are working on utilisation and recycling of ewaste to minimise its impact on human health and...
environmental degradation. Some of the technological advancements are discussed below.

In the UK, researchers at Department of Chemistry, University of York, have found a way to turn electronic waste from LCD screens into an anti-microbial substance that destroys infections. Polyvinyl-alcohol (PVA), a chemical compound present in LCD televisions, is compatible with the human body.

In Canada, Nortel has developed a lead-free phone that performs better than those made with lead-based solder. A company in Vancouver made the Olympic medals from gold, silver and copper recovered from end-of-life electronics otherwise destined for the landfill.

In the US, Motorola has developed a phone with 95 percent less lead than its conventional phones.

ViewSonic has announced two new eco-friendly LED mercury-free monitors.

Asus has developed a notebook whose case is made of bamboo.

The recovered gold, silver and copper used in the Olympic medals came from 6.8 metric tonnes of electronics circuit boards collected and processed at Teck’s Trail, BC facility and the Umicore facilities in Belgium.

In the US, Motorola has developed a phone with 95 percent less lead than its conventional phones.

ViewSonic has announced two new eco-friendly LED mercury-free monitors.

Asus has developed a notebook whose case is made of bamboo.


243 Ing Nils Nissen, Lutz Stobbe, Karsten Schischke, Jutta Muller and Herbert Reichl, op cit.

244 Anna Bernstad, Jes la Cour Jansen and Henrik Aspegren, Evaluation of property close source separation of hazardous waste and waste electronic and electric equipment – a Swedish case study, Waste Management, Vol 31, 2011, pp 536-543


249 Ibid.


256 Deepali Sinha Khetriwal, Philipp Kraeuchi, and Rolf Widmer, op cit.


259 Ibid

260 Martin Streicher-Porte, SWICO/SENS, the Swiss WEEE recycling systems and best practices from other European systems, IEEE international symposium on electronics and the environment, 2006, pp 281-287.


INTERNATIONAL EWASTE DEVELOPMENTS


277 www.cnngo.com/tokyo/shop/urban-mining-finding-value-amongst-old-electronics-464333


279 PC Recycling in Japan, inform strategies for a better environment. (www.informinc.org/japanpc.pdf)


281 Sung woo chung and Rie Murakami-Suzuki, A comparative study of e-waste recycling systems in Japan, South Korea and Taiwan from the EPR perspective: implication for developing countries, 2008. (www.idr.go.jp/English/Publish/Download/Spot/pdf/30/007.pdf)


285 Soo-cheol Lee and Sung-in Na, E-waste recycling systems and Sound circuitive economies in East Asia: a comparative analysis of systems in Japan, South Korea, China and Taiwan, Sustainability Vol 2, 2010, pp 1632-1644.


292 www.retroworks.net/assorted/RecyclingToday_.CRTGlassRecy_1203.pdf


294 Campaign for recycling, summary of e-waste laws in the US. www.campaignforrecycling.org/issues/ewaste/summary_legislation


297 Ibid

298 Ibid

299 Ibid

300 Ibid


302 Hai-Yong Kang and Julie M. Schoenung, op cit.


304 http://e-stewards.org/certification-overview/

305 ERI to pursue official BAN e-steward certification. www.africainstitute.info/electronics


308 The toxic content of cell phones. (www.p2pays.org/ref/19/18713/cph3.pdf)


310 www.asus.com/Notebooks/Superior_Mobility/U33Jc/
## 18. Appendix 3: New Zealand ewaste recyclers

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Abilities Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td>Community group</td>
</tr>
<tr>
<td>LOCATION</td>
<td>91 Hillside Road, Glenfield, Auckland</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.abilities.co.nz">www.abilities.co.nz</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>May charge depending on type and amount of equipment</td>
</tr>
</tbody>
</table>
| RECYCLING PRACTICES (unverified) | • Use strategic partners for the disposal of ewaste.  
• Dis-assembly of electronic products into re-usable components.  
• Dismantle equipment, sort and collect the different components and take them to the recyclers for re-use.  
• Typically recover the steel, copper, printed circuit boards, aluminium and recyclable plastics.  
• Dismantle monitors and ‘safe disposal’  
• Destruction of hard drives |

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Computer Recyclers</th>
</tr>
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<tbody>
<tr>
<td>CATEGORY</td>
<td>Community group</td>
</tr>
<tr>
<td>LOCATION</td>
<td>49 Turret Rd, Tauranga South, Tauranga 3112,</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.computerrecyclers.co.nz/">www.computerrecyclers.co.nz/</a></td>
</tr>
</tbody>
</table>
| PUBLIC OFFER | • Recycling old broken computers, laptops, LCD monitors, LCD TVs, CRT monitors, printers, mobile phones, network switches, network cables, and basically anything that attaches to a computer.  
• Pickup and removal of computer waste and parts on request |
| RECYCLING PRACTICES (unverified) | Fix and repair desktop computers and laptops |

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Cargill Enterprises</th>
</tr>
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<tbody>
<tr>
<td>CATEGORY</td>
<td>Community group</td>
</tr>
<tr>
<td>LOCATION</td>
<td>199 Hillside Road, South Dunedin</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.cargillenterprises.co.nz">www.cargillenterprises.co.nz</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>Trading arm of the Disabled Citizens Society (Otago Inc.)</td>
</tr>
<tr>
<td>RECYCLING PRACTICES (unverified)</td>
<td>Use strategic partners to recycle and then dispose of computers and peripheral equipment.</td>
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<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Computer Consultancy and Recycle IT Ltd</th>
</tr>
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<tr>
<td>CATEGORY</td>
<td>Primarily small retail</td>
</tr>
<tr>
<td>LOCATION</td>
<td>29 Jesmond Street, Ngaruawahia, Waikato</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.recycle-it.co.nz/">www.recycle-it.co.nz/</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>Recycling services not detailed on website</td>
</tr>
<tr>
<td>RECYCLING PRACTICES (unverified)</td>
<td>Fix and repair desktop computers and laptops</td>
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• Pickup and removal of computer waste and parts on request |
| RECYCLING PRACTICES (unverified) | Fix and repair desktop computers and laptops |
### Computer Recycling Ltd

**Category:** Dismantling, Exporting  
**Location:** 95 Gavin Street, Penrose, Auckland  
**Website:** www.computerrecycling.co.nz/  
**Public Offer:** Free pickup in Auckland of all types of ewaste, computers and electronic equipment, including:  
- Computer monitors, plasma, CRT and LCD  
- Mainframe and server computers, laptops, notebooks, personal computers, desktop computers, software power supplies, UPS (uninterruptable Power Supplies)  
- PABX Systems, telephone equipment, cellphones, PDAs, handhelds  
- Hubs, routers, switches, all peripherals, keyboards, mice, modems  
- Terminals, thin client, laser printers, inkjet printers, dot matrix printers, photocopiers (drop off to yard)  
- Fridges, freezers, dishwashers (drop off to yard)  
- Electronic components, PCBs and industrial electronics, cables and leads  

**Recycling Practices (unverified):**  
- Hold a Basel Permit - to Singapore  
- All CRT monitors are tested and graded before sale and/or export  
- All CRT monitors failed its Grading Test (Yellow/dead/screen burn/scratched) is dismantled on-site, the glass sent off-shore through Basel State that no retired or waste electronics, plastic or glass is placed into dumpsters or back into landfill except for a less than 1% residue  
- Divide out as much equipment as possible, for reuse, these items are then tested and or, refurbished then remarkepted.  
- Equipment that can’t be reused is prepared, and or, dismantled and packaged for recycling.  
- State that all equipment sent overseas for recycling is sent to and processed by an ISO certificated Recycler, and the equipment is shipped in accordance to the Basel Convention.  
- Claim that the effective technical sorting and salvaging for refurbishment, offsets the cost of recycling the ewaste, allowing them to offer their free service.

### Core Technology Brokers

**Category:** Decommissioning, Refurbishment  
**Location:** Unit C, 66 Barrys Point Rd, Takapuna, Auckland  
**Website:** www.core.net.nz  
**Public Offer:** Refurbishment and recycling  
**Recycling Practices (unverified):**  
- Obsolete computer hardware with no resale value is treated as scrap recycling.  
- State that they completely dismantle equipment and separate into recoverable and hazardous.  
- The recoverables, such as aluminium, plastics, iron, copper, are sent to local companies for recycling.  
- The hazardous items are collated for further processing by “government certified” companies, mainly overseas.

### DecomIT Ltd

**Category:** Decommissioning, Refurbishment  
**Location:** 25 Selwyn St, Onehunga, Auckland  
**Website:** www.decomit.co.nz  
**Public Offer:** Equipment breakdown and component recycling  
- Remarketing – i.e. reusing systems rather than disposing of them  
- Certified ewaste systems to minimise impact on environment  
- Free disposal of ewaste  
- Certificate of disposal available upon request  

**Recycling Practices (unverified):**  
- Partner with leading New Zealand ewaste providers to ensure that all IT equipment that has no value or re-use is disposed of in an environmentally efficient way.
### Divers Group

**CATEGORY**
- Decommissioning
- Refurbishment

**LOCATION**
41 Andrew Baxter Drive, Airport Oaks, Auckland

**WEBSITE**
[www.divers.co.nz/services_ewastesolutions.htm](http://www.divers.co.nz/services_ewastesolutions.htm)

**PUBLIC OFFER**
- Dispose of large quantities of obsolete equipment for large organisations.
- Divers will act as a collection point for all your obsolete equipment, and transport it to overseas processing facilities.
- Can issue a certificate of destruction that provides a written guarantee that equipment has been disposed of in an environmentally-responsible manner.

### E Scrap Recycling / Metalcorp NZ Ltd

**CATEGORY**

**LOCATION**
615 Halswell Junction Road, Hornby, Christchurch

**WEBSITE**
[www.escraprecycling.co.nz](http://www.escraprecycling.co.nz)

**PUBLIC OFFER**
- Will pay for many specific components of ewaste
- Whole PCs can be dropped off for free
- CRT televisions and monitors are the only items that attract a charge - at $4.50 each

#### Computer scrap $NZ/Kg
- IC chips: 20.00
- Fans: 0.38
- CPU cards: 20.00
- Laptops: 0.93
- Memory sticks: 8.00
- Slave cable: 0.20
- Telecom boards: 3.19
- Low grade circuit boards: 0.12
- Medium grade circuit boards: 0.70
- Mixed computer scrap: 0.00
- PC server incomplete: 0.29
- PC server complete: 0.40
- PC motherboards: 3.08
- Hard drives: 0.93
- CPU processors: 31.00
- Keyboards / mouse: 0.00
- CD-Rom and floppy drives: 0.17
- Apple computers (Mac): 0.00

#### Telecommunications scrap
- Meterboxes: 0.65
- Modems: 0.15
- Telephone switches: 0.29
- Telephones / printers / faxes: 0.00
- Cellphones: 2.10

#### Chargeable materials & Items $NZ/each
- TVs: 4.50
- CRT monitors: 4.50

#### Power Supply Scrap $NZ/Kg
- NiMH batteries: 0.55
- NiCd batteries: 0.33
- Lithium batteries: 1.37
- AC adapters and chargers: 0.50
- PC power supply: 0.44
- TVs: 4.50
- CRT monitors: 4.50

#### Power Supply Scrap $NZ/Kg
- NiMH batteries: 0.55
- NiCd batteries: 0.33
- Lithium batteries: 1.37
- AC adapters and chargers: 0.50
- PC power supply: 0.44

**RECYCLING PRACTICES (unverified)**
- No details of how material is processed
<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>E-waste Recycling Hawkes Bay</th>
<th>E-waste Recycling (Now also part of the RCN e-Cycle initiative)</th>
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<tr>
<td>CATEGORY</td>
<td>Community group</td>
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</tr>
<tr>
<td>LOCATION</td>
<td>Unit 4, 24 Goodsheid Road, Upper Hutt</td>
<td>Unit 7, 101 Gracefield Road, Seaview, Wellington</td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>Earthlink provides a drop in service for recycling.</td>
<td>Public Offer As of November 2010 they recycle anything that has computer parts, VCRs, DVD players, computer chips, wire, ovens, fridges, even batteries.</td>
</tr>
<tr>
<td>Recycling Practices (unverified)</td>
<td>State that they process ewaste either through refurbishing or dismantling and disposing of recovered components via the most environmentally friendly means available. i.e. not dumped in landfills.</td>
<td>Recycling Practices (unverified) States that they shred all hard drives before they leave their premises for ewaste processing to the specified customer security level. Also state they fully comply with the Basel convention. IT Recycler performs &quot;a certified withdrawal of waste through Sims Meric.&quot;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Ecycler</th>
<th>Ecycler</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td>73 Memorial Ave, Christchurch</td>
<td>73 Memorial Ave, Christchurch</td>
</tr>
<tr>
<td>LOCATION</td>
<td><a href="http://www.ecycle.co.nz/">www.ecycle.co.nz/</a></td>
<td><a href="http://www.ecycle.co.nz/">www.ecycle.co.nz/</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>As of November 2010 they recycle anything that has computer parts, VCRs, DVD players, computer chips, wire, ovens, fridges, even batteries.</td>
<td>As of November 2010 they recycle anything that has computer parts, VCRs, DVD players, computer chips, wire, ovens, fridges, even batteries.</td>
</tr>
<tr>
<td>Recycling Practices (unverified)</td>
<td>• Cables and wire: are removed from inside computers and given to New Zealand recyclers that extract copper.</td>
<td>Recycling Practices (unverified) • State they shred all hard drives before they leave their premises for ewaste processing to the specified customer security level.</td>
</tr>
<tr>
<td></td>
<td>• Computer cases: Remove everything from inside. What remains is melted down for reuse.</td>
<td>Also state they fully comply with the Basel convention.</td>
</tr>
<tr>
<td></td>
<td>• Whole computers: Sometimes make whole computers and sell them to subsidise other services. Refurbished computers also given to people in the community that would not otherwise be able to get one.</td>
<td>IT Recycler performs &quot;a certified withdrawal of waste through Sims Meric.&quot;</td>
</tr>
<tr>
<td></td>
<td>• Motherboards: Are recycled for their copper and gold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Heat sinks: Are removed from CPUs and steel, through New Zealand metal recyclers. Some that are over 200W are on-sold. PCI cards: PCI cards are on-sold after testing to ensure they are working.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CD and floppy drives: floppy drives, CD drives and DVD drives are recycled for their metal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Power supplies: Are recycled for their copper and steel, through New Zealand metal recyclers. Some that are over 200W are on-sold. PCI cards: PCI cards are on-sold after testing to ensure they are working.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• RAM: RAM is also removed and they state that they extract copper and gold.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• CPUs: State that they extract the gold.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>IT Recycler (2nd Wave Technology trading as: ITRecycler)</th>
<th>IT Recycler (2nd Wave Technology trading as: ITRecycler)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td>73 Memorial Ave, Christchurch</td>
<td>73 Memorial Ave, Christchurch</td>
</tr>
<tr>
<td>LOCATION</td>
<td>Unit 7, 101 Gracefield Road, Seaview, Wellington</td>
<td>Unit 7, 101 Gracefield Road, Seaview, Wellington</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.itrecycler.co.nz/">www.itrecycler.co.nz/</a></td>
<td><a href="http://www.itrecycler.co.nz/">www.itrecycler.co.nz/</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td></td>
<td>PUBLIC OFFER</td>
</tr>
<tr>
<td>Recycling Practices (unverified)</td>
<td>• State they shred all hard drives before they leave their premises for ewaste processing to the specified customer security level.</td>
<td>Recycling Practices (unverified) • State they shred all hard drives before they leave their premises for ewaste processing to the specified customer security level.</td>
</tr>
<tr>
<td></td>
<td>• Also state they fully comply with the Basel convention.</td>
<td>Also state they fully comply with the Basel convention.</td>
</tr>
</tbody>
</table>
| | • IT Recycler performs "a certified withdrawal of waste through Sims Meric."

NEW ZEALAND EWASTE RECYCLERS
**Business: IT Recycle**

- **Location**: 10A Honan Pl, Avondale, Auckland
- **Website**: www.itrecycle.co.nz
- **Public Offer**: Free pickup in Auckland for: computers, monitors, laptops, servers, terminals, printers, router switches, all network equipment, cell phones, all types of circuit board, wiring & cabling, scientific equipment, electronics scrap, copiers, typewriters, fax machines, PDA and mobile phones, ups, LCD TV, DVD players, overhead projectors, stereo equipment, car battery, tools, electrical motors.

**Recycling Practices (unverified)**
- On-site physical destruction of hard drives and data storage media on request.
- Auditing, reporting and online project tracking on request.
- Certificates of destruction issued on request.
- Free dismantle of all computers on request.

**Business: PC Recycle**

- **Location**: 204 Featherston Street, Palmerston North
- **Website**: www.pcrecycle.co.nz
- **Public Offer**: Recycling and refurbishment. Charge per item:
  - Computer screen (monitor, CRT or LCD. 17-19’): $10.00
  - Computer screen (monitor, CRT or LCD. 20-21’): $15.00
  - Computer box (case/box. small & medium sized): $5.00
  - Printers & scanners (small - medium sized): $10.00
  - Laptops & accessories: $10.00
  - Pickup within Palmerston North: $20.00
  - Data wiping of hard drives add $5.00
  - Cellphones: Free
  - All other Items POA

**Recycling Practices (unverified)**
- No details of how material is processed.

**Business: Molten Media**

- **Location**: 205-A Wordsworth Street, Sydenham, Christchurch
- **Website**: www.molten.org.nz
- **Public Offer**: 
  - Resource recovery from ewaste
  - Computer repairs
  - Sales of second-hand computer systems, components and parts
  - Training for young people on employment skills; resource recovery; refurbishing, repairing and rebuilding computer equipment
  - Computers in the Community project.
  - Ask for a donation on any goods dropped off to cover cost of recycling many of the items received. The following is the donation guide:
    - CRT monitors: $5.00
    - LCD monitors: $5.00
    - Laser printers: $2.00
    - Inkjet printers: $2.00
    - Copiers: $5.00
    - Videos/stereos $5.00
    - UPS: $4.00
    - TVs: $10.00

**Recycling Practices (unverified)**
- "All materials we dispose of are done so in accordance with the Basel Convention."

**Business: PC Recycling**

- **Location**: 28 Fitzherbert Ave, West Harbour, Waitakere, Auckland
- **Website**: www.pcrecycling.co.nz
- **Public Offer**: Free pickup in Auckland for more than 10 items: computers, monitors, laptops, servers, terminals, printers, router switch, all network equipment, electronics scrap, cell phones, all types of circuit board, wiring & cabling, scientific equipment, microwave oven, electronics scrap, copiers, typewriters, fax machines, PDA and mobile phones, UPS, LCD TV, DVD players, overhead projectors, stereo equipment, car battery, tools, electrical motors

**Recycling Practices (unverified)**
- "Disposed of in a socially aware and environmentally friendly manner."
<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>RCN e-Cycle</th>
<th>BUSINESS</th>
<th>Southland Disability Enterprises</th>
</tr>
</thead>
</table>
| CATEGORY       | • Dismantling  
|                | • CRT splitting  
|                | • Exporting  | CATEGORY       | Community Group |
| LOCATION       | Multiple locations  | LOCATION       | 8 Kinloch Street, Grasmere,  Invercargill |
| WEBSITE        | www.e-cycle.co.nz/  | WEBSITE        | www.sde.org.nz |
| PUBLIC OFFER   | Partnership between RCN Group and Community Recycling Network. Offers recycling service for domestic sources of ewaste. Network of 20 collection sites with varying charges. See section above for more detailed description. | PUBLIC OFFER   | No details of ewaste recycling service provided on website |
| RECYCLING PRACTICES | See the section above for a detailed description | RECYCLING PRACTICES | (unverified) |

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>RCN e-Waste</th>
<th>BUSINESS</th>
<th>Sims Recycling Solutions</th>
</tr>
</thead>
</table>
| CATEGORY       | • Business to business  
|                | • Dismantling  
|                | • CRT splitting  
|                | • Exporting  | LOCATION       | 5/113 Pavilion Drive, Airport Oaks’ Auckland |
| WEBSITE        | www.rcn.co.nz  | PUBLIC OFFER   | • Dismantles a wide range of electrical and electronic products, ensuring all sensitive data is shredded to protect customer assets.  
|                |  
|                | • Hazardous substances are recovered and disposed of in an environmentally friendly manner. | RECYCLING PRACTICES | (unverified) |
| RECYCLING PRACTICES | • Turnkey management of all ‘end-of-life’ IT equipment.  
|                | • CRT and TV disassembly plants in Auckland, Wellington and Christchurch.  
|                | • Data destruction and shredding of components |  |

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Recytech</th>
<th>BUSINESS</th>
<th>southland disability Enterprises</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td></td>
<td>CATEGORY</td>
<td>Community Group</td>
</tr>
</tbody>
</table>
| LOCATION       | 5 Argus Place, Glenfield, Auckland, 2  
<p>|                | Level 6, 114 The Terrace, Wellington  | LOCATION       | 8 Kinloch Street, Grasmere,  Invercargill |
| WEBSITE        | <a href="http://www.recytech.co.nz">www.recytech.co.nz</a>  | WEBSITE        | <a href="http://www.sde.org.nz">www.sde.org.nz</a> |
| PUBLIC OFFER   | Recycle end-of-life computers, monitors, TVs, mobile phones, printers and other electronics. | PUBLIC OFFER   | No details of ewaste recycling service provided on website |
| RECYCLING PRACTICES | Work with business partners in New Zealand and internationally who they state recycle ewaste in a responsible and efficient way. ISO 9001 / 14001 and Basel Certified Partners. | RECYCLING PRACTICES | (unverified) |</p>
<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>TES-AMM</th>
<th>BUSINESS</th>
<th>REMARKIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td></td>
<td>CATEGORY</td>
<td>Decommissioning</td>
</tr>
<tr>
<td>LOCATION</td>
<td>89 Lansford Crescent, Avondale, Auckland</td>
<td>LOCATION</td>
<td>Recycling</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.tes-amm.com/regional.asp?id=6&amp;id=31">www.tes-amm.com/regional.asp?id=6&amp;id=31</a></td>
<td>WEBSITE</td>
<td><a href="http://www.remarkit.co.nz">www.remarkit.co.nz</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>Collect and export ewaste for recycling</td>
<td>PUBLIC OFFER</td>
<td>Services include: decommissioning, security wiping, remarketing, auctions/tenders, commissioning, imaging new equipment, deployment of new equipment, asset management, freight, warehousing/storage, recycling ewaste.</td>
</tr>
<tr>
<td>RECYCLING PRACTICES (unverified)</td>
<td>• Hold Basel permit for export of CRTs to Australia and mixed ewaste to Singapore. • Use Global Collection Centres disassembly and segregation of various ewaste products into appropriate waste streams for onward processing. • Material uplifts and Inbound material flows can be requested, tracked and reported on-line. • Non/low value segregated waste streams such as paper, wood, plastics, ferrous metals and hazardous components are recycled locally. • Precious metal bearing wastes are pre-processed and densely consolidated for onward processing at the central refinery operation. • All relevant data on a clients’ load is entered and tracked on a unique ewaste Tracking software, following a load through the process and enabling the provision of detailed client reports. • State that refinery operations are Waste Licensed and ISO 14001 and OHSAS 18001 Accredited.</td>
<td>RECYCLING PRACTICES (unverified)</td>
<td>“Recycling-through a national and international network in an environmentally friendly way.”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>The Ark</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORY</td>
<td>Decommissioning</td>
</tr>
<tr>
<td>LOCATION</td>
<td>Unit 1 / 11 Blackburn Road, East Tamaki, Manukau</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.the-ark.co.nz/">www.the-ark.co.nz/</a></td>
</tr>
<tr>
<td>PUBLIC OFFER</td>
<td>Majority of the equipment handled comes from corporate partners or leasing organisations. Major focus is to try and get computers into New Zealand schools.</td>
</tr>
<tr>
<td>RECYCLING PRACTICES (unverified)</td>
<td>• Sort and collate the equipment depending on it’s make up into various loads, and then use third party organisations to do the recycling. • Use local recyclers for cables, steel, cardboard, aluminium, plastic, polystyrene, etc. • More complex ewaste products are sorted into major product groups such as CRT screens; computers/notebooks; miscellaneous items (printers, scanners, keyboards, mice, etc). • These are then consolidated and shipped to specialist organisations, pre-dominantly in either Korea or Singapore.</td>
</tr>
<tr>
<td>BUSINESS</td>
<td>The Computer Broker Ltd</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>CATEGORY</td>
<td>Refurbishment</td>
</tr>
<tr>
<td>LOCATION</td>
<td>76 Thackeray Street, Christchurch</td>
</tr>
<tr>
<td>WEBSITE</td>
<td><a href="http://www.computerbroker.co.nz">www.computerbroker.co.nz</a></td>
</tr>
</tbody>
</table>

**PUBLIC OFFER**
- Recycling, repairs, upgrading, decommissioning, retail and network infrastructure support.
- Recycling, repairs, upgrading, decommissioning, retail and network infrastructure support.
- Recycle or reclaim the following: Computers, laptops, servers, mainframes, hard drives, optical drives, tape drives, CRT and LCD monitors, printers, scanners, printed circuit boards, cables, power supplies, batteries, memory, CPUs, and mobile phones.
- Bulk collection service or dropoff at warehouse – some charges apply.

**RECYCLING PRACTICES (unverified)**
- Recycle ewaste in conjunction with a number of specialist organisations. The incoming waste is recorded and decommissioned, which includes asset tag removal, hard drive cleansing and reporting.
- Products are then recycled by repairing, upgrading or dismantling.
- The resulting byproducts are further processed, donated or sold to recoup costs.

<table>
<thead>
<tr>
<th>BUSINESS</th>
<th>Upcycle Ltd/CRTNZ</th>
</tr>
</thead>
</table>
| CATEGORY | • Recycling  
• Exporting |
| LOCATION | 8b Monier Place, Mt Wellington, Auckland |
| WEBSITE | www.upcycle.co.nz  
www.crtnz.co.nz  
www.ewaste.org.nz |

**PUBLIC OFFER**
- Recycle everything that has a power cable or has batteries in it.
- Free of charge drop-off at warehouse.

**RECYCLING PRACTICES (unverified)**
- All ewaste is sorted and transported to recycling plants within New Zealand or overseas, which uses required international practices to ensure the safety of workers and maximize the recovery of materials.
- The recycling plants disassemble equipment of ewaste so that the component materials, including metals, steel and plastics can be separated out to re-process for the manufacture of new products.
1. Introduction and summary

1.1. I have been asked to provide an opinion as to whether the Minister for the Environment has powers under Part 2 of the Waste Minimisation Act 2008 to make regulations under section 23 of that Act providing support for industry-based recycling schemes, in circumstances where the products involved (in particular IT products and television sets) have not been, and are unlikely to be, declared priority products.

1.2. In summary, it is my view that the Minister does have those powers under the Act. The scope of those powers would include controls on disposal of the products, requiring take-back services, fees or refundable deposits, product labelling, information collection, and any other matter contemplated under Part 2.

1.3. Having said that, I point out that for the Minister to make any regulations, significant procedural requirements must be satisfied, in addition to the specific procedures provided within the Act itself. The Minister would need to be convinced that the result was worth the cost and effort.

2. Background

2.1. Part 2 of the Waste Minimisation Act 2008 ("WMA") provides for the management of solid waste, primarily through compulsory or voluntary product stewardship schemes. Section 8 of the Act sets out the purpose, making it clear that while the primary purpose is to encourage the management of products, in "certain circumstances" (most clearly demonstrated by the priority product scheme) an element of compulsion may be applied:

> The purpose of this Part is to encourage (and, in certain circumstances, require) the people and organisations involved in the life of a product to share responsibility for:

- (a) ensuring there is effective reduction, reuse, recycling, or recovery of the product; and
- (b) managing any environmental harm arising from the product when it becomes waste.

2.2. The focus of Part 2 is towards product stewardship schemes, which address the reduction, reuse, recycling or treatment of the product to which a scheme relates. There are three levels of product stewardship scheme:

2.2.1.1. Priority product schemes, where a product is declared by the Minister to be a priority product, in which case a compulsory product stewardship scheme must be developed, accredited by the Minister for the Environment, and adhered to by those in the supply chain. The Minister may recommend the passing of regulations prohibiting the sale of a priority product, except in accordance with an accredited scheme. Failure to comply with priority product scheme regulations is a criminal offence, with fines on summary conviction of up to $100,000.

2.2.1.2. Accredited product stewardship schemes, where a voluntary scheme receives accreditation from the Minister. The members of the scheme are expected to comply with it or face enforcement by other participants or by the scheme manager.

2.2.1.3. Voluntary product stewardship schemes. The WMA makes no express provisions with respect to these schemes, but encourages them indirectly by citing them as a matter to be taken into account before a product may be declared to be a priority product (the implication being that an effective voluntary scheme may well preclude the imposition of an industry-wide priority product scheme).

2.3. To date, no products have been designated as priority products. Ministerial powers to declare priority products are limited to circumstances where the Minister is satisfied that either the product will or may cause significant environmental harm when it becomes waste, or there are significant benefits from reduction, reuse, recycling, recovery or treatment of the product, in either case provided that the Minister is satisfied that the product can be effectively managed under a product stewardship scheme. The Minister in this case is the Minister for the Environment.
3. Incentives for industry participants

3.1. Although the WMA appears to pay little attention to voluntary product stewardship schemes, in fact, it provides clear incentives for market participants to create voluntary schemes:

3.1.1.1. first, the priority product regime is clearly punitive. The rules of priority product schemes effectively become tertiary legislation. Failure to comply with the scheme rules will usually also be contravention of a regulation leading to an offence, not just by the "producer" (the manufacturer, brand owner, importer) but by any other person who knowingly contravenes those regulations319. Further, the WMA deems these offences to be strict liability offences: section 68 provides that In any prosecution for an offence specified in section 65(1)(a) ... it is not necessary to prove that the defendant intended to commit the offence. Thus it is essential for any person in the supply chain to become conversant with the regulations and comply with them at all times.

3.1.1.2. secondly, the accreditation regime is costly and is also potentially punitive. The requirements for accreditation are complex, and require an extensive and costly application to the Minister, together with a fee. The Secretary for the Environment has the power to monitor the performance of an accredited scheme, while recovering the costs of monitoring from the scheme manager on behalf of the scheme. The participants in the scheme have little control over this cost.320 The scheme manager can be subject to an audit (with costs likely to be recoverable as monitoring costs), with criminal penalties for failure to comply with the auditor's requirements321. Regulations may be made by the Minister setting out information to be included in an application for accreditation. In addition, the scheme may also be subject to further regulations made under section 23, which can also lead to criminal penalties (see paragraph 2.2.1.1).

3.2. Altogether, a voluntary product stewardship scheme is more likely to be manageable by the participants without the costly overview and quasi-regulation imposed by the accreditation regime.

4. The making of regulations

4.1. Regulations are secondary or subordinate legislation which is delegated to Ministers, who are given the law-making power by an Act of Parliament. The general principles underlying the delegation of law-making powers are:

4.1.1.1. the statute should contain matters of higher-level policy, including significant changes to existing policy, and matters that impact upon individual rights and liberties;

4.1.1.2. procedural matters that go to the essence of a legislative scheme should be in the statute;

4.1.1.3. detail and technical matters required to implement the statute should be left to delegated legislation;

4.1.1.4. offences which impose significant criminal penalties should only be in the statute;

4.1.1.5. delegated legislation is the appropriate mechanism if frequent changes are required.322

4.2. A variety of rules come within the definition of ‘regulations’, including regulations, rules or bylaws made under an Act by the Governor-General in Council or by a Minister of the Crown, and Orders in Council made under an enactment which vary or extend the scope or provisions of an enactment323. In Part 2 of the WMA there are less obvious regulation making powers that affect product stewardship schemes, including the Ministerial guidelines for products for priority product stewardship schemes set out in section 12 and the Minister's declaration of a product to be priority product under section 9.

4.3. Ministerial regulation making powers are, however, quite closely constrained. First, there are the constraints provided by the empowering provisions in any Act. Secondly, a regulation must be approved by Cabinet and laid before the House. The steps to be carried out before Cabinet will accept a regulation are set out in the Guide to Cabinet and Cabinet Committee Processes, known as "CabGuide". The CabGuide requires that before a regulation is presented to Cabinet, the Minister must provide evidence of compliance or non-
compliance with a variety of provisions including:

4.3.1.1. rights and freedoms contained in the New Zealand Bill Of Rights Act 1990;

4.3.1.2. relevant international standards and obligations (a relevant obligation in the case of solid waste being any Australian provisions, in the light of CER (Australia) and the Trans-Tasman Mutual Recognition Act 1997 (‘TTMRA’);)

4.3.1.3. the Legislation Advisory Committee Guidelines (‘LAC Guidelines’)324 which will be addressed further in paragraph 4.7.

4.4. Further, unless there is a specific exemption (and there is no specific exemption contained in the WMA) a Regulatory Impact Statement (‘RIS’) must be prepared, setting out the economic consequences of the regulation. Although there was no RIS for the WMA, since its passing (and possibly because of this omission) the rules for the requirements for RISs have been tightened, and RISs are now carried out in consultation with Treasury.

4.5. Details of consultation of affected persons or industries must be included. Other government departments may need to be consulted. In the case of matters regarding solid waste, it is likely that at the least the Department of Internal Affairs will need to be consulted in relation to potential local government issues relating to collection, storage or disposal.

4.6. Where proposed regulations create new or alter existing criminal offences and penalties, the Ministry of Justice must be consulted, and proposals to raise issues of compliance with the New Zealand Bill Of Rights Act 1990 also require consultation with the Ministry of Justice.

4.7. The LAC guidelines are interesting, and in particular address the issue as to whether the quasi-regulations referred to in paragraph 4.2 are “deemed regulations”. The Guidelines require the draft regulations to be subjected to the following tests325:

4.7.1.1. have the terms of the empowering provision and the general law been complied with when making the delegated legislation?

4.7.1.2. is the proposed delegated legislation beyond the power conferred by the empowering provision?

4.7.1.3. does the proposed delegated legislation contain an unlawful sub delegation? Is the proposed delegated legislation invalid by reason of repugnancy to any other enactment (for example, because it infringes the New Zealand Bill of Rights Act)?

4.7.1.4. is the proposed delegated legislation invalid by reason of uncertainty? (this is an issue which is frequently raised during consultation by submitters)?

4.7.1.5. could the proposed delegated legislation infringe any of the grounds set out in [Parliamentary] Standing Order 310?

4.8. Standing Order 310 sets out the grounds on which the Regulations Review Committee, a Parliamentary Select Committee, can draw the attention of the House to a regulation, with the potential for that regulation to be overturned. The grounds set out in Standing Order 310 are that the regulation -

4.8.1.1. is not in accordance with the general objects and intentions of the statute under which it is made;

4.8.1.2. trespasses unduly on personal rights and liberties;

4.8.1.3. appears to make some unusual or unexpected use of the powers conferred by the statute under which it is made;

4.8.1.4. unduly makes the rights and liberties of persons dependent upon administrative decisions which are not subject to review on their merits by a judicial or other independent tribunal;

4.8.1.5. excludes the jurisdiction of the courts without explicit authorisation in the enabling statute;

4.8.1.6. contains matter more appropriate for Parliamentary enactment:
4.8.1.7. is retrospective where this is not expressly authorised by the empowering statute:

4.8.1.8. was not made in compliance with particular notice and consultation procedures prescribed by statute:

4.8.1.9. for any other reason concerning its form or purport, calls for elucidation.

4.9. Cabinet or any person can refer a regulation or proposed regulation to the Regulations Review Committee. A regulation can be referred to the Committee after it has been passed under the Regulations (Disallowance) Act 1989. The Committee can present the regulation to the House and ask for it to be disallowed.

4.10. These rights are significant with respect to the Minister's regulation-making powers under the WMA. It is clearly conceivable that persons (potentially, in this case, importers and other traders) who feel that their property rights have been affected by the regulations, or that there has been insufficient consultation or consideration of the scheme would make a complaint of this kind. A successful Court challenge to regulations has been mounted on the grounds that the rights involved were too valuable and far-reaching to assume that silence (including, in that case, failure to consult widely) would satisfy Parliament’s intent as shown by the statute.326

4.11. Please note that there is currently before Parliament a Legislation Bill which is likely to be enacted before the end of this Parliamentary session. This Bill when passed will repeal the Regulations (Disallowance) Act 1989, and replace it with provisions addressing "disallowable instruments" in relation to subordinate legislation. Disallowable instruments include legislative instruments (such as regulations) that create, alter or remove rights or obligations or alter the content of the law applying to the public or class of the public. It is not yet clear how this would impact upon the WMA, but it seems likely that it would streamline procedures.

4.12. In summary, the making of a regulation involves the Minister for the Environment in a significant amount of work in order to comply with the various rules surrounding the making of legislation and regulations. Those rules will inevitably require consultation because of the Cabinet requirements, and a regulatory impact statement. This means that in order to make a regulation, the Minister will need to be convinced that it is worth spending resources on a regulation, and that its net benefit will be positive.

5. Further challenges to the validity of regulations

5.1. It is also possible for regulations to be challenged in the High Court, on the grounds that the regulation is 'ultra vires', that is, it is beyond the scope of the powers given by the relevant Act. In a case relevant to this issue327, involving multiple statutory powers for the making of regulations, it was argued that where there was the power for a Minister to make a regulation under one section of an Act, the Minister could not have an identical power to impose a condition under a broader section. The case involved the judicial review of a condition imposed upon the annual renewal of a licence to operate gaming machines under the (then) Gaming and Lotteries Act 1977. Regulations under section 8(5) of that Act gave broad powers to make regulations which set standard conditions for licences, while section 8(3) addressed individual licences. The argument was that standard conditions could not be imposed upon an individual licence while it was being considered under section 8(3). The High Court disagreed:

A licence condition that is justified does not become any less so because it is equally justified in other cases. There is an inevitability about the development of standard conditions in circumstances where the Crown has chosen not to make regulations. Some matters are common to all licenses ...

5.2. There is a direct parallel in this case with the dual regulation-making provisions in sections 22 and 23 of the WMA. Section 22 addresses priority product and accredited schemes. Section 23 provides for more general regulations. Its heading clearly indicates that Parliament contemplated overlap between the two sets of powers: Regulations in relation to products (whether or not priority product), materials and waste.

5.3. Further, section 5 of the Interpretation Act 1999 equally clearly provides that the heading is to be taken into account in interpretation of statutes:

5 Ascertain meaning of legislation

(1) The meaning of an enactment must be ascertained from its text and in the light of its purpose.
(2) The matters that may be considered in ascertaining the meaning of an enactment include the indications provided in the enactment.

(3) Examples of those indications are preambles, the analysis, a table of contents, headings to Parts and sections, marginal notes, diagrams, graphics, examples and explanatory material, and the organisation and format of the enactment.

5.4. For this reason, as set out below, I think that the Minister does have the power to make regulations under section 23, whether or not a product is a priority product or subject to an accredited product stewardship scheme.

6. The matters to be considered in making regulations under Part 2 of the WMA

6.1. Section 23 (2) sets out the steps to be taken by the Minister in making regulations under section 23. Again, these are couched in the negative: the Minister must not recommend the making of regulations unless the appropriate processes have been carried out.

6.2. First, the Minister may not make a regulation controlling or prohibiting the disposal, or anything done for the purposes of disposing, of products or waste328, unless he or she is satisfied that there is adequate infrastructure and facilities in place to provide an alternative to disposal. Alternatively, if the Minister is not satisfied that the infrastructure is in place, the Minister must provide a reasonable time before the regulations come into force to enable the infrastructure and facilities to be put into place. In my view, that time would be reviewable: the Minister might well allow (for example) two years for the infrastructure to be put into place. However, if at the end of two years the infrastructure was not yet in place, that period would have to be extended (again in my view) because the Minister would not be able to be satisfied that the alternative was available.

6.3. The Minister may not make a regulation controlling or prohibiting the manufacture or sale of products that contain specified materials329 unless, again, a reasonably practicable alternative to the specified materials is available. In any case, the Minister must obtain and consider the advice of the Waste Advisory Board.

6.4. The Minister must also be satisfied that there has been adequate consultation with persons and organisations who may be significantly affected by the regulations, that the benefits he or she can expect from the regulations exceed the costs (this refers, at minimum, to an RIS) and that the regulations are consistent with New Zealand's international obligations. For example, a regulation which placed restrictions upon imports of IT products from a country such as China, which may have different manufacturing mechanisms from another country, could very well contravene the New Zealand - Republic of China Free Trade Agreement.

6.5. The consultation process is likely to be extensive. It is likely to involve industry and consumer groups, together with local authorities.

6.6. However, providing these conditions are satisfied, in my view the Minister will be able to make regulations under section 23, whether or not they relate to priority products or products under an accredited product stewardship scheme.

7. A warning – compliance with other laws

7.1. Section 19 of the WMA provides that an accredited scheme applies subject to any other enactment, the general law and any bylaws. The Act is silent in respect of voluntary schemes or regulations. While it would appear that the Minister does not have to take compliance with other laws into account in making regulations, this is not the case, neither will compliance with any regulations under the WMA be an excuse for those parties affected by the regulations to fail to comply with other laws.

7.2. In particular, voluntary waste management schemes and accredited schemes have the potential to involve groups of competitors. The Commerce Act 1986 addresses contracts, arrangements and understandings which substantially lessen competition. The mere fact that a regulation has been passed does not mean that industry participants at all levels can lessen their vigilance towards anti-competitive conduct.
313 WMA section 8.
314 WMA section 22(1)(a).
315 WMA section 65(1)(a).
316 WMA sections 13-15.
317 WMA section 9(3)(d).
318 WMA section 9(2).
319 WMA sections 22(1)(a), 65(1)(a).
320 WMA section 22(3) sets out a variety of mechanisms for the Secretary of the Environment to set charges, the only constraint being that “the Secretary must use the method that he or she believes on reasonable grounds to be the most suitable and equitable in the circumstances concerned.”
321 WMA section 65(3)(a): $5000 maximum.
323 Regulations (Disallowance) Act 1989, section 2.
324 The LAC is an independent external committee of advisers, including a number of senior constitutional lawyers and law professors.
325 LAC Guidelines Chapter 10A
326 Official Assignee and others v Minister of Fisheries, [2002] 2 NZLR 722 (CA).
328 Section 23(2) referring to regulations under subsection (1)(a)
329 Section 23(2) referring to regulations under subsection (1)(b).
Electronics Recycling Standards Compared: R2 and e-Stewards®

Why the environmental groups support e-Stewards and not R2

There are now two voluntary certification programs based on performance standards for electronics recyclers: The R2 Guidelines and the e-Stewards Standard. How do they compare?

When you look at how the two standards address the four worst problems plaguing the e-waste recycling industry – particularly the problem with exporting e-waste to developing countries - it is clear that the e-Stewards Standard sets a much higher bar for this industry that is plagued by “take recyclers” and exporting. This chart explains why.

<table>
<thead>
<tr>
<th>The 4 worst problems plaguing the recycling industry</th>
<th>R2</th>
<th>e-Stewards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Problem 1: EXPORTING E-WASTE TO DEVELOPING COUNTRIES</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The U.S. exports most of its toxic e-waste to developing nations, where it causes great harm. This is the single biggest problem plaguing this industry, and U.S. laws don’t prevent it.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the standard prohibit recyclers from exporting e-waste to developing countries for RECYCLING?</td>
<td>No, exports are allowed.</td>
<td>Yes. The e-Stewards Standard prohibits these exports.</td>
</tr>
<tr>
<td>Does the standard prohibit recyclers from exporting non-working hazardous equipment or parts to developing countries for REPAIRS?</td>
<td>No. In fact, this is one of the biggest loopholes in R2. An R2 certified exporter may send non-working hazardous equipment from the U.S. to an R2 certified company in a developing nation. The R2 export language will not</td>
<td>Yes. Only working equipment, which has been tested and is fully functional may be exported to developing nations. If it doesn’t work, or hasn’t been tested, it can’t be exported if it contains hazardous components.</td>
</tr>
<tr>
<td>The 4 worst problems plaguing the recycling industry</td>
<td>R2</td>
<td>e-Stewards</td>
</tr>
<tr>
<td>-------------------------------------------------</td>
<td>---</td>
<td>------------</td>
</tr>
<tr>
<td>Does the standard require e-waste exports from the U.S. to developing countries to comply with the importing countries’ laws?</td>
<td>No. R2 says imports must go to countries “which legally allow it” but then it allows the recycler to decide what’s legal. This is a problem because only the importing countries (not an R2 exporter) have the right to determine what wastes or materials are legal for them to import. R2 claims the exports will be legal, but their auditors are not conducting a legal compliance audit. Therefore, R2 certification provides no legitimate proof that the imports are legal.</td>
<td>Yes, and goes beyond this. The exports of toxic materials for recycling and exports of non-working toxic e-waste are simply not allowed from developed to developing countries. Legal compliance is not an issue because the exports don’t take place.</td>
</tr>
</tbody>
</table>

**Problem 2: INCINERATION/LANDFILLING E-WASTE**

U.S. laws allow toxic e-waste to be sent to solid waste landfills and incinerators that are not designed for hazardous waste, resulting in inappropriate management and release of heavy metals and persistent bio-accumulative chemicals.

| Does the standard prohibit incineration or landfilling of toxic e-waste? | No. R2 discourages but still allows R2 certified recyclers to put toxic e-waste in solid waste landfills or incinerators, including waste-to-energy incinerators, if undefined ‘circumstances beyond their control’ occur. | Yes, this is prohibited. The e-Stewards Standard bans the disposal of hazardous e-waste in solid waste landfills and incinerators, including waste-to-energy incinerators. |

**Problem 3: WORKER HEALTH & SAFETY**

The U.S. is doing little to identify potential hazards and to protect its own electronics recycling workers. A common practice in the U.S. is to shred electronics that contain mercury, small batteries lead-free solders, and brominated flame retardants in the mix, when it is widely known that this disperses toxins directly into the workplace and the shredded materials.

<p>| What chemical hazards does the standard require the recycler to address in protecting workers? | R2 leaves it up to recyclers to identify the toxic chemicals they are dealing with, their potential hazards, and appropriate tests for exposures. | The e-Stewards Standard specifies the hazards which must be tested for (at a minimum) while using certain recycling technologies, such as breaking CRTs, removing mercury-containing devices, shredding using solvents and thermal processes. |</p>
<table>
<thead>
<tr>
<th>The 4 worst problems plaguing the recycling industry</th>
<th>R2</th>
<th>e-Stewards</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What kinds of worker health testing or monitoring are required?</strong></td>
<td>R2 has no baseline requirements for what tests should be done to check for exposure to toxic materials common in electronics, or how to minimize exposure. R2 recyclers must develop their own Environmental Health and Safety Management System, but the requirements are very general and allow the recycler to determine what’s “appropriate.”</td>
<td>The e-Stewards Standard requires recyclers to establish and maintain procedures to minimize exposure, but it goes even further by requiring very specific kinds of worker testing and monitoring, every 6 months, by qualified professionals to detect unsafe exposures. Recyclers must conduct full occupational health and safety evaluations every 3 years.</td>
</tr>
<tr>
<td><strong>Mercury is known to be a problem for recyclers, since it’s used in lamps, switches, and button cell batteries commonly found in electronics. How does the standard address this very toxic material?</strong></td>
<td>R2 allows mercury and batteries to go into shredders. If it’s “too costly” to remove small mercury devices, and the recycler can argue that workers are protected and “appropriate technology” is used, although that’s not defined. While shredding mercury in e-waste is currently allowed under OSHA regulations, there are currently no shredders that can capture vaporized mercury.</td>
<td>e-Stewards recyclers must safely remove and separate all mercury-containing devices so they are not recycled or disposed of using potentially hazardous processing technologies (such as shredding). (End processors for mercury are allowed to do this, in fully licensed and permitted mercury retort operations.)</td>
</tr>
</tbody>
</table>

**Problem 4: PRISON RECYCLING**

The federal government sends toxic e-waste to federal prison recycling operations, where inmates lack the same rights and options to redress serious occupational hazards as private sector workers. Because this government prison recycling is subsidized by taxpayers, it competes unfairly with private sector recyclers and therefore undermines private sector recyclers.

Does the standard prohibit the use of prison recycling?  
**No.** R2 allows the use of prison recycling, and prison recycling operations may be certified.  
**Yes.** The e-Stewards Standard bans the use of prison labor for processing hazardous e-waste.

**CERTIFICATION PROGRAM OVERSIGHT**

Certification program ownership and oversight  
R2 has no owner, thus multiple R2 programs exist without central oversight on quality control, auditor training, maintenance & interpretation of “R2 Practices”, use of logo, promotion of the program, certification & accreditation.  
The e-Stewards program is housed by the Basel Action Network, with full time staff and certification consultants who oversee quality control on all aspects of the standard, auditor training, certification, accreditation, & use of logo.

Learn more about the e-Stewards program: [www.e-stewards.org](http://www.e-stewards.org)  
Electronics TakeBack Coalition [www.electronicstakeback.com](http://www.electronicstakeback.com)  
April 12, 2010
21. Appendix 6: The R2 RIOS comparative ‘recycling industry operating standard’ scorecard

<table>
<thead>
<tr>
<th>The electronics recycling standard…</th>
<th>R2</th>
<th>BAN’S STANDARD E-STEWARD®S</th>
<th>E-RIOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is supported and was co-developed by the U.S. Environmental Protection Agency.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Assures clients that recyclers comply with all relevant and applicable environmental and health and safety requirements, including the Basel Convention.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Provides independent third-party certification through companies accredited by the ANSI ASQ National Accreditation Board (“ANAB”).</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Gives companies one management system that combines key operational and continual improvement elements of ISO 9001 for Quality, ISO 14001 for Environment and OHSAS 18001 for Occupational Health and Safety performance.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Assures clients that all practicable steps are taken to reuse properly functioning equipment within a hierarchy of responsible management strategies.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Requires downstream tracking of vendors to certify that all focus materials** are processed safely and environmentally.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Promotes global economic development and the adoption of environmentally responsible and safe practices worldwide by supporting sustainable trade among high quality recycling facilities.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Discriminates against responsible recyclers on the basis of their country’s economic and social status.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Assures clients that auditing requirements will not be unilaterally changed to make sure that certain companies can pass on audit, thus assuring that the same high level standards are applied to all certified companies.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Requires recyclers to pay exorbitant annual licensing fees based on a recycler’s gross revenue.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Requires electronics recyclers to submit extensive proprietary business data to a third party, without effective controls on its use or dissemination.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Defines recyclables as hazardous wastes and suggests that recyclers should be permitted and treated as hazardous waste treatment, storage and disposal facilities (TSDF).</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Allows un-certified recyclers to use the standard’s brand, implying certification, causing confusion in the marketplace and devaluing legitimate certification.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Requires business enterprises who support the standard to pay a fee and limit their freedom to contract with responsible recyclers of their choice.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
<tr>
<td>Provides the trademarked designation of CERTIFIED ELECTRONICS RECYCLER®.</td>
<td>✔</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

* As it pertains to R2.
** All items containing polybrominated biphenyls, items containing mercury, cathode ray tubes and cathode ray tube glass, batteries, and whole and shredded circuit boards with batteries, lead solder or mercury.

www.CertifiedElectronicsRecycler.com
### 22. Appendix 7: Glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACC</td>
<td>Accident Compensation Corporation (NZ)</td>
</tr>
<tr>
<td>AEHA</td>
<td>Association for Electric Home Appliances</td>
</tr>
<tr>
<td>AIIA</td>
<td>Australian Information Industry Association</td>
</tr>
<tr>
<td>ARF</td>
<td>Advance recycling fee</td>
</tr>
<tr>
<td>B2B</td>
<td>Business to business</td>
</tr>
<tr>
<td>BAN</td>
<td>Basel Action Network</td>
</tr>
<tr>
<td>Basel convention</td>
<td>International convention, ratified by New Zealand in 1994, governing the trans-boundary movement of hazardous waste (including ewaste)</td>
</tr>
<tr>
<td>B&amp;W</td>
<td>Black and white (referring to televisions)</td>
</tr>
<tr>
<td>BDE</td>
<td>Brominated diphenyl ether (used as a flame retardant in plastics)</td>
</tr>
<tr>
<td>CANZ</td>
<td>Computer Access NZ Trust</td>
</tr>
<tr>
<td>CBA</td>
<td>Cost benefit analysis</td>
</tr>
<tr>
<td>CEANZ</td>
<td>Consumer Electronics Association New Zealand</td>
</tr>
<tr>
<td>CESA</td>
<td>Consumer Electronics Suppliers Association (Australia)</td>
</tr>
<tr>
<td>CFCs</td>
<td>Chlorofluorocarbons, used in refrigerants</td>
</tr>
<tr>
<td>CRR</td>
<td>Compulsory recycling rate</td>
</tr>
<tr>
<td>CRN</td>
<td>Community Recycling Network (NZ)</td>
</tr>
<tr>
<td>CRT</td>
<td>Cathode ray tube</td>
</tr>
<tr>
<td>DBCDE</td>
<td>Department of Broadband, Communications and the Digital Economy (Australia)</td>
</tr>
<tr>
<td>DE</td>
<td>Design for environment</td>
</tr>
<tr>
<td>DoL</td>
<td>Department of Labour (NZ)</td>
</tr>
<tr>
<td>EAÉF</td>
<td>Swedish Association of Recycling Electronic Products</td>
</tr>
<tr>
<td>EECA</td>
<td>Energy Efficiency and Conservation Authority (NZ)</td>
</tr>
<tr>
<td>EEE</td>
<td>Electronics and electrical equipment</td>
</tr>
<tr>
<td>EICC</td>
<td>Electronic Industry Code of Conduct</td>
</tr>
<tr>
<td>EMC</td>
<td>Environment management cost</td>
</tr>
<tr>
<td>eNZ/eday nZ</td>
<td>eDay New Zealand Trust</td>
</tr>
<tr>
<td>EoL</td>
<td>End-of-life</td>
</tr>
<tr>
<td>EPA - NZ</td>
<td>New Zealand Environmental Protection Agency</td>
</tr>
<tr>
<td>EPHC</td>
<td>Environment Protection and Heritage Council (Australia)</td>
</tr>
<tr>
<td>EPR</td>
<td>Extended producer responsibility</td>
</tr>
<tr>
<td>EPR2</td>
<td>Electronic Product Recovery and Recycling Project</td>
</tr>
<tr>
<td>ERMA</td>
<td>Environmental Risk Management Authority</td>
</tr>
<tr>
<td>ESIG</td>
<td>Environment special interest group</td>
</tr>
<tr>
<td>e-Stewards</td>
<td>An international standard for recycling ewaste developed by the Basel Action Network</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>EuP</td>
<td>Energy Using Products Directive</td>
</tr>
<tr>
<td>EXITO</td>
<td>Extractive Industries Training Organisation</td>
</tr>
<tr>
<td>FAIDP</td>
<td>Framework for Action on ICT for Development in the Pacific</td>
</tr>
<tr>
<td>Free-rider</td>
<td>Organisations that don’t comply with or contribute to a product stewardship scheme but benefit from it</td>
</tr>
<tr>
<td>FRRC</td>
<td>Fee Rate Reviewing Committee</td>
</tr>
<tr>
<td>GfK</td>
<td>An international market research organisation</td>
</tr>
<tr>
<td>Going Digital</td>
<td>The New Zealand Government’s brand for the switch-off of analogue television transmissions, from September 2012</td>
</tr>
<tr>
<td>HARL</td>
<td>Home Appliances and Recycling Law</td>
</tr>
<tr>
<td>Hazard</td>
<td>Property or situation in which particular circumstances can lead to harm</td>
</tr>
</tbody>
</table>
### GLOSSARY

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazard Identification</td>
<td>Determines what can go wrong by identifying a set of circumstances</td>
</tr>
<tr>
<td>HCF</td>
<td>Hydrochlorofluorocarbons, used in refrigerants</td>
</tr>
<tr>
<td>HS code</td>
<td>Harmonisation System code; internationally agreed classification of imported goods (used by Customs Departments)</td>
</tr>
<tr>
<td>HSNO</td>
<td>Hazardous Substance and New Organisms Act 1996</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and communication technology</td>
</tr>
<tr>
<td>IDC</td>
<td>An international market research firm</td>
</tr>
<tr>
<td>IIS</td>
<td>Interim Industry Standard (Australia)</td>
</tr>
<tr>
<td>INRS</td>
<td>National Institute for Research and Security</td>
</tr>
<tr>
<td>ISO</td>
<td>International Standards Organisation</td>
</tr>
<tr>
<td>ISRI</td>
<td>Institute of Scrap Recycling Industries</td>
</tr>
<tr>
<td>IT</td>
<td>Information technology</td>
</tr>
<tr>
<td>JAS-ANZ</td>
<td>Joint Accreditation System Australia and New Zealand</td>
</tr>
<tr>
<td>JEITA</td>
<td>The Japanese Electronics and Information Technology Association</td>
</tr>
<tr>
<td>LCA</td>
<td>Life cycle assessment</td>
</tr>
<tr>
<td>LCD</td>
<td>Liquid crystal display, the most common form of flat screen display used in TVs and computer monitors</td>
</tr>
<tr>
<td>LCP</td>
<td>Limited credit programmes</td>
</tr>
<tr>
<td>LED</td>
<td>Light emitting diode, a technology used to enhance and reduce power use of flat screen displays</td>
</tr>
<tr>
<td>LEV</td>
<td>Law on Resource Circulation of Waste of Electrical and Electronic Equipment and End of Life Vehicles</td>
</tr>
<tr>
<td>LRSR</td>
<td>Law for Promotion of Resource Saving and Reutilization</td>
</tr>
<tr>
<td>MCR</td>
<td>Mandatory collection rate</td>
</tr>
<tr>
<td>MED</td>
<td>Ministry of Economic Development (New Zealand)</td>
</tr>
<tr>
<td>MFA</td>
<td>Material flow analysis</td>
</tr>
<tr>
<td>MFD</td>
<td>Multifunction device, typically combined printer, photocopier, scanner and facsimile</td>
</tr>
<tr>
<td>MFE</td>
<td>Ministry for the Environment (New Zealand)</td>
</tr>
<tr>
<td>MRF</td>
<td>Materials recovery facility</td>
</tr>
<tr>
<td>NEPSI</td>
<td>National Electronics Product Stewardship Initiative</td>
</tr>
<tr>
<td>NQF</td>
<td>National Qualifications Framework</td>
</tr>
<tr>
<td>NVQ</td>
<td>National Vocational Qualification</td>
</tr>
<tr>
<td>NZAID</td>
<td>New Zealand Agency for International Development</td>
</tr>
<tr>
<td>NZES</td>
<td>New Zealand electronics suppliers</td>
</tr>
<tr>
<td>NZICT</td>
<td>New Zealand Information and Communications Technology Group</td>
</tr>
<tr>
<td>NZIER</td>
<td>New Zealand Institute of Economic Research</td>
</tr>
<tr>
<td>NZQA</td>
<td>New Zealand Qualifications Authority</td>
</tr>
<tr>
<td>OECD</td>
<td>The Organisation for Economic Co-operation and Development</td>
</tr>
<tr>
<td>OEMs</td>
<td>Original equipment manufacturers</td>
</tr>
<tr>
<td>OH&amp;S</td>
<td>Occupational health and safety</td>
</tr>
<tr>
<td>ORDEA</td>
<td>Ordinance on the Return, the taking back and the Disposal of Electrical and Electronic Appliances</td>
</tr>
<tr>
<td>OSH</td>
<td>Occupational safety and health</td>
</tr>
<tr>
<td>Pb</td>
<td>Lead</td>
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</table>
EWASTE IN NEW ZEALAND — FIVE YEARS ON

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>PBB</td>
<td>Polybrominated biphenyl</td>
</tr>
<tr>
<td>PBDE</td>
<td>Polybrominated diphenyl</td>
</tr>
<tr>
<td>PCB</td>
<td>Printed circuit board</td>
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<tr>
<td>PICTs</td>
<td>Pacific Island Countries and Territories</td>
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<tr>
<td>POPs</td>
<td>Persistent organic pollutants</td>
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<tr>
<td>PRO</td>
<td>Producer responsibility organisation</td>
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<tr>
<td>Probability</td>
<td>Mathematical expression of chance (e.g., 0.2 is a 20% or one in five chance). Often not calculable and can only be expressed qualitatively (e.g., possible/likely).</td>
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<tr>
<td>PS</td>
<td>Product stewardship</td>
</tr>
<tr>
<td>PSA</td>
<td>Product Stewardship Australia</td>
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<tr>
<td>PSO</td>
<td>Product stewardship organisation</td>
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<tr>
<td>PVC</td>
<td>Polyvinyl chloride</td>
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<tr>
<td>PWB</td>
<td>Printed wiring board</td>
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<tr>
<td>PwC</td>
<td>PricewaterhouseCoopers, an international consulting firm</td>
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<tr>
<td>R2</td>
<td>The Environmental Protection Agency in the USA has released a voluntary standard for recyclers of electronic waste, called ‘2’, R2 stands for ‘responsible recycling’.</td>
</tr>
<tr>
<td>REACH</td>
<td>The Registration, Evaluation, Authorisation and restriction of Chemicals</td>
</tr>
<tr>
<td>RCN</td>
<td>RCN Group, a New Zealand ewaste recycler</td>
</tr>
<tr>
<td>Regulation</td>
<td>The term ‘regulation’ is used in its broadest sense, being voluntary or mandatory mechanisms, legislation or formal initiatives of government or peak industry bodies.</td>
</tr>
<tr>
<td>REMB</td>
<td>Recycling Fund Management Board</td>
</tr>
<tr>
<td>RFMC</td>
<td>Recycling Fund Management Committee</td>
</tr>
<tr>
<td>RIOS</td>
<td>Recycling Industry Operating Standard</td>
</tr>
<tr>
<td>RIS</td>
<td>Regulatory impact statement</td>
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<tr>
<td>Risk</td>
<td>A combination of the probability, or frequency, of occurrence of a defined hazard and the magnitude of the consequences of the occurrence.</td>
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<tr>
<td>Risk Assessment</td>
<td>Consists of risk estimation and risk evaluation.</td>
</tr>
<tr>
<td>Risk Estimation</td>
<td>Is concerned with the outcome or consequences of an intention taking account of the probability of occurrence. It includes predicting how likely it is that a set of circumstances will occur.</td>
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<tr>
<td>Risk Evaluation</td>
<td>Is concerned with determining the significance of the estimated risks or tolerable level of risk for those affected: it therefore includes the element of risk perception.</td>
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<tr>
<td>RMA</td>
<td>Resource Management Act (NZ)</td>
</tr>
<tr>
<td>RoHS</td>
<td>European Union Directive on the Restriction on the use of certain Hazardous Substances</td>
</tr>
<tr>
<td>RONZ</td>
<td>Recycling Operators of New Zealand</td>
</tr>
<tr>
<td>RSA</td>
<td>Royal Society for the Encouragement of Art, Manufactures and Commerce</td>
</tr>
<tr>
<td>RSR</td>
<td>Recycling standard rates</td>
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<tr>
<td>SDF</td>
<td>Sustainable Development Fund</td>
</tr>
<tr>
<td>SEWPaC</td>
<td>Department of Sustainability, Environment, Water, Population and Communications</td>
</tr>
<tr>
<td>SPC</td>
<td>Secretariat of the Pacific Community</td>
</tr>
<tr>
<td>SPR</td>
<td>Shared product responsibility</td>
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<tr>
<td>SPRREP</td>
<td>Secretariat of the Pacific Regional Environment Programme</td>
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<tr>
<td>SSDPF</td>
<td>State Sector Development Partnerships Fund</td>
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<tr>
<td>S. EN. S</td>
<td>The Swiss Foundation for Waste Management</td>
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<tr>
<td>SCM</td>
<td>Scrap Computer Management</td>
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<tr>
<td>SMRANZ</td>
<td>Scrap Metal Association of New Zealand</td>
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<td>SNZ</td>
<td>Standards New Zealand</td>
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<tr>
<td>SVTC</td>
<td>Silicon Valley Toxics Coalition</td>
</tr>
<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>SWICO</td>
<td>The Swiss Association for Information, and Organisation Technology</td>
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<tr>
<td>TCLP</td>
<td>Toxicity characteristic leaching procedure, US precautionary-based test to assess maximum leachate. US EPA</td>
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<tr>
<td>TEC</td>
<td>Tertiary Education Commission</td>
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<tr>
<td>TLA</td>
<td>Territorial Local Authority</td>
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<tr>
<td>TradeMe</td>
<td>New Zealand’s largest online auction site for buying and selling goods</td>
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<tr>
<td>TV</td>
<td>Television set</td>
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<tr>
<td>UNEP</td>
<td>United Nations Environmental Programme</td>
</tr>
<tr>
<td>URS</td>
<td>An international consulting firm providing engineering and environmental expertise</td>
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<tr>
<td>USEPA</td>
<td>United States Environmental Protection Agency</td>
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<tr>
<td>Waigani Convention</td>
<td>Convention, to which New Zealand is a signatory, governing the trans-boundary movement of hazardous waste (including ewaste) between Pacific Island countries, New Zealand and Australia</td>
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<tr>
<td>WasteMINZ</td>
<td>Waste Management Institute of New Zealand</td>
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<tr>
<td>WDL</td>
<td>Waste disposal law</td>
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<tr>
<td>WEEE</td>
<td>Waste electrical and electronic equipment</td>
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<tr>
<td>WEEELABEX</td>
<td>WEEE Label of Excellence</td>
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<tr>
<td>Whitebox</td>
<td>Computers that are assembled locally using imported parts</td>
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<tr>
<td>WMA</td>
<td>Waste Minimisation Act (2008) NZ</td>
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<tr>
<td>WML</td>
<td>Waste Management Law</td>
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<tr>
<td>WRAP</td>
<td>Waste and Resources Action Programme</td>
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