

Sustainable Waste Management Sector Research Paper

Assessment of the Existing and Potential Job Market in Waste Management in Scotland

May 2003

*Report for Jobs in the Environment Support Unit prepared by
Colin Murchison of the Caledonian Shanks Centre for Waste Management*



Assessment of the Existing and Potential Job Market in Waste Management in Scotland.

March 2003

Summary

- Estimates of existing jobs directly related to the management of wastes in Scotland varied significantly, from WasteWatch's figure of **1,700** to **20,800** from the Strathclyde Labour Market Intelligence Survey.

Category	Audit Scotland	Estimate	SLIMS	WasteWatch
Managers / Supervisors	113	1959		
Operators	2552	5135		
Ancillary	/	1138		
Other		2592		
Total	5257	10,824	20,800	1700

- T** here is a significant lack of data sources on jobs existing and potential. Broad assumptions and estimates have had to be made and the figures presented can only be considered to be indicative. This was also identified in the :-

WINTO Waste Management Sector, Workforce Development Plan – July 2002 and Waste Watch Report – Jobs From Waste: Employment Opportunities in Recycling

- Segregated collection systems are likely to provide the highest quality of recovered goods - vital for the end market – reduces need for MRF's.
- The majority of jobs created are likely to be in collection services - primarily in the public sector.
- Some reprocessing will be necessary in MRF's, however larger plants offering greater economies of scale will limit the numbers. These jobs are dirty and unpleasant and consequently suffer from high turnover.
- In addition, developments in processing technology both increase quality and reduce job numbers.
- Smaller WM companies who recover the majority of Construction and Demolition Waste are often inhibited from expansion into greater sorting, by factors including
 - Lack of planning approval
 - Lack of financial support from the Enterprise Agencies
 - Sometimes lack of support or consistency from the Regulator
- Low level education eg SVQ Levels 1 and 2 in Recycling/Composting are unlikely on their own to secure or sustain employment but may be effective if part of a broader training package.
- There may be some potential for developing in partnership with Recyclers of Electrical and Electronic waste, training in equipment dismantling.
- The provision of direct waste management training eg HNC appears to be very limited while higher level education eg BSc, MSc seems also to be very low. However graduates from various disciplines are entering the sector where their background education may have included elements of waste management.
- Utilising WasteWatch data (plus the WINTO estimate of a further 7,500 ancillary jobs being created) would therefore suggest that the total number of jobs in waste management may vary from **10,000 to 12,000 jobs**.

WasteWatch	Report Estimate	SEPA
12,003	10,500	12,200

1 Introduction

Increasing legislative pressure to develop sustainable Waste Management practices in Scotland could potentially lead to significant job creation

Due to the increasing importance of waste management in Scotland and the subsequent potential for job creation, this report describes the results of a study undertaken to assess the job market and a number of the current issues which may influence potential employment levels.

The study assessed existing and potential jobs in the collection and initial processing of wastes from industrial and municipal sources.

The main drivers for change in the industry are from:

- **The Landfill Directive** - which seeks to shift dependence away from landfill and sets targets for reducing the biodegradable fraction of municipal waste for 2010, 2013, 2020
- **Producer Responsibility** – Packaging Directive – primarily focussed on business but indirectly affects LA's, also Waste Electrical and Electronic Directive (WEEE), and End of Life Vehicles Directive (ELV).
- **Landfill Tax** – currently £13/T and due to rise year on year to £35/T
- **Aggregates Tax** – Increases price of virgin aggregates by £1.60/T, aims to reduce demand for primary aggregates and stimulate use of recycled aggregates.
- **National Waste Strategy for Scotland** – 25% domestic waste to be recycled and composted by 2006 and around 85% of homes to have kerbside collection scheme by 2010.

With major changes in the industry it is to be expected that a significant increase in jobs is likely to result. New pressures in the form of Producer Responsibility which aims to pass responsibility to manufacturers for these goods at the end of their working life is a new and radical shift in approach but is limited to specific streams. There will be some impact on job creation mainly in the private sector related to equipment dismantling, although the 3rd sector is already involved in equipment refurbishment and will see an increase in opportunities.

However the primary focus of current legislation and Scottish Executive funding is targeted towards recycling municipal waste and will have a significant impact on the numbers of jobs created in the collection and recovery of recyclables (mainly glass, paper, organics, as well as some metal and plastic containers also composting). These jobs will mainly arise in the public sector. There is less direct pressure on manufactures to utilise the recovered materials and development of the markets to receive these goods will be critical to ensure long term stable outlets. Where these recycled materials are adopted they may simply displace virgin sources without significant impact on jobs.

2 Methodology

A variety of sources were used although existing data is limited

The research was undertaken primarily as a desk study reviewing existing literature, and known studies, and also involved telephone calls and meetings with various agencies, waste management companies and recycling companies. Representatives from the public, private and third sector were contacted. See Appendix 1 for summary of organisations contacted.

Despite the high profile given to the development of a shift towards more sustainable waste management, the existing information and analysis of data is very limited and even the establishment of existing base line data is not readily recorded. The figures in this report often portray a wide range of possible values depending on the source or quality of estimate

3 Waste Arisings and Flows

Wastes in Scotland predicted to grow between 2 – 3% per annum.

SEPA's Waste Data Digest (2002) records the total waste landfilled in Scotland during 2000 as 11.16 million tonnes, comprising:

- Household waste: 2.49 million tonnes
- Commercial waste: 1.58 million tonnes
- Industrial C&D(2) waste: 3.95 million tonnes
- Industrial non-C&D waste: 3.05 million tonnes
- Other waste: 0.09 million tonnes

3.1 Commercial and non C&D wastes

The existing collection and treatment of Commercial and non C&D wastes is largely already addressed by the private sector. These wastes are, where economics dictate, already segregated at source – largely giving rise to fairly homogeneous wastes which can be more readily processed and sold on to end markets. More material could be recovered but the main impetus for this largely arises from the increase in landfill tax. Some job increases are to be expected over time but not necessarily to any significant level in the near future.

3.2 C & D wastes

Similarly for the C& D wastes. The majority of waste management and recycling companies either collect this material already segregated or process the material to recover timber (mainly for recycling into particle board) and stone and concrete (to be crushed into aggregates). Stimulated by both the landfill tax and the Aggregates tax.

In contacting over 35 of the 60 demolition skip hire companies in Scotland a significant proportion advised that expansion of their operations to include greater sorting and segregation of wastes into saleable products was often inhibited by one or more of the following factors:-

- Difficulty in obtaining planning approval
- Lack of financial support from the Enterprise Agencies
- Sometimes lack of support or consistency from the Regulator
- Lack of support from their local authority – even as a provider of wastes for treatment.

Overall the companies did not expect even if able to expand their operations to employ more than one or two additional staff. Although these jobs would have the potential to be long term.

3.3 Local Authorities

Local Authorities as with other sectors, are the main employers of staff. It is estimated that 8,232 people are employed in Waste Management by councils.

Drivers / operators	5135
Managers / Foremen	1959
Ancillary staff	1138

Local Authorities provide majority of employment in waste management although difficult to identify precise

figures

Total 8,232

However the estimate of **5,135** drivers/operators is twice the **2,552** obtained from Audit Scotland but which is based only on the information from form PF4 and relates to refuse collection only amongst trade union members.

Without a more detailed analysis of the exact numbers of jobs involved in waste management it is difficult to make a reasonable estimate of even the current level of employment. Of the 32 LA's in Scotland there is no consistency with how the depts that deal with waste are established as some are part of *Public Health*, while others come under *Direct Services* or *Roads* etc. This in turn affects the numbers of ancillary jobs involved, ranging depending on dept size, from a few secretarial staff to teams in Accountancy or Human Resources and so on. In addition some authorities have their own refuse disposal operatives whilst the remainder who do not own landfills, contract this out to the private sector.

The estimates provided are based on figures obtained from:-

Audit Scotland – these figures based purely on operatives and not managers or ancillary support staff.

East Ayrshire Council – A small mixed (rural/urban) council, figures based on direct operatives including managers but not ancillary staff. The council does not operate a landfill.

Glasgow City Council – The largest Scottish urban council who have a broad range of ancillary staff and who own and operate their own disposal operations.

3.4 Other Employment Figures

Based on contact with a number of other agencies and organisations the following table summarises the estimate of jobs arising outwith Local Authorities.

Total of other jobs	
SEPA	50
Scottish Exec	15
Other orgs eg NHS etc	15
Shanks	382
Wm Tracey	230
Other skip cos 60* 10	600
Electronics	150
Other	150
3 rd Sector	1000
Total	2592

The total estimate of existing jobs is summarised below and includes figures obtained from:-

SLIMS - Strathclyde Labour Market Intelligence. This figure for Scotland has been extrapolated by SLIMS from ONS (Annual Employment Survey 1995-1997, Annual Business Enquirey 1998-2001). However the data also includes sewage and sewage treatment operations. (**This is also confidential data:1947 Statistics of Trade Act**)

WasteWatch Report - *Jobs from Waste: Employment Opportunities in Recycling*. This report assesses figures from collection to sorting to the first stage of reprocessing and suggests 17,000 current jobs. A value of 10% for this provides 1,700 for Scotland. WasteWatch also highlight the lack of available data and its fragmented state.

Total Estimates of Existing Jobs in Waste Management both Public and Private Sector

Category	Audit Scotland	Estimate	SLIMS	WasteWatch
Managers / Supervisors	113	1959		
Operators	2552	5135		
Ancillary	/	1138		
Non LA	/	2592		

4 Education / Training

Steady but weak existing demand for dedicated Graduate or Vocational education.

There are increasing numbers of professional jobs in WM but employees drawn from many sectors. Increased training at CPD level may be required.

Vocational training often most effective when programme includes

4.1 Academic

Evidence of demand for academic courses is apparently steady but not strong in Scotland. Indeed there is very limited provision for undergraduate or post graduate degrees in Waste Management with only Glasgow Caledonian University and the University of Paisley offering courses. Experience from Caledonian University where the MSc in Waste Management has been running for 2 years is that they are receiving about 25 applications a year. Knowledge of the fate of graduates is less clear but certainly a number so far are known to be working in the industry. On this current year, 2 of the part time students are from Local Authorities.

Until recently Stow College were offering an HNC in Waste Management but are no longer running the course.

4.2 Vocational

2 vocational training programmes were contacted. The evidence from the very small sample suggests that there are very definite benefits for the participants but that longer term employment once training is completed is not so certain. However by their success they also provide employment for those running the programmes.

4.3 2 Case Studies of Vocational Training Programmes

In the case of *L.A.M.H Recycle Ltd* based in Wishaw and supported by North Lanarkshire Forward, the company sustains 5 full time employees (1 development officer, 1 training office 1 operations officer 1 senior technician, 1 technician and 1 administrator). The organisation provides a range of skills training in computer renovation for mentally or physically disabled individuals. However the business is able to also sell and refurbish customers pcs and provide IT and network support to other organisations thus helping to support the business itself.

Developing North Ayrshire are running WORMS R'US A 1 yr Intermediate Labour Market, Training programme, for New Deal leading to SVQ's in Community Work level 2 and Waste Management Operations level 2. The course which began in August

development of complimentary skills

with ESF funding has been very popular with the trainees and one trainee has left after 9 months to start a composting business. The remainder have not been successful in identifying job opportunities but are being helped to develop further complementary skills, to support job prospects, such as using the compost to grow products for supply into a local market garden.

The project also provides jobs for 4 staff. A project manager, an Environmental Education Officer, an Environmental Education Supervisor and an administrator.

A similar programme is being developed for East Renfrewshire

4.4 Private Sector view of SVQ Levels 1 & 2

In an interview with a representative from Wm Tracey, they advised that providing operatives with level 1 or 2 SVQ's to work on their MRF would not be particularly attractive as the work is very simple and the requisite training can be delivered insitu in a short space of time. Additionally as the work is dirty and unpleasant they suffer from a high turnover rate.

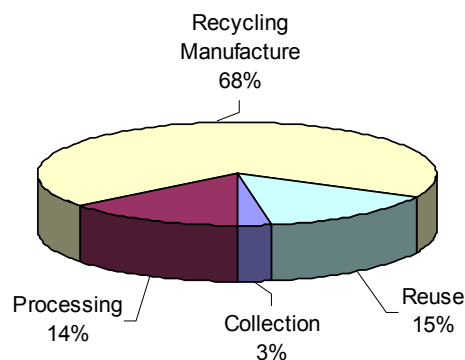
5 Potential Jobs

Potentially significant numbers of jobs could be created although American estimates likely to be overly optimistic due to differing local conditions

The potential for job creation has been predicted by WasteWatch as being a total of **45,000** for the UK if the national target of 30% is achieved by 3010.

This predicts jobs only in collection and reprocessing and does not look to the associated jobs, such as in equipment manufacture, vehicles and haulage, education, consultancy etc let alone the wider ancillary jobs that would be created by the growth or creation of small and large enterprises that will require the support staff of professionals from admin to accounting. WINTO estimate that up to a further 750,000 people work in waste associated activities (e.g motor, steel, and haulage etc) i.e **7,500** Scottish equivalent – an escalator of x1.6.

The potential for the x4 escalator from the US Recycling Economic Information Study (July 2001) where collection and processing provides 17% contribution compared to 68% for manufacture therefore seems overly optimistic for Scotland. This is further supported if we consider job creation through consideration of the materials recovered.



Glass – Rockware anticipate that 35 new jobs will be generated at their Irvine plant if they can be assured a minimum of 35,000 t of recovered glass from Scotland. This seems highly likely as an additional 12,000T of glass is anticipated to come from Ayrshire and Dumfries & Galloway alone from their new kerbside recycling programme. United Glass have also made recent investments at

Types and numbers of jobs also related to specific materials.

their plant in Alloa and would also require more staff as their supply increases.

Wood - Nexfor and Eggar the two main particle board manufacturers who between them employ around 400, are the primary end users of recovered wood. They optimally use 50% recovered fibres. They may even now be facing increasing supply of recycled timber and it is understood they have recently started to increase standards and reduce prices.

Cardboard – Old Corrugated Card (OCC) has a ready market in plasterboard through BPB in Aberdeen. The material also commands a fair price shredded for animal bedding and a number of small business have been established which provide this – at least as part of their operations. Although some opportunity unlikely to be significant.

Paper – Majority recovered news and pams delivered to Shotton or Cheshire Recycling for processing in mills South of the Border. Scotland has no newsprint capacity of its own and increases in this material will either supply these mills or be exported, without creating further manufacturing jobs. A potential to use the de-inking plant at Kilbaggie by LPC is currently being considered. This would generate 140 new jobs but is reliant on securing supplies of recovered white office paper for processing into tissue paper.

Textiles – Recent discussions with 4 textile reprocessors has found that all the companies are facing over supply and are not willing to take more material. This may indicate some market opportunity or merely market saturation.

Plastics – Up to 60,000¹ tonnes of plastic bottles with a sales value of over £6.5 million exist within Scotland's waste stream. If the material can be collected and transported then a number of facilities would be required to sort and pre-process this material creating a number of job opportunities. However the actual sorting can most economically be achieved utilising advanced mechanical sorting – see comment in box on paper sort.

Non Ferrous Metal – Aluminium cans – Alcan smelters are likely to be able to absorb significantly more tonnages before likely to affect job numbers.

Ferrous Metals – Somewhat beleaguered market with long term low prices unlikely to hold major prospect for jobs particularly following recent announcements at Corus of potentially hundreds or even thousands of job losses due to global over supply at cheap rates.

Organics – Inevitably going to create several hundred jobs in composting and processing of organic wastes as local authorities seek to achieve the landfill directive targets for 2020 of composting over 1 million tonnes of biodegradable waste.

Reuse – The 3rd Sector which is already active in Equipment and Furniture renovation is seeing an ongoing increase in the number of projects and business established to refurbish a wide range of goods. Much of this sector has also been involved in collection but the changes in the landfill tax credit scheme and the level of funding for LA collection of £230 Million for LA's over 3 years may negatively impact on jobs in this area.

Electronics – including electrical wastes as well as white goods and mercury lamps. Likely to result in a wide range of opportunities

¹ Plastics Recycling in Scotland – a report produced by Recoup for Remade Scotland, March 2003

from high tech recovery of heavy metals to simple segregation and dismantling. However the extent of the opportunity is still largely unclear as uncertainties exist in estimates of volumes arising, current recycling rates and potential increase in collection rates once a recovery system is implemented. Opportunities are also dependant on how the Directive is implemented in the UK. In Holland where the lowest disposal cost is the focus, there is virtually no drive to stimulate recovery of components or for producers to re-use recovered materials or components.

Source	Arising Prediction	Estimate Currently Recycled
ICER	44,800 T	38,080 T
ENTEC	42,000 T	31,420 T
PhD Student	112,000 T	/
WEEE Directive 4kg/head	20,400 T	

Strictly speaking according to ICER and ENTEC, Scotland is already collecting more than is required by the WEEE Directive, however the Directive does require the material to be recovered separately and once a collection scheme is established as previous studies have indicated the volume inevitably increases over time.

On the basis of US studies on recycling and employment an average of one job is created for each 465 T of processed material. For 20,400 T alone this would represent 44 jobs. And if this was in addition to existing collection it would represent 111 jobs.

In discussions with Recyclers of Electronic waste these predictions are believed to be very low and they would anticipate far more jobs to be generated. However to date no estimates from Scottish recyclers are available and indeed results from Holland² where WEEE recycling is already recovering more than the Directives requirement of 4kg/head suggests that few, if any, jobs have been created other than a small number in local authorities. This was also confirmed during a recent study tour with Electronics Scotland, where Mirec who process all the countries ICT equipment, employ no more than 30 staff.

Based on a current Phd thesis on WEEE arisings, collection by Local Authorities of WEEE for delivery to CA sites could vary between requiring 150 to 600 employees.

5.1 General Waste Management Companies

Given the picture of the current situation with the various small skip hire and waste sorting companies as well as Shanks and Tracey two of the main WM companies would suggest that they are keen to grow but limited by availability of materials. However it would seem that even significant expansion in supply would only lead to modest growth in business size in the short to medium term. Say 50 jobs in short to medium term.

Case Study of

5.2 Local Authority Collection

² *Employment Effects of Waste Management Policies*, Report for European Commission, Directorate-General Environment, Prepared by Risk and Policy Analysts limited, January 2001

Paper Sort Technology in Sweden

Prior to using automated sorting technology, IL recycling sorted the recovered paper manually. Under their previous manual sorting system, one person could sort 5 tonnes per hour. The quality of the sorted fibre was inconsistent.

With the Papersort, IL recycling now sorts 12 tonnes per hour, with two individuals, and the quality of the sorted fibre is consistently high. Around 140,000T /yr

IL Recycling suggests that they have saved the costs of 3 people. On an annualized cost basis, this represents significant savings.

Costs of Sorting ILS Recycling books show the current costs of sorting recovered fibres to be 12 SEK/tonne

ILS Recycling found significant savings in the costs of sorting mixed grade fibre. The company presented the following comparison:

- Automated sorting = 18 SEK/tonne (1.35 GBP)
- Manual sorting = 219 SEK/tonne (28.80 GBP)

Savings to company of 1.2 million SEK per year (89,539 GBP)

On the basis that 90% of homes are to have a kerbside collection scheme by 2020. And utilising an average employee level of 5 staff per 7,000 homes – derived from development of the kerbside scheme for the Ayrshire Councils (includes foremen, reserve capacity and driver plus 2 crew per vehicle), then **1,465** jobs in collection alone would be generated

5.3 Processing – MRF

The number and size of MRF’s required is critically dependant on the method of collection. For instance in multimaterial collection systems such as Glasgow’s blue box, all dry recyclables are lifted into a vehicle and taken to the MRF at Polmadie for segregation. However in Alloa where segregation takes place at the kerbside more crew are required for collection but an MRF is not required only a bulking facility for the materials is necessary.

The size of the MRF also affects the numbers of jobs created and as highlighted in the box with the case study on the paper sort technology, a higher tech facility using relatively few crew to operate. The following table summarises the relationship between level of technology at an MRF and Employee numbers.

MRF Type	Annual Tonnage Processed	No. FTE	Tonne/year/employee
High tech	60,000+	22	2,700+
High tech	60,000	20	3,000
Low tech	9,550	11	870
High tech	41,100	30	1,370
Low tech	12,500-15,000	50	250-300

Given 2.2 million tonnes of waste arising and a requirement to recycle and compost 25%, without detailed plans from each authority on their collection and reprocessing requirement then it is unclear how much of the 545,250T of waste requires processing through an MRF. However if for arguments sake it is assumed that all the material is processed in this way, then the numbers of people involved in pre-processing could range from 200 if high tech facilities are deployed to nearer 1,000 for more low tech solutions. Given that not all collections will result in the use of MRF’s an assumption of 500 jobs has been made. A similar figure for composting has been assumed.

5.4 SEPA Estimate

Employment assumptions

Employment is separated into operational jobs and construction jobs and has been calculated for each individual collection and treatment regime. For operational jobs, calculations were based on the number of employees per tonne of waste collected/treated. For construction jobs, numbers were estimated on the basis of person years of employment per unit of capital expenditure. Total employment is represented by the average number of FTE jobs per year between 2002 and 2020. The employment multiplier effect of these jobs in the local economy is also estimated using a standard multiplier of 1.08 (based on Treasury EGRUP guidance) to give the total employment impact of waste management. The main assumptions used are summarised below.

- capital expenditure on capital intensive projects such as energy from waste, is assumed to generate one person year of construction employment per £100,000 of expenditure;
- for less capital intensive options (such as landfill), £60,000 of investment is assumed to generate one person year of construction employment;
- 10 person years of construction employment is assumed to be equivalent 1 permanent full time job in terms of employment impact;
- every one thousand tonnes of waste collected is assumed to create 1.09 jobs in collection and transport;
- it is assumed that KBC collection will create twice as much employment (assuming that a large part of the extra cost will be in labour) as conventional collection;
- one job is created for every 352 tonnes of recyclables abstracted at waste facilities, (within Scotland);
- composting creates four jobs for every 10,000 tonnes of waste composted;
- all the energy from waste options are assumed to create fifty jobs; these estimates are based on scaled down figures for typical modern MSW incinerators which employ approximately 100 people per 500,000 tonnes of waste (all plants in Scotland are envisaged to be substantially smaller than this);
- in the options that send less than 100,000 tonnes per annum to landfill, there are assumed to be 10 jobs in landfill operation (based on the existing situation);
- in options sending over 100,000 tonnes to landfill there are assumed to be 20 jobs in landfill operation;
- every job in waste management generates 0.08 jobs in the broader economy as a result of:
 - procurement by waste management operators; and
 - expenditure by workers employed in waste management and supplying waste management operators.

This estimate is the mid-range of HM Treasury guidance, as set out in the EGRUP guidance on appraising regeneration projects

Source : ERM May 2002

Summary of Total Numbers of Potential Additional Jobs

	WasteWatch Sorting & Processing	WINTO	Estimate	SEPA
Paper	1,884	/	140	
Glass	805	/	40 Rockware & UG	
Aluminium	40	/	/	
Steel	419	/	/	
Plastics	427	/	20 automated sorting	
Cardboard	/	/	35 animal bedding	
Textiles	/	/	0	
Wood	/	/	0	
Refurbish goods			100	
Electronics	/	/	150	
Collection	928	/	1,465	
MRF / Composting	/	/	1,000	
Waste Management Cos			50	
Associated jobs	<i>7,500</i>	<i>7,500</i>	<i>7,500</i>	
Total	12,003		10,500	12,200

Appendix 1 References and Sources

Jobs Through Recycling Program

United States Environmental Protection Agency (EPA)

December 1997

www.epa.gov/jtr

Jobs from Waste : Employment Opportunities in Recycling

Biffa Waste

1999

www.wastewatch.org.uk

Determination of the Source, Nature, Amount and Disposal Routes of WEEE Arising in Scotland.

Report for the Scottish Executive by Entec UK Limited

September 2000

U.S Recycling Economic Information Study

Report for the National Recycling Coalition, prepared by R.W. Beck, Inc.

July 2001

Employment Effects of Waste Management Policies

Report for European Commission, Directorate-General Environment

Prepared by Risk and Policy Analysts limited

January 2001

Estimating Job Creation from Recycling and Reprocessing

Report for London Remade by Anne Gray, Sue Percy and Irene Brugel

June 2002

Waste Management Sector Workforce Development Plan

Waste Industry National Training Organisation

July 2002

Plastics Recycling in Scotland

A report produced by Recoup for Remade Scotland,

March 2003

Summary of Organisations Contacted

Public Bodies	Private / Industry Federations	Third Sector
Audit Scotland	SESA – Scottish Environmental Services Association	RAGS – Recycling Advisory Group
COSLA – Convention of Scottish Local Authorities	Shanks Waste Solutions	L.A.M.H Recycle Ltd
IEMA – Institute of Environmental Managers and Auditors	Wm Tracy Ltd	ACE – Alloa Community Enterprise
SEPA – Scottish Environmental Protection Agency	Viridor	
SLIMS – Strathclyde Labour Market Intelligence	Nexfor – particle board manufacturer	
Scottish Executive	ICER – Industry Council for Electronic Recycling	
East Ayrshire and Glasgow City Councils	Electronics Scotland – Industry body for manufacturers	
DTi – Department of Trade and Industry	Electronic Equipment Recyclers Easdale CoverTronic Mirec (previously Frasers) CCL	
Developing North Ayrshire WORMS R'US project	IL Recycling – paper sorting - Sweden	
	The Recycling Works Consortium - Devon	