



Waste Electrical and Electronic Equipment (WEEE) Reuse and Recycling in Essex & Cambridgeshire

WasteWISE Overview Report 5

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Executive Summary

- The amount of WEEE produced annually in the UK is not precisely known because collections at CA and other sites are not documented. Estimates based on sales and lifetimes predict that well over 1.1 million tonnes, or around 20 kg per person, will be produced in 2004
- It is estimated that only 49% of WEEE is currently recycled. The proportion re-used is probably only a small fraction of this. For example, large household WEEE, which includes washing machines, cookers and refrigerators, is estimated to be recycled at rate of around 87% but most of it shredded.
- WEEE can comprise highly toxic materials such as mercury, lead and cadmium.
- The EU WEEE directive and its sister RoHS directive provides targets for recycling in the 70-80% range and must be implemented by August 2004.
- A key factor of the directive is producer responsibility for the costs of recycling. Reuse is encouraged in principle but not in practice.
- At present the details of how the Government intends to apply the directives are vague and a crisis many times greater than the 2002 "fridge fiasco" is predicted
- The best opportunities for social enterprises appear at present to be in the collection and processing of large household appliances. Other possibilities include IT equipment and TVs.
- Around 48 people could be employed in Essex and Cambridge and 130 people in the Eastern Region reprocessing the residual 13% of unshredded large household WEEE, provided a fee of *ca.* £20 per item could be obtained. At least 8 times this number could be employed if 20% of appliances currently shredded were re-used.
- Around 24 people could be employed in Essex and Cambridge and over 65 people in the Eastern Region refurbishing 10% of residual waste commercial and domestic IT equipment, provided a fee of *ca.* £15 per item could be obtained.



1. Background

Waste Electrical and Electronic Equipment (WEEE) includes a wide range of items including fridges, washing machines, computers, printers, televisions/monitors, radios, telephones, hairdryers, toasters and toys. The various categories are summarised in the Appendix, together with estimated relative percentages. The EU has identified WEEE as a priority waste stream; first because the amount generated is growing rapidly, second because the waste usually contains hazardous substances and third because current recycling levels within the community are relatively low.

The precise amount of WEEE currently produced in the UK is unknown. The Industry Council for Electronic Equipment Recycling (ICER) is presently conducting a survey and intends to publish a report in Spring '04. Until then, the best data comes from the ICER '98 report as summarised by the DTI [1] which is an estimate based on retail sales volumes of electrical and electronic equipment (EEE) and expected lifetimes. This gave a projected figure of 915,000 tonnes for the UK in '98 of which 49% was estimated to be recycled. An annual growth rate of between 4% and 5% was estimated, although this appears to have increased recently as the Environment Agency are now quoting a figure of 8% [2]. Assuming a growth rate of 4%, this would give a projected figure from the 1998 data of 1.070 million tonnes for the UK in 2002, or 18.2 kg per person, roughly in line with the average EU estimate of around 20 kg per person. This would become 1.118 million tonnes by 2004. For a worst-case 8% growth rate since 1998, a figure of 1.452 million tonnes is projected for 2004.

A recent assessment of the capacity of Civic Amenity (CA) sites to separate WEEE by Network Recycling [6] has established that over half of the sites currently collect WEEE, more if refrigeration is included. It is estimated that there is considerable capacity to expand the collection of WEEE at CA sites on the basis of site space alone and that an additional 1 kg per inhabitant per year (kg/inh/yr) could be collected in addition to the 3.5 kg/inh/yr already separated in this way.



WEEE contains a wide range of toxic substances including lead, mercury, cadmium, chromium VI, polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs) [1-4]. The aim of the EU WEEE directive is to improve the environment by progressively reducing the amounts of WEEE that is landfilled by reducing the toxicity of new EEE. More generally, the directive aims to improve the environmental performance of all operators involved in the life cycle of WEEE.

The WEEE directive was signed by all member states in February '03 [13]. It produces a framework for dealing with the waste, a timetable for implementation and recycling/recovery targets. The document is complex - key points are summarised below. A daughter directive for the Reduction of Hazardous Substances in electrical and electronic products (RoHS) has also been signed up to by member states [13]. Military equipment is exempt from the terms of the directives.

- Both directives must be implemented by 13th August 2004. Collection, treatment and financing systems for WEEE must be in place by September 2005 and the first collection and treatment targets are to be attained by December 2006.
- Producers have responsibility for financing the management of consumer WEEE. Costs from collection points are to be met by producers.
- There is a compulsory separate collection target of 4 kg of WEEE per inhabitant from households by the end of 2006 [this target would appear to be already being exceeded – see Section 2, Table 3 - but the directive requires that proper monitoring systems are put in place]
- Emphasis is on re-use where possible (but paradoxically, there are no targets for this).
- Minimum recovery targets of between 70% and 80% by weight are set depending on category to be met by the end of 2006 – for example, large appliances 80%, circuit boards 75%, CRTs 70% (see Appendix for more details).
- Measures must be taken to minimise disposal of WEEE by consumers as unsorted municipal waste.
- The costs of treating historical waste are to be shared proportionately between producers.



- Financial guarantees to be made by producers to guard against costs arising from orphan WEEE.
- Heavy metals and brominated fire retardants are banned in new products from July 2006 (RoHS)

The WEEE directive defines EEE as “equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in the Annex1A (Appendix 1 in this report) and designed for a voltage rating not exceeding 1000 V for ac and 1500 V for dc”. Batteries do not form part of the WEEE directive but will be covered by a new separate directive for transposition in the next year or so. Battery recycling trials in Bristol [23] have shown that they are very expensive to collect and dispose of (over £5,000 per tonne) as recycling facilities no longer exist in the UK.

A strange aspect of the WEEE directive is that although it provides a very clear definition of WEEE, member states have the power to interpret the directive as they wish and exempt certain items. This has led to a confusing situation where the DTI still cannot be clear on which items will be covered and how the directive will be implemented, although some odd decisions have already been made. For example inkjet cartridges are increasingly being fitted with control “chips” precisely to discourage recycling and earn more income for the manufacturers. Not only is this type of activity prohibited by the WEEE directive but the cartridges unquestionably need an electric current to operate and are thus clearly defined as EEE. However, they have been classed as consumables by the DTI and exempted without discussion [2], dooming at a stroke the cartridge recycling industry which includes many charities and social enterprises. To make matters worse, the control chips have been shown by the Consumers’ Association to encourage waste by forcing replacement when still 39% full. The residual ink, which adds up to a considerable amount annually, not only costs customers more than six times the price per unit volume than vintage Dom Perignon Champagne (*ca.* £200 per litre) but is toxic to marine life. The state-by-state interpretation could lead to the situation where items will be recycled in some countries and not in others – for example, inkjet cartridges may have to be shipped to France for processing. The European Technical Advisory Committee (TAC) for the WEEE directive met on the 17th Dec ’03 for a final vote on the scope, although no



details have yet been published. In the light of the current state of flux and lack of specific information on many aspects of the WEEE directive this report can only give general guidance. Potential social enterprises are advised to check the DTI website [13] for the latest information. This report will be updated as soon as new information is obtained and especially in March '04 when the draft regulations are released.

A consultation paper by the DTI outlining options for industry, retailers and local authorities was issued on 28th March '03 for response by 30th May '03. On the basis of the response to this a second consultation document detailing the Government's preferred options for implementation was issued on 25th November '03 for response by 1 March '04 [2]. Draft regulations and guidelines will be issued in May '04, just three months before the implementation date in August '04. Key points in the consultation paper include the following:

- The Government has produced three operational options. The favoured option is a producer-funded "clearing house" to coordinate free collection of domestic WEEE from CA sites and retailer collection points. It is envisaged that additional "bulking up" sites may be needed in various regions [this is along the lines of the Furniture Recycling Network's (FRN) plans for 35 or more nationally distributed Appliance Re-use and Recycling Centres (ARCs), as discussed in the Appendix].
- A second option is a structure like the Dutch NVMP scheme, an organisation run by producers and importers which arranges collection and treatment and recovery of WEEE from retailers and local authority sites and is funded by a visible fee on goods.
- A third option is a system of tradeable notes for WEEE recycling (somewhat along the lines of PRNs) and perhaps treatment.
- Retailers are to have a take-back obligation; there will be a choice of either in-store take-back or membership of a retailer take-back scheme. The Government is inviting proposals from retailers for such a scheme providing around £10 million per annum initially over 5 years for a collection network and a commitment to fund CA site upgrades. This works out at £9.34 per tonne of total WEEE or just 87p per waste large household item before the remaining 57% (610,000 tonnes) of WEEE is considered. [A reviewer has pointed out that not all WEEE will be disposed



of via civic amenity sites – retail takeback WEEE will follow a different channel, as will last non-private household WEEE and business and public sector WEEE). Plus not all WEEE is expected to be recovered – there are no 100% targets – so this calculation is probably of academic interest only but perhaps worth including to give some perspective].

- No new burdens are to be placed on local authorities; these can choose to bid for funding to upgrade CA sites. The total funding available for this is expected to be about £5 million per annum from 2005 to 2010. Again the amount of money is insufficient – amounting to only £4.67 per tonne of total WEEE or 18.7p per large household item. This may be because the DTI considers the 2006 80% target for recycling large household items has already been reached. Ironically, the current *ca* 87% recycling rate is only an estimate and the documentation required by the directive will necessitate the implementation of revised collection schemes for which scant funding now appears to be available. The Local Government Association warned the parliamentary Environment, Food and Rural Affairs Sub-Committee in December '03 that existing local authority waste infrastructure was unlikely to be able to cope with the demands of the WEEE directive [15].
- The Government is considering options for encouraging re-use of electrical and electronic equipment in line with the directive. These include a best performance re-use indicator for local authorities and incentives for producers. These probably won't be finalised until 2008.
- Businesses which collect WEEE from private householders and transport it will, as now, have to be registered with the Environment Agency as waste carriers.
- The WEEE directive is close to amendment with regard to the financing of Business WEEE. For new business WEEE, producers are to pay, whereas for historic business WEEE producers are to pay for collection, treatment and recovery with a new purchase of the same or similar product and users are likely to have to pay for this where there is no new product. There is an opt-out in Article 9 that allows for separate arrangements to be made at time of sale where items may be refurbished and sold – a key element in regard to the aims of prospective WEEE re-use/recycling social enterprises.



The consultation document also gives the following details about how the WEEE implementation proposals will concern charities and social enterprises:

- The Government sees a role for these groups refurbishing equipment for re-use as this will help meet the WEEE directive's requirement for re-use of whole equipment where possible.
- Organisations are encouraged to work with local authorities, producers or retailers where opportunities arise to re-use electrical and electronic equipment.
- Organisations undertaking refurbishment work will be required to report on the levels of re-use achieved.
- Refurbishment organisations will be required to ensure that all products they handle which are not reusable are passed on to an authorised WEEE treatment facility (if they are not licensed for this activity themselves).
- Producers will be required to make relevant information available to refurbishers to help them refurbish products safely and to a high standard.
- The Government will continue to work with the Furniture Recycling Network and other social enterprises to help develop and promote national codes of practice or standards for refurbishment, including guidelines on energy consumption, assessment of suitability of products for refurbishment and consumer guarantees. Energy consumption is an important issue because older appliances are likely to be less energy efficient than new ones – and in the case of washing machines, less water efficient – so increased running costs and environmental damage must be taken into account.

It has recently been announced that 15 of the largest EEE producers, including Alba, Hoover, Candy and Smeg, have set up a recycling management company [14]. Called the Recycling Electrical Producers Industry Consortium (REPIC), this has been formed with help from the Association of Manufacturers of Domestic Appliances (AMDEA) and will invite recycling companies to meet competitive tenders. It hopes to be fully operational from April '04.



Network Recycling (www.networkrecycling.co.uk) have recently written a literature review of Local Authority best practice in the management of the household bulky waste stream which discusses the WEEE directive and various recommendations to Government put forward by the FRN. The London Assembly have also recently issued a report discussing the effect of the WEEE directives [22] which provides useful additional background information and interpolations for amounts of WEEE presently available in London from the 1998 ICER data, along the line of some of the projections given here for Essex and the Eastern Region.

2. Estimated Quantities Available for Re-use and Recycling

Tables 1 and 2 shows estimated quantities of WEEE available in 2002 in Essex, Cambridgeshire and the Eastern Region. Tables 3-4 show additional data for the UK in general. These have been calculated proportionately using the most recent accurate population data (2001 census) using a basic estimate of 915,000 tonnes for UK WEEE reported by ICER in 1998 updated to 1,070,000 for 2002 using an average predicted growth forecast of 4% per annum. The 1998 ICER estimate of a 49% recycling rate has been incorporated. No additional account is made of the large amount (*ca.* 5,000 tonnes) of IT re-used and recycled by RDC, Witham, which largely originates outside Essex. Figures for Essex include Thurrock and Southend. Similar figures can be calculated for other local areas.

Table 1

Estimated WEEE in Cambridge and the East of England 2002 (Tonnes)

	Total WEEE	WEEE Re-used/Recycled	WEEE Available For Re-use/Recycling
Essex	28892	14402	14490
Cambridge	10445	5118	5327
E & C	39337	19520	19817
Eastern Region	98106	48072	50034



The values in Table 1 probably represent an under-estimate of the amount of WEEE available for the following reasons:

- WEEE arisings are not measured (with the exception of a few local studies including a recent FRN survey in Bath) so data is estimated based on sales and predicted lifetimes of products.
- The high rate of technological change and high replacement rate leads to a high annual growth. The ICER study in 1998 estimated this was around 4%-5%, however the Environment Agency recently released an estimate of 8%. This is probably partly due to the post-'98 surge in the sales of domestic IT equipment, wide-(and recently plasma) screen TVs and digital cameras.

A key issue to be considered is that ICERS estimated 49% recycling rate (1) was obtained by a survey of shredders, not refurbishers [8]. It has been estimated that only 2,500 tonnes (50,000 appliances) were re-used in 2000 although no account was made for appliances exported to developing countries [8]. The FRN has accounted for an additional 100,000 appliances being re-used each year and predict that at least 20% and possibly up to 33% of large household WEEE could be re-used [8]. The apparent totals of re-used large household WEEE indicate that while the ICER data suggests that *ca.* 87% of this category of WEEE is recycled, almost 99% of this is shredded without re-use. The following tables give a breakdown of estimated WEEE available in the region after subtracting amounts currently recycled but as the low rate of current re-use applies to most categories, the figures represent minimum quantities for groups interested in setting up re-use and recycling centres.



Table 2

Breakdown of estimated WEEE Available for Re-use/Recycling in Essex, Cambridgeshire and the Eastern Region in 2002, as shown in Table 1 (Tonnes)

	Large House hold	IT	Video + Sound	Telecoms	Other
E	1549	9734	2257	128	1321
C	550	3460	802	46	507
EC	2099	13194	3059	174	1818
ER	5170	32493	7535	429	4407

Table 3

Estimated WEEE UK 2002 (kg per inhabitant)

Total WEEE	WEEE recycled	WEEE available
18.21	8.92	9.29

Table 4

Estimated, categorised WEEE available for recycling UK 2002 (kg per inhabitant)

Large House hold	IT	Video + Sound	Telecoms	Other
1.0	6.0*	1.4	0.08	0.8**



Notes:

Tables compiled using ICER 2000 data.

*ICER 1998 report [1] stated that majority of IT waste was commercial. In the lack of any further information, if this is estimated at 75%, household contribution is 1.5 kg per annum. Also assumes 1998 estimate of IT making up 12% of recycled WEEE, equivalent to a 15% recycling rate. REALISE 2003 report [19] estimates UK recycling rate for IT is only 5% which would increase figure to 6.75 kg.

**ICER 1998 report states that small household = 3%, tools = 3%, lamps = 1%, toys = 1% translating to around 0.5kg, 0.5kg 0.2kg and 0.2kg respectively (1.4 kg in total) so this extrapolated figure is probably an underestimate.

These figures may be compared to those shown in Table 5, in which results from recent reprocessing trials conducted by SOFA in the Bath and North East Somerset area comprising WEEE separated from CA sites are presented:

Table 5

Total WEEE (kg per inhabitant per annum) estimated from 5-month CA site trial (SOFA)

Large Domestic	Refrigeration	TV + Monitors	Consumer	Other
0.49	1.82	0.43	0.56	0.79

3. Financial Overview

Government has created new start-up funding for effective community recycling projects. Although it is recognised that grants may be essential at the beginning, the aim is to create sustainable businesses that no longer need them. WasteWISE will assist organisations to win funding for projects in the two counties, including in Thurrock, Southend and Peterborough. There is plenty to bid for, including: New Opportunities Funding: The CRED scheme, SEED funding, Fair Share projects and the new Government £100 million/year sustainable waste funding package managed by WRAP. EEDA/DTI may also offer funding opportunities for some aspects.



4. Social Employment Opportunities

As mentioned previously, the lack of up-to-date, precise information on the amount of WEEE and current state of flux and lack of specific information about the DTI's own interpretation and implementation of the WEEE directive makes it difficult to for prospective social enterprises to plan at this stage. However some conclusions can be drawn. It is unlikely that the re-use and recycling of small appliances such as hairdryers, toasters etc will ever be serious option due to the costs of collection, electrical testing etc and very low price of new items. The used mobile phone arena seems to be fairly well covered by various groups. Inkjet cartridges are no longer worth considering in the light of the recent DTI assessment. At present, the best opportunities appear to be in the refurbishment of large household items and IT equipment - the analyses in Appendix 2 look into these categories in more detail.

Large household items can be refurbished fairly easily, provided trained technicians are on-board, and may provide a sustainable income provided a suitable fee could be established with local authorities, manufacturers and retailers. The Furniture Recycling Network produced an extensive manual to aid community enterprises in the field of repair, refurbishment and re-use of large household appliances ("Fit for Reuse", 2001). The cost of disposal of scrap refrigerators and freezers must be considered; especially since these have to be transported large distances to the few sites in the UK which can process them (see Appendix 3). Also, the cost of disposal of scrap components such as motors and transformers may be an issue. IT equipment is more problematic as according to some reports [18] the UK market for used computers is diminishing and the costs of disposal of scrap CRT monitors and plastic can be relatively high. The best return seems to be in supplying charities for export; however such schemes will probably some level of grant support.

Another opportunity for serious consideration is to work with existing businesses to create employment and affordable access to refurbished EEE rather than just seek to start up new business as social enterprises. RDC in Witham would be interested to discuss opportunities to develop in this area (contact Gary Griffiths). The advantage of this is that existing businesses have already invested in plant, facilities and resources. Existing businesses know markets, customers and processes and operate on a commercial basis without subsidy. By working with existing business partners to expand employment



opportunities and to explore markets for affordable access to equipment, this may prove more cost effective and sustainable than relying upon subsidy alone. The costs of establishing and running enterprises could instead be diverted into other areas.

In the case of large household items, there is a potential of at least 1550 tonnes available annually in Essex which are currently not being re-used or recycled (Table 2) and probably 8x this amount tonnes or ca. 12,000 tonnes if items which is currently shredded are taken into account. If only 13 % of this amount (1560 tonnes) is processed by social enterprises and 20% of the appliances found suitable for refurbishment and re-use, 5 social enterprises employing 40 people in total could be provided in Essex (see Appendix 2). In the Eastern region the number of possible jobs expands to over 130.

In the case of IT equipment, there appears to be a potential of 9730 tonnes of domestic and commercial waste available annually in Essex which are not being re-used or recycled (Table 2). Since accurate, up-to-date data is not available, it must be emphasised that this is only an estimate based on the 1998 ICER data and recycling rates, but presumably this amount is currently being stored or landfilled. If 10% of this was processed it would provide enough material for 4 5-man social enterprises similar to Millrace IT in Chelmsford. In Cambridge, one enterprise could possibly be set up. For the Eastern Region, this number expands to 13 at the 10% rate, providing employment for 65 people in total. It should be pointed out that some computers can't be re-used without extensive repairs, which may cost more than buying new or other refurbished computers. Some older computers are no longer required by anyone – even charities no longer want PII machines.

5. Environmental Issues

WEEE contains a wide range of substances which are harmful to the environment as well as toxic substances that include lead, mercury, cadmium, chromium VI, arsenic, asbestos and fire retardants such as polybrominated biphenyls (PBPs) and polybrominated diphenyl ethers (PBDEs) [1-4].

Older refrigeration units contain Ozone Depleting Substances (ODS) such as chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs) which although non-toxic, if released to the atmosphere deplete the ozone layer, reducing its protective effect against UV radiation. These were banned as from the 1st October 2000 by EC regulation 2037/2000 which implemented



the Montreal Protocol and restricted the import, export, production, use and re-use of ODS and introduces requirements for the prevention of leakage, recovery and disposal. The majority of appliances reaching the end of their life in the UK use CFCs (usually R12) as refrigerants in the cooling circuit and most also contain significant quantities of CFCs in their insulation foam.

Manufacture of CFCs was banned in 1996. More recent appliances may have used HCFCs for their foam. The regulation states that ODS present in the foam as well as the cooling circuit must be recovered, which requires transport to an industrial facility. DEFRA recently told The Recovery Quality Assurance Association, RAL, that the UK is recovering 352 tonnes of CFC gas each year [20]. RAL, estimates that 2.5 million CFC-containing fridges are being processed each year, with each unit containing about 398g of CFCs – however, it considers this means that only 47% of UK fridge CFCs are being recovered.

Lead is used for soldering of printed circuit boards and in the glass of cathode ray tubes (CRTs). Industry is currently researching alternatives to lead solder but this is at an early stage. WRAP estimate (May '02) that 41,000 tonnes of waste CRT glass is produced in the UK per year, of which virtually none is presently recycled due to lack of infrastructure although a recent report [16] shows how the glass could be used to make glass bricks and tiles, new CRTs (10-30% of waste), as fluxing agents in ceramics manufacture or in smelting operations. Around 1.5kg of lead oxide, used for radiation shielding, is loosely bound within the glass (up to 20% by weight). Most of this is concentrated in the neck of the CRT and around the seal with the screen. The lead can leach out if the CRTs are deposited in landfill so they are now classified as toxic waste. Lead poisoning leads to brain damage, haemolysis, lowered resistance to infection and cancer of the lungs and kidneys. Screens are coated with phosphors which can contain cadmium. Cadmium is moderately carcinogenic and can cause lung, liver, kidney and bone disease. Cadmium is adsorbed by respiration but is also taken up with food. Due to its long half-life (30 years), cadmium can easily be accumulated in amounts that cause symptoms of poisoning. With prolonged exposure cadmium chloride may cause cancer. Cadmium shows a danger of cumulative effects in the environment due to its acute and chronic toxicity. Rare earth metals such as lanthanum are also used to form the phosphor coatings. It is possible to remove the coatings from screens but further recycling is complex. Unless the glass is re-smelted to remove the lead using expensive high-temperature furnaces it has to be crushed to provide cullet to make more CRTs. However, the market is



diminishing somewhat due to the increasing market for flat screen monitors (these also pose a problem as they currently use fluorescent tubes for backlighting which contain mercury). Care has to be taken when crushing CRT glass as the lead dust is toxic.

Chromium VI is used in plastic dyes, platings, LCD backlights and camcorder viewfinders. If ingested it causes sores in the mouth, diarrhoea, stomach ache, indigestion, vomiting, elevated white blood cell counts and a higher per capita rate of cancers, including lung cancer and stomach cancer [21].

CRT cases and many electrical appliance casings incorporate brominated flame retardants (BRFs) such as those mentioned earlier which are highly toxic endocrine disrupters. Cables are sheathed in PVC which also incorporates BRFs. These materials can produce dioxins and furans during the extrusion process when recycled.

Mercury is used in thermostats, relays and fluorescent lamps. Exposure to elemental mercury can result in effects on the nervous system, including tremor, memory loss and headaches. Other symptoms include bronchitis, weight loss, fatigue, gastro-intestinal problems, gingivitis, excitability, thyroid enlargement, unstable pulse, and toxicity to the kidneys. In the environment, particularly lakes, waterways and wetlands, mercury can be converted to a highly toxic, organic compound called methyl mercury through biogeochemical interactions. Methylmercury, which is absorbed into the body about six times more easily than inorganic mercury, can migrate through cells which normally form a barrier to toxins. It can cross the blood-brain and placental barriers, allowing it to react directly with brain and fetal cells. Mercury contamination causes a wide range of symptoms, affecting the kidneys and neurological systems in particular [7].

Inkjet cartridges may contain azonaphthalenesulphonates which are toxic to marine life [9]. Toxicity studies which considered disposal to landfill have assumed waste cartridges will only have around 2% of ink remaining whereas the latest "Chipped" cartridges force replacement with up to 39% residual ink.

Waste permits and licences are required under the Environmental Protection Act 1990. Permits are required to carry, store, transfer, treat, process and dispose of WEEE. This is important when costing WEEE recycling – a Waste Management Licence (WML) may cost over £5,000 to acquire and then £2,000 a year to maintain, including having a technically competent person



named in the WML (who may require training by WAMITAB at £3,000 a year). Charities may be exempt from WEEE / EPA permits but only if they are supplying charities – if they are selling commercially then they will be treated as commercial organisations (according to a verbal response to a question on this topic from Jeff Cooper, Environment Agency officer responsible for Producer Responsibility).

The WEEE Directive adds requirements to: -

- weigh WEEE
- certification to environmental management systems, such as EMAS
- treatment sites to have impermeable surfaces and good drainage
- recyclers to track components reused
- pre-treat before disposal batteries, LCDs, toner cartridges, printed circuit boards, CRT screen luminescence and certain flame retardants used in plastics.
- not to export WEEE outside EU unless comparable standards are used.

There are other laws that apply to reuse of EEE. Health and Safety legislation applies to all WEEE reprocessing. Some WEEE may contain bio-hazards from degrading foodstuff residue. In tests, kitchen WEEE (fridges, freezers, microwaves, cookers & dishwashers) were discovered to have 7 different pathogens, including e-coli and salmonella. Also, WEEE is not made to be dismantled – internal surfaces may be dangerous to operate within due to sharp edges, residual current – in CRTs, a lethal charge may linger in condensers for several days after mains power has been turned off.

Display Screen Equipment Regulations apply to equipment and require specific tests to ensure the equipment is fit for purpose and not likely to cause harm to users.

Data Protection Obligations require data to be deleted. Apart from commercial confidential information being left in computer memory, personal bank data will attract fraudsters and family photographs of children may prove attractive to paedophiles. Copyright laws may prevent the transfer of computer operating systems – RDC are members of the Federation Against Software Theft (FAST) who prosecute software pirates.



6. Potential Partner Organisations

- WasteWISE and WISE - WISE provides detailed development and management training for recycling/other social enterprise managers in Essex, Cambridgeshire and neighbouring areas.
- Recycling social enterprises and community/environment groups (CREATE, FRN etc)
- Essex and Cambs county councils, district and unitary councils, and joint waste strategy and recycling initiatives.
- Essex ReMaDe, and other initiatives/umbrella organisations.
- External partners, e.g. ICER
- Retailers, e.g. Comet, Dixons Stores Group, Thorn, etc.
- Manufacturers, re trial schemes and other organisations covered by proposed producer responsibility.
- Local recycling, waste, and other businesses. Many commercial organisations already exist. RDC are Britain's largest IT reuse and recycling organisation, employing 150 people in Witham. Shields Environmental is Britain's largest telephone reuse and recycling organisation, employing 130 people in West Thurrock. Plus there are other organisations (S B Wheelers in Colchester, AWA Refiners in Harlow, ICEX in Witham) who together probably employ over 500 people.
- New entrepreneurs/venture capital funders

7. Next Steps

Our standard two stage approach at WasteWISE is, with partners, to

A Consult on discussion drafts like this, then improve and publish a final 'overview report'

B To then consider undertaking a detailed feasibility study and financial analysis with partners on a real potential scheme covering a defined catchment area that is projected to deliver economic and successful recycling. This will normally cover at least two or three council districts in Essex and/or Cambs, and the study will be overseen by the creation of a 'task and finish' project group including key partners.

8. Detailed Financial Analysis

In the case of WEEE, the issues to be costed in detail in a more detailed local business plan include:



A FIXED COSTS (** costs reduced by partnerships/links)

Capital investment

- recycling skips appropriate to categories such as ..
- collection vehicles
-
- ** premises for sorting/
- ** Retail outlets
- ** Operating costs
- business rates, phones etc
- promotion/media

B VARIABLE COSTS

Staff costs

- WEEE collection
- Sorting
- Electrical testing
- Dismantling/Refurbishment
- Testing (eg. Wash/dry cycle)
- Guarantee/back-up
- Delivery/transport to market

Operating costs

- Fuel/power/premises
-

C INCOME

Price per item

Recycling or reuse credit per tonne?

Potential financial support from local authority for trial

Staffing contribution re: placing people with learning disability/training support

Potential assistance from industry responsibility fund

Local partners interested in reprocessing outputs

Potential grant aid and start up funding (WasteWISE has further analysis on these)



9. Further Contacts and Sources

(other contacts can also register with us to have their details added below)

Contacts

Craig Anderson, Development Manager (WEEE), Furniture Recycling Network (FRN), 48-54 West Street, St Philips, Bristol BS2 OBL. Tel: 0117 954 3571. frnresearch@btinternet.com.

John Redmayne, Create, Speke Hall Road, Speke, Liverpool L24 9HA. Tel: 0151 448 1748. speke@create.mersinet.co.uk.

Ron Taggart, SOFA, 48-54 West Street, St Phillips, Bristol BS2 OBL. Tel: 0117 941 3322. sofa@brisrc.demon.co.uk.

John Wilson, Revitalise, Unit 2, Wycke Hill Business Park, Wycke Hill, Maldon, Essex CM9 6UZ Tel/Fax: 01621 855954 Email: mail@revitalise.fsnet.co.uk, web: www.revitalise-IT.co.uk

Gary Griffiths, Environmental and Quality Systems Manager, RDC, 29, Eastways, Witham, Essex CM8 3YQ. Tel: 01376 504234/07753 771222 E-mail: ggriffiths@rdc.co.uk, web: www.rdc.co.uk

Amy Griffiths, Project Coordinator, WEEE Recycling Network. Tel: 01392 262366. a.griffiths@darpenvironmental.com, www.weeenetwork.com. www.createuk.com/inside/

Andy Grant, Network Recycling, Trelawny House Surrey Street, Bristol, BS2 8PS. Tel: 0117 942 2271 Fax: 0117 914 1270 e-mail: info@networkrecycling.co.uk

Industry Council for Electronic Equipment Recycling (ICER), 6 Bath Place, Rivington Street, London, EC2A 3JE Tel: +44 (0) 20 7729 4766 Fax: +44 (0) 20 7729 9121 Email: ws1@icer.org.uk www.icer.org.uk

Chris Tollardy, DTI Sustainable Development, Tel: 0207 215 0972. Email: chris.tollardy@dti.gsi.gov.uk



Neil Thomson, Project Manager, Remade Essex, AMT Centre, Upper Chase, Writtle Road, Chelmsford, Essex. CM2 0BN. tel: 01245 259351, neil.thomson@eepartnership.co.uk.

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Appendix 1

(i) Categories of WEEE (as defined by the Directive). Percentages of total WEEE shown in brackets.

- | | |
|---|---------|
| 1. Large household - Washing machines, fridges etc. | (49%) |
| 2. Small household - Vacuum cleaners, toasters etc. | (3%) |
| 3. IT and telecoms - PCs, printers, mobile 'phones. | (40%) |
| 4. Consumer equipment – TVs, radios etc. | (8%) |
| 5. Lighting equipment – fluorescent lamps, sodium lamps etc. | (1%) |
| 6. Electrical and electronic tools – Drills, lawnmowers etc | (3%) |
| 7. Toys and Leisure – Video games etc. | (1%) |
| 8. Medical devices – X-ray, cardiology etc. | no data |
| 9. Monitoring and control – Smoke detectors, thermostats etc. | (1%) |
| 10. Automatic dispensers – Hot drinks, cash machines etc. | (3%) |

Percentages refer to ICER 1998 estimates [1]

(ii) Recycling and Recovery Targets set in the WEEE Directive

Category	Recovery Target (%)	Recycling Target (%)
1. Large Household	90	75
2. Small Household	70	50
3. IT	75	65
4. Consumer	75	65
5. Lighting	70	50
6. Tools	70	50
7. Toys	70	50
8. Medical	None	none
9. Monitoring	70	50
10. Dispensers	90	50



(iii) Particularly Difficult Components of WEEE

CRTS from Computer Monitors and TVs

Andela (www.andelaproducts.com/products/crt3.html) in the USA sell a compact pulverising system and provide useful information on their website. The procedure exceeds the value of the raw materials so reprocessors charge a fee, which varies from around £5 to £13 per unit. Reprocessors are few and far between and transportation costs also have to be added. NuLife (www.nulifeglass.com) have recently built a new plant in Flintshire which uses a novel process. There are no details of how this operates but it appears to be more cost effective than traditional smelting. They currently accept monitors via a drop-off point in Chester for £2.50 per unit. NuLife are interested in forming regional partnerships. It is not clear whether this involves collection sites or whether the technology is simple enough to start up regional reprocessing centres.

RDC in Witham use a third party recycler who takes whole CRTs, dismantles them and sells the plastic for recycling although some flame retardant "contaminated" plastic is sent for waste to energy recovery. Cable is sold recycling, the metal skeleton for scrap. The recycler then smelts the circuit boards and Cathode Ray Tubes to reclaim the lead. The CRT glass reverts to silica that replaces mined furnace sand. The smelting tank slimes are refined to recover precious metals and copper from circuit boards, and the furnace slag (oxidised iron and steel) is sold as a product to strengthen foundation cement. Nothing is landfilled – zero waste is produced.

Plastics

The current plastics content of WEEE is estimated to be *ca.* 22% [1], or over 235,000 tonnes of the projected 2002 total. The polymers are high-value engineering materials which may fetch a good price if correctly sorted. Grinding prior to transportation reduces costs. Unsorted materials may be accepted but this is usually without payment. Sorting will probably require infrared or x-ray equipment together with initial training by plastics experts. Linpac in Yorkshire accept ABS, HIPS and PC. Sonopa, based in the Netherlands, buy ABS, PC and other plastic scrap. J.J. Plastics in Flint and Manchester accept mixed scrap of all kinds. However, it must be borne in mind that highly toxic furans and dioxins can be produced during the



extrusion process when recycling these materials so the effect on the environment may not be entirely beneficial.



Appendix 2

(i) Large Household Appliances

Refrigeration.

Refurbishing is not quite so simple with these items due to compliance with EC 2037/2000. Provided the coolant does not need topping up, refurbishing will probably involve electrical safety testing, cleaning/disinfection, and temperature monitoring over a 24 hour cycle.

Each appliance has a plate either on the back or inside giving the type and volume of refrigerant charge. If it has been refilled with a different type to the original a further label should have been put on the compressor. Older appliances have no information about the foam used – it is best to assume that these contain CFCs. As long as the appliance doesn't need a top up of gas there are no restrictions on servicing, refurbishing or selling the appliance. Topping up with CFCs is now illegal – the circuit must be drained by a suitably qualified person and the gas collected, stored and sent for destruction. The appliance can then be filled with a suitable replacement. Appliances must have CFCs removed by a qualified person before being scrapped. The regulation states that ODS present in the foam as well as the cooling circuit must be recovered, which requires transport to an industrial facility – these are still few and far between in the UK (see list in Appendix 3) and costs range from £10 to £25 per unit. Care must be taken with the transportation in case of coolant leakage.

Laundry and Cookers

Washing machines, tumble dryers and cookers are fairly simple to refurbish, so long as electrical safety testing is completed. The appliances should be tested over one or more complete cycles – this could involve extensive electricity and water costs which should be considered in cost analyses. It is likely that a team of technicians will be involved in the refurbishment and a stock of spares produced from scrap items.

Create [10] provides a good example of the re-use and recycling of large household WEEE. It has premises in Liverpool and Tottenham and was



developed to help the long-term unemployed in association with Curry's, Thorn and the FRN. Create started in 1995 with an annual input of 4000 units and have progressed annually at an approximately linear rate to 16,500 units (88,000 in total) during which time they have provided work for 176 trainees and sold 15,000 refurbished appliances. Create UK has been set up to support and co-ordinate the development of a network of Create-type projects across the UK.

It is essential that such schemes collect appliances before they are dumped at CA and other sites so they are preserved in best condition. Refurbishing must include electrical testing to the relevant standards [11,12]. Washing machines, for example, should be tested under load, and a reasonable warranty – at least 6 months - and service back-up should be provided as part of a quality service.

From Table 2 in section 2, the estimated annual quantity of large household WEEE available for re-use and recycling in Essex is *ca.* 1560 tonnes. This takes into account a recycling rate of *ca.* 87% estimated from the limited ICER data available. In practice, the number of appliance currently re-used appears to be so small that it can probably be assumed that 20% of this 87% are suitable for re-use, giving a potential of *ca.* 2,400 tonnes of re-usable large household WEEE in Essex alone, with *ca.* 900 tonnes in Cambridge and *ca.* 8,500 tonnes in the Eastern Region.

Using data from Create (www.createuk.com/inside/information_sheet_1.htm), the average weight of large household appliances is 40 kg, from which an annual total of at least 38,700 appliances available for re-use and recycling in Essex can be deduced from the data in Table 2, Section 2, without the additional amounts outlined above. This is over twice the number of units currently processed by annually by Create in Speke and Tottenham combined.

Table 1 shows estimated annual costs and income from a possible scheme processing 290 tonnes (*ca.* 7200 items) of large household WEEE per year from which it can be seen that jobs for at least 5 social enterprises employing over 40 people in total could be provided in Essex from the residual waste. For Cambridge at least one such scheme could operate and in the Region 17 in total, providing employment for over 130 people. The collection of 100% of large household WEEE as demanded by these figures is of course unrealistic but as outlined above, around 8 times this amount of re-usable large household WEEE is probably being shredded and so could be used if a better



collection structure were put into place. Further research, particularly with regard to the cost of premises, cost of waste disposal and collection fees, together with consultation with the FRN is recommended before embarking on such projects. It may be advisable to break the operation down into smaller units so as to avoid VAT by reducing sales below the VAT threshold of £56,000 – equivalent to sales of around 600 units at £93 each. The work schedule in the proposed scheme is ambitious and an extra driver and technician for service/sales may be required. It may be more feasible, in the first instance, for prospective social enterprises to act as collectors for one or more of the 35 Appliance Re-use and Recycling Centres (ARCs) which the FRN hopes to set up across the UK. Realistically, without good support from Local Authorities or retailers and manufacturers towards the cost of premises, fees of around £20 - £25 per item will have to be charged.



Table 1 Estimated annual costs/income for large household WEEE scheme

Item	cost	Income
Vans	11,580	
Fuel	8,935	
Staff	150,000	
Premises + Insurance	29,000	
Waste Management Licence	7,000	
Equipment	5,000	
Sales 1440 units @ £93 each		130,200
VAT@17.5%	22,785	
Scrap 2160 units (86 tonnes @£10/tonne)		864
Scrap refrigeration (2160 units@£15)	32,400	
Waste disposal equiv.1440 units (57 tonnes @£30/tonne)	1,728	
Fee from man/retailer/LA (£20/item)		144,000
Total	268,428	275,064
Surplus		6,636

Notes:

Assumes throughput of 7200 units (290 tonnes) per year (0.6 tonnes or *ca.* 15 units per vehicle per day), 20% refurbishment, 20% spare parts and 60% scrap. Half total number of units assumed to be refrigeration (derived from www.dti.gov.uk/sustainability/wEEE/cawcapacity.pdf) which has to be disposed of by an external dismantler at a minimum cost of £15 per unit – extra transport costs may also be incurred. It is further assumed that 20% of the total replaced by spares has to be disposed of at an estimated cost of £30/tonne (this may be much higher if considered hazardous waste – as motor and transformer windings, capacitors etc. may be under RoHS.). The throughput of *ca.* 6 units per technician is in the range identified by Craig Anderson at the FRN (private communication). The equipment cost may need to be increased if a fork-lift truck and operator are required.

Van costs assume use of 2 Ford Transit Connect 1.8 TDCI vans leased and



maintained at £435 per month inc VAT (www.castleleasing.co.uk) insured at £400 per year, taxed at £170 per year and used for 24,000 miles per year.

Fuel costs assume 100 miles per day (6.6 miles per item), 48 weeks per year, 20 mpg (7km/l) diesel at 82p per litre). Figure reduces by ca. £1,100 if using bio-diesel produced from waste cooking oil (see WasteWISE report 2). Cost could be reduced further by using LPG although the environmental benefit would be less.

Staff costs (8 in total) assume senior technician (1x £25,000), 2 technicians + 2 drivers + 2 assistants (6 x £15,000), and 1 admin (1x £10,000) and include 20% on-costs.

£2000 per month is a very rough estimate for premises. This should be investigated further as a fairly large area would be required – for example, 30 units need to be worked on each day and a week's store would be 150 units – enough to cover around 40 square metres when stacked two high.

£5000 is estimated for insurance. This should also be investigated further as the operation may be viewed as hazardous – latest news is that the FRN may be able to broker a special deal for social enterprises.

A Waste Management licence (WML) may cost over £5,000 to acquire and then £2,000 a year to maintain. A technically competent person must be named on the WML, who may also require training by WAMITAB at £3,000 a year. Charities may be exempt but only if they supply charities.

The sales figure of £93 per item is derived from averaging current prices displayed on the Create UK site (www.createuk.com). These are given below, together with weightings used for the average. To derive a figure the average price within each band was used. The weighting scheme is based on figures from Create's survey of sales of 8,000 appliances which showed proportions to be 56% Washing, 30% Refrigeration and 14% Cookers.

	Price	Weighting (total = 4)
Washing:		
Washing Machines	£79 - £129	(2.00)
Tumble Dryers	£59 - £79	(0.15)
Condenser Dryers	£120	(0.05)
Dishwashers	£95 - £130	(0.05)



Refrigeration:

Fridges & Freezers £49 - £79 (0.60)

Fridge Freezers £69 - £159 (0.60)

Cooking

Electric Cookers £85 - £155 (0.55)

High quality items such as the “nearly new” returns obtained by the FRN may have a much higher value, increasing the average, but on the other hand, social enterprises may wish to sell some items at lower cost to the disadvantaged, reducing it. For example, SOFA put a cap of £60 on the price charged (It is difficult to see how an enterprise could be sustainable selling generally at such a price).

(ii) IT

Since April 2002, the commercial firm RDC in Witham has processed over 2,000 tons of waste IT with zero landfill, producing mass balance reports tracking materials reclaimed. They report 100% recovery and 92% recycling. RDC are keen to work with social enterprises as partner organisations to provide affordable access to EEE as described previously.

It is difficult to propose an entirely social enterprise based scheme for IT WEEE re-use and refurbishment that doesn't require some degree of grant support. The extent to which this is needed depends on whether a fee can be obtained from manufacturers/retailers. Social enterprises currently operating in Essex in this field are Millrace IT in Chelmsford, Seetec in Hockley and RevITalise in Maldon.

Millrace IT was set up in Chelmsford 1995 and is now a trading arm of InterAct Projects Ltd. Millrace has a staff of 5 people and reprocesses discarded computers for sale to the UK market or to send to Africa for charitable purposes. They also provide a tutoring service, install hardware/software, provide a data eradication service, and strip down the components for resale as scrap. A recent profile report conducted for InterAct [18] has concluded that the UK market for PCs is very competitive and that without a large budget for marketing Millrace IT will find it difficult to compete, especially if larger manufacturers undertake their proposals to recycle. The lack of government projects and schemes for the recycling of PCs



was also thought to leave the market at a weak level. In addition, the difficulties posed by the disposal costs of waste CRTs and waste plastic which contain materials banned from landfill (see section 5) make the operation more costly and complicated than may be initially thought. Another IT re-use and recycling social enterprise, RevITalise in Maldon, have recently had problems and costs involved disposing of these items. The sequence of operations for re-use are as follows:

- (i) On arrival the equipment is logged into a database and labelled
- (ii) it is then safety tested
- (iii) All hard disks are wiped to ensure removal of sensitive or confidential data (if this is not possible, the disk will be destroyed)
- (iv) The equipment is cleaned thoroughly and all corporate identification removed
- (v) Additional licensed software and hardware is installed as required
- (vi) The equipment is packaged .

Table 2 shows a breakdown of estimated costs and income for a reuse/recycling social enterprise modelled along the lines of Millrace IT. At present, Millrace is selling 50 units per year at an average price of £150, providing an income of £7,500 [18]. If the maximum target of 200 units were sold to the UK market at this price an income of *ca.* £30,000 would be generated. However, this is probably an overestimate as the prices charged for used computers are falling in the face of the low prices charged for new equipment – for example a well-specified 2.4 GHz unit with Windows XP, 256 MB of RAM, DVD + CD writer and TFT screen can be bought on the High Street for £450. On-line sellers are advertising used P III units complete with monitors for £130 [17], so this figure is probably a more reasonable estimate. Using approximate figures for overheads, Millrace need £117,000 to break even every year [18]. Around £12,000 of income is provided by tutoring at a rate of £15.38 per hour and other contracts have been secured to increase this. However, even with over £62,000 of grants and donations there is currently a trading viability of almost £34,000. A recent possibility has arisen to provide computers for a charity called Digital Links International who may be willing to pay up to £12 for the collection of each PC and £20 for the resale of each unit to Africa with no packing or shipping overheads. It has been calculated that Millrace could provide 2000 computers per year, generating an income of £64,000 from the contract. This would leave a short-fall of *ca.* £30,000 to be filled by tutoring, grants and/or a fee of *ca.* £15 per item charged to the manufacturers. A number of funding sources are available, for



example, Seetec have received grants of over £150,000 from the ESF and have recently applied for CRED funding.



Table 2

Breakdown of Costs for an IT Reuse/Recycling Scheme

	Cost	Income
Overheads	117,000	
Tutoring		12,000
UK Sales (200 units)		26,000
VAT	6,650	
Exports (2000 units)		64,000
VAT	11,200	
Fee from manufacturer		33,000
Totals	134,850	135,000

Notes:

Based on current operations at Millrace IT, Chelmsford, employing staff of 5.

Tutoring: 780 hrs at rate of £15.38 per hour

VAT may not be payable on charitable exports. If it is, it may be preferable to split the enterprise so as to form units trading below the current £55,000 per year VAT threshold

Digital Links International, the charity accepting PCs, has these minimum criteria:

- Pentium 1 or II processor (P166 to P350 MHz)
- 64 Mb of RAM
- 1.2 Gb - 4 Gb Hard Drive
- 14" Monitor
- Keyboard & Mouse

Fee from manufacturer assumes £15 could be obtained per unit (2,200 units).

From DTI reports [1], the average weight of IT equipment can be calculated as *ca.* 16 kg per unit. The 9730 tonnes of IT WEEE estimated to be available in Essex then translates to *ca.* 600,000 units. If 75% of this is considered to



be commercial, this leaves *ca.* 150,000 domestic units. If 50% of these are PCs and 20% of these are suitable for refurbishment, it can be roughly estimated that 22,000 PCs are available for re-use – enough for *ca.* 10 social enterprises similar to Millrace IT, each exporting 2000 units and selling 200 to the UK market. If Commercial IT were included this figure would quadruple to 40 enterprises so re-use and recycling of just 10% of the total estimated quantity available would provide jobs for 20 people. In Cambridge one enterprise could be set up for domestic and commercial waste, assuming 10% of the estimated quantity available was used and for the Eastern Region, the figures are domestic: 3, commercial + domestic: 13. The current recycling rate of IT is estimated to be only between 5 to 15% [1,19] compared to the WEEE directive target for recovery of 75% and recycling of 65% so far more opportunities than these could exist.



Appendix 3

Recyclers for Refrigeration Equipment

The following companies have received or have applied to receive their licence from the Environment Agency to recycle fridges:

[European Metal Recycling Ltd](#)

Sirius House, Delta Crescent, Westbrook, Warrington, WA5 7NS Phone: 01925 715400, Fax: 01925 713470

[Overton Recycling Ltd](#)

Unit B1 Cradley Industrial Park, Overend Road, Cradley Heath, Birmingham, B64 7DW Phone: 0121 5859885, Fax: 01384 633470

[Sims Recycling Solutions](#)

Northside, South Dock, Alexander Dock, Newport, Gwent, NP20 2WE
Phone: 01633 261 959, Fax: 01633 261 951, pwake@uk.sims-group.com

Other recyclers involved to some extent with fridges:

[Aquaforce Special Waste Ltd](#)

Unit 9, Sprint Industrial Estate, Station Road, Four Ashes, Wolverhampton, West Midlands, WV10 7DB Phone: 01902 198 599, Fax: 01902 798 690

[Cleanaway Ltd](#)

The Drive, Warley, Brentwood, Essex, CM13 3BE Phone: 01277 234567, Fax: 01277 230067

[Connell Group](#)

Mossgate Road, Oldham, Lancashire, OL2 6HS Phone: 01706 845 666, Fax: 01706 846683

[European Metal Recycling Ltd](#)

Sirius House, Delta Crescent, Westbrook, Warrington, WA5 7NS Phone: 01925 715400, Fax: 01925 713470



[John Hornby & Sons Ltd](#)

Old Crown Dye Works, Birkenshall Lane, Bradford, BD4 7PG Phone:
01484 652777, Fax: 01484 461460

[M.Baker Recycling Ltd](#)

Baring House, 6 Baring Crescent, Exeter, EX 1 1TL Phone: 01392 433
912, Fax: 01392 411 951, enquiries@mbakergroup.co.uk

[MDJ Light Bros Ltd](#)

Greystone Quarry, Southerham, Lewes, East Sussex, BN8 6JN Phone:
01273 476862, Fax: 01273 478936

[Overton Recycling Ltd](#)

Unit B1 Cradley Industrial Park, Overend Road, Cradley Heath,
Birmingham, B64 7DW Phone: 0121 5859885, Fax: 01384 633470

[Polar Recycling Ltd](#)

The Old Coal Depot, Wallasey Bridge Road, Birkenhead, Merseyside,
CH41 7BA Phone: 0151 6530733, Fax: 0151 6512121

[Shanks Group Ltd](#)

Corporate Head Office, Astor House, Station Road, Bourne End, Bucks,
SL8 5YP Phone: 01628 524523, Fax: 01628 524114

[Sims Recycling Solutions](#)

Northside, South Dock, Alexander Dock, Newport, Gwent, NP20 2WE
Phone: 01633 261 959, Fax: 01633 261 951, pwake@uk.sims-group.com

[Swindon Borough Council](#)

Civic Offices, Euclid Street, Swindon, SN1 2JH Phone: 01793 463000

[Tag Hygiene Services Ltd](#)

Kirkburn Manor, Main Street, Kirkburn, Driffield, YO25 9DU Phone: 01377
229 068, Fax: 01377 229 071



Appendix 4.

Further Details of the Waste Electrical and Electronic Equipment Directive (WEEE) 2002/96/EC and Restrictions of the use of certain Hazardous Substances in electrical and electronic equipment Directive (RoHS) 2002/95/EC.

Definition of WEEE:

The WEEE directive defines Electrical and Electronic Equipment (EEE) as “equipment which is dependent on electric currents or electromagnetic fields in order to work properly and equipment for the generation, transfer and measurement of such currents and fields falling under the categories set out in the Annex1A (Appendix 1 in this report) and designed for a voltage rating not exceeding 1000 V for ac and 1500 V for dc”.

Timetable:

13 February 2003 Directives published.
Summer 2004 Regulations laid by members states.
Summer 2004 Producers to commence registration.
13 August 2005 Producer responsibility for financing commences alongside retailer take-back.
1 July 2006 RoHS substance ban commences.
31 December 2006 Collection and recycling targets to be achieved.

WEEE is an environmental directive to achieve only minimum objectives and may be extended in each state. RoHS is a single-market directive. Under the EU WEEE and RoHS Directives, you are deemed as the Producer if you: manufacture within the EU, import into the EU products that have been manufactured outside the EU, market the product under your own brand name, wherever it is manufactured. (E.g. B&Q Power Tools.)

The Waste Electrical and Electronic Equipment Directive (WEEE) aims to minimise the impacts of electrical and electronic equipment on the environment during their life times and when they become waste. It applies to a huge spectrum of products. It encourages and sets criteria for the collection, treatment, recycling and recovery of waste electrical and electronic equipment. It makes producers responsible for financing most of these



activities (producer responsibility). Private householders are to be able to return WEEE without charge. Retailers have obligations to provide services to take back old electrical and electronic equipment on purchase of replacement goods or fund an equivalent service.

The Restriction of Hazardous Substances (RoHS Directive) will ban the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants from 1 July 2006. There are a number of exempted applications for these substances. RoHS takes its scope broadly from the WEEE Directive. Manufacturers will need to ensure that their products - and their components - comply in order to stay on the Single Market. If they do not, they will need to redesign products.

Details of WEEE Directive requirements

Collection: A collection target for household WEEE of 4 kg per head of population per annum to be achieved by 31 December 2006.

Recovery: Setting of minimum recovery and recycling targets according to product category. Targets divided into overall recovery element, of which a certain amount must be achieved through recycling, component or substance re-use remainder could be incineration with energy production or equivalent. Targets range from 50% - 80% to be reached by 31 December 2006.

Financing: Producers to pay for collection (from centralised points), treatment and recovery/recycling of household WEEE from 13 August 2005. Producers must provide a guarantee that waste will be managed for products they place on the market after 13 August 2005. Products put on the market before 13 August 2005 are to be financed proportionally by producers, through collective schemes. Business to business WEEE to be dealt with by producers where replacements, users responsible in other cases. Costs may be shown to consumers for up to 8-10 years from 13 August 2005.

Treatment: Removal of all fluids and certain substances (e.g. lead, mercury) and components that contain them. To be carried out by permitted operators. Premises must have adequate storage facilities (i.e. weatherproof and with impermeable floors etc) for removed substances and components. Possible derogation from permitting for small businesses (subject to



inspection).

Information: Member States to draw up register of producers of electrical and electronic equipment. Separate collection symbol (crossed out wheellie bin) to appear on all products from 13 August 2005. Users to be told of their role in contributing to the collection of WEEE, what collection/return facilities are available etc. Users to be told of the health and environmental hazards from hazardous substances used in electrical and electronic equipment. Treatment facilities to be given appropriate information to identify components, materials and the location of hazardous substances in products. Member States to record amount of goods on market and levels of recycling achieved.

Product design: Product designs should take into account and facilitate dismantling, recovery and recycling. Manufacturers should not “design out” re-use, unless there are overriding reasons (safety or environmental). For further information see: www.dti.gov.uk/sustainability/weee and www.envirowise.gov.uk

This report has been compiled to the highest accuracy using the best available information, but prospective users should check details prior to setting up a new social enterprise and produce a detailed business plan. The WasteWISE team requests anyone using this analysis or other assistance to set up a new enterprise to acknowledge the role/contribution of WasteWISE and other partners e.g. councils, to such projects.

RESEARCHED AND WRITTEN BY: Andrew Stevens, February 2003

Previous WasteWISE reports:

1. Expanding Plastic Bottle recycling in Essex and Cambridgeshire (Feb '03)
2. Waste Vegetable Oil Recycling for Bio-diesel Production in Essex and Cambridgeshire (March '03)
3. Waste Wood Recycling and Reuse in Essex and Cambridgeshire (May '03)
4. Waste Tyre Reuse/recycling in Essex and Cambridgeshire and Potential for Rubber Products (Aug '03)