



Overview document

WEEE recovery in the UK: the current situation and the road ahead

A summary of key findings from recent research into waste electrical and electronic equipment (WEEE) disposal and processing in the UK.

WEEE recovery in the UK today

As a modern consumer society, the UK acquires and disposes of a large amount of electrical and electronic equipment every year. In 2011, a total of 1.3 million tonnes of new electrical and electronic goods were purchased by UK households – and a similar amount disposed of. Some 38.4% of used equipment was evidenced as being recycled. This reflects the increase, in recent years, in the proportion of electrical and electronic equipment that is re-used, recycled, or from which materials are recovered to be used in producing new equipment. However, not all of this goes through the official waste electrical and electronic equipment (WEEE) system: in fact, it is estimated that some 37% of all used equipment (590,000 tonnes) still goes to landfill.

An increasingly effective WEEE recovery system

Once within the WEEE system, material recovery in the UK is increasingly effective. Around 75% of WEEE arising in 2010 was either re-used or treated to recover useful materials, either through the WEEE treatment system or through other routes, including local re-use. This is particularly important in the current global market where many of the materials used in electronic equipment manufacturing are subject to concerns over the security of supply.

The UK WEEE treatment and recovery industry

Over 500 organisations operate within the UK WEEE treatment sector, and almost all perform 'primary dismantling/recovery' – separation of the waste equipment into different fractions: ferrous and non-ferrous metals, mixed plastics and leaded and unleaded glass. Some of these can be sold directly (base metals); others (e.g. mixed plastics) require further treatment in order to extract a range of recyclates and maximise commercial value.

Such secondary treatment typically takes place overseas, closer to major manufacturing markets where the demand for these materials is greatest. However, a few UK companies are exploiting the handful of relatively niche domestic markets, such as single polymers from WEEE derived plastics. For example, one engineering company supplies a leading white goods manufacturer with high grade polymer pellets made from recycled fridge waste; these pellets are used to produce plastic access panels for washing machines. This is reported to save the manufacturer around 5% on raw material costs.

Effective... but expensive

While recovery of the key material streams is very effective in terms of the proportion of materials recovered, UK treatment costs are typically higher than their overseas counterparts, predominantly due to higher labour costs. Margins are further affected by costs of transporting the primary materials for re-use or secondary processing.

A changing WEEE landscape

Several factors are set to shape the WEEE treatment and recovery sector over the next few years.

1. In 2016 new EU regulations will come into force, increasing WEEE recycling and recovery targets to 45%. These regulations will also place greater responsibility on retailers and manufacturers to accept used equipment – which in turn will create a greater demand for WEEE treatment.
2. The total volumes of WEEE arising are predicted to increase, particularly from large household items and, from 2020, photovoltaics.
3. Demand for raw materials – in particular metals, such as cobalt, platinum and titanium, and rare earth elements, all of which are widely used in high-tech manufacturing – is set to rise due to their value to different manufacturing sectors and the ongoing concern already highlighted around supply security.

Prices for many of these materials are already high, and there are concerns over security of future supply, as detailed in Defra's [Resource Security Action Plan](#) and the Scottish Environment Protection Agency (SEPA) study on [Raw Materials Critical to the Scottish Economy](#). For example, global demand for rare earth elements, critical to mobile phones, flat screen TVs and computers, is forecast to grow at up to 11% a year between now and 2014. China produces around 97% of the world's supply of these, and in 2010 it cut its export quota by 72%.

Together, these factors increase the importance of WEEE materials recovery and emphasise the importance of reducing manufacturers' reliance on virgin raw materials. Crucially too where the UK is concerned, a growing number of manufacturers will be operating in the UK – particularly in green industries, such as low-carbon vehicle production and renewable energy. Further research is underway to evaluate these potential market opportunities for recovered WEEE, in line with the concerns raised in the Resource Security Action Plan. This research being delivered by WRAP will provide an indication of potential market size and the particular materials that are likely to be required.

New opportunities in WEEE treatment and materials recovery

This changing market landscape offers a range of opportunities for organisations in the UK WEEE treatment and materials recovery sector to expand their services and move up the value chain. Broadly, these opportunities involve organisations adapting their operations to incorporate more secondary processing – a step which would enable them to recover higher value recyclates, such as the individual metals and polymers that are recognised as critical to electronic and electrical equipment manufacturing.

With demand expected to grow and question marks over the security of supply for certain resources, organisations in the sector would be able to command high prices for these vital materials – considerably higher than for the primary recyclate fractions they currently sell.

New end markets in the UK

The challenge for UK Approved Authorised Treatment Facilities (AATFs) is to identify and quantify end markets for these materials, and offer a material of sufficient quality and at a consistent price to compete with overseas suppliers. Without such markets, it is difficult to justify investment in additional processing systems and technologies, and historically, there have been few end markets in the UK. In 2007, there were only 20 UK domestic electrical appliance manufacturers that employed more than 250 people.

But with the emergence of domestic electric/hybrid vehicle and renewable energy manufacturing industries – both fields in which the UK is taking a strong lead – new opportunities exist to develop closed-loop recycling systems. By investing in secondary processing now, UK AATFs may be able to secure end markets and accelerate return on investment.

Increased secondary processing would also help increase the proportion of WEEE recycled in the UK – an important step given the higher targets set under the latest EU directive.

How can these opportunities be capitalised on?

The attitudinal survey of material recovery facilities in the UK found that most businesses in the sector believe that WEEE treatment inevitably requires a number of steps to deal with all components. In other words, most feel there will always be a need for separate primary and secondary processing – the latter a more specialist task carried out by fewer companies.

However, during face-to-face interviews with some of the organisations that took part in the survey, it became clear that the difference between these two stages is at least partly to do with the sequence in which treatment is undertaken, and the specifications of the process. For example, for plastics, much of the same equipment can be used for both primary and secondary processing.

This essentially means that the level of capital investment needed to move from primary to secondary processing does not necessarily need to be a barrier: many organisations already own some or all of the equipment required to recover high-value materials.

Allied with the efficiency of existing recovery processes, provides a strong starting point. But in addition, the research also examined a number of new methods of recovery, all of which could lead to lower cost/more efficient recovery of key materials. The table below provides an overview of the methods considered in the research – though this is by no means a comprehensive list of all current and emerging technologies.

Technology	Separation method	Treated product/material	Recovered material
TITECH Polysort	Near infra-red processing	Mixed plastics	Plastic polymers
TITECH X-tract	X-ray	Shredded ferrous scrap	Copper. Can also be configured to sort panel / funnel glass.
Wet Shaking Tables	Vibration/water flow	Copper-rich WEEE derived plastic	Copper
AllMineral Wet Stratification Jig	Jigging	WEEE plastic	Fine copper
Flat Panel Display Recycling	Manual disassembly/ shredding/ optical sorting/ mercury decontamination	Flat Panel Displays	Metals, plastics, glass and mercury
Active Disassembly	Shape memory polymers	LCDs	Liquid crystal, indium, metal, glass, plastics

Visys Spyder	Laser sorting	Shredded WEEE	Glass, metals, plastics
Kinetic Gravity Separator	Terminal velocity	Plastic	Fine copper, metal, glass
MeWa Smash Boom Bang	Disassembly by mechanical 'throwing' within a drum	Mixed WEEE	Capacitors, plastic casing, batteries, electric motors, transformers, circuit boards

WRAP is currently supporting a trial with one treatment operator to investigate new treatment methods in more depth.

How WRAP can help

We provide a range of information, advice and support to help business, individuals and communities reap the benefits of reducing waste, developing sustainable products and using resources more efficiently. This document is part of our work to support WEEE recovery and increase recycling in the UK.

The Waste Prevention Loan Fund: focusing on electricals

WRAP recently announced the launch of the Waste Prevention Loan Fund. This is designed to support organisations to develop innovative, more resource-efficient ways of doing business in England. The Fund provides an opportunity for organisations looking to increase capacity for re-use, repair or recovery to receive grants or loans to support their projects.

Electricals is a key focus of the fund along with furniture and textiles, and WRAP would welcome applications from organisations in England seeking to focus on secondary processing of WEEE materials. Loans are available from £100,000 to £1m for machinery and/or industrial units, either to fund a project directly or lower the risk of an investment programme to help secure commercial funding. For more details on lending conditions, interest rates and fees, visit www.wrap.org.uk/wplf

More information on WEEE recycling and recovery can be found at www.wrap.org.uk/weee

While we have tried to make sure this information sheet is accurate, we cannot accept responsibility or be held legally responsible for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. This material is copyrighted. You can copy it free of charge as long as the material is accurate and not used in a misleading context. You must identify the source of the material and acknowledge our copyright. You must not use material to endorse or suggest we have endorsed a commercial product or service. For more details please see our terms and conditions on our website at www.wrap.org.uk

**Waste & Resources
Action Programme**

The Old Academy
21 Horse Fair
Banbury, Oxon
OX16 0AH

Tel: 01295 819 900
Fax: 01295 819 911
E-mail: info@wrap.org.uk

Helpline freephone
0808 100 2040

www.wrap.org.uk/weee

