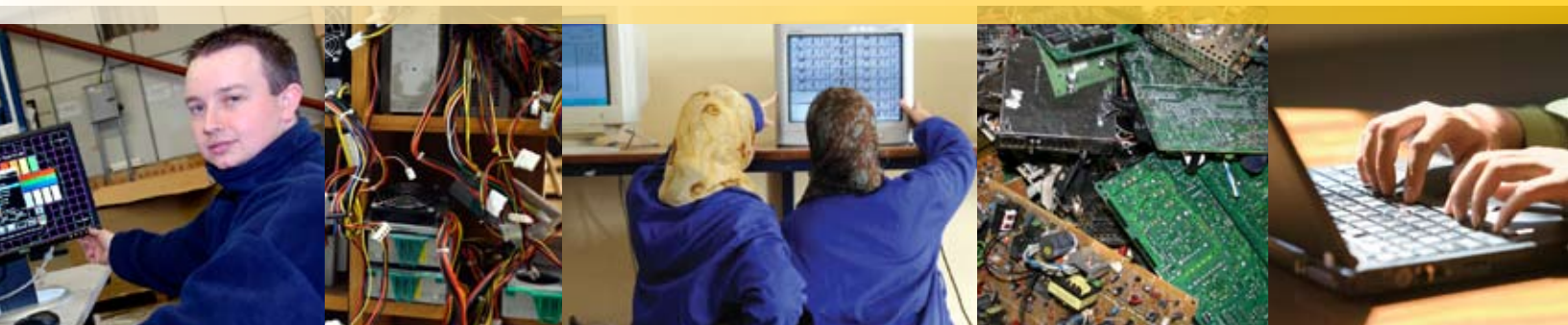




A leader in the environmentally responsible handling of used computer equipment, UK-based RDC has refurbished or recycled more than 4 million PCs over the past eight years.

## Europeans Lead in Refurbishment and Recycling of Used Computers





*By testing and refurbishing equipment that is just a few years old, Community Microsoft Authorized Refurbishers like RDC and Ateliers Sans Frontieres divert tons of electronic waste from landfills every year.*

*The growing mountain of electronic waste generated throughout the world has emerged as an issue of global concern. In 2008 alone, PC users worldwide will replace more than 180 million computers, about 20 percent of which will end up in landfills.<sup>1</sup> The most environmentally responsible way to deal with unusable PCs is to refurbish them so they can be reused. This also increases access to computers for underserved populations that might not otherwise be able to afford PCs. Equipment that cannot be refurbished should be responsibly recycled. This case study looks at two organizations in Europe that have taken unique approaches to addressing the challenges and opportunities of refurbishing and recycling used PCs.*

## Microsoft Partners Promote Reuse of Computers and Cut Electronic Waste

*RDC has refurbished or recycled 4 million PCs over the last eight years, enough to cover a soccer field—more than 200 feet deep.*

**R**DC, a for-profit British company that manages the disposition of computer equipment for large organizations, has refurbished or recycled more than 4 million computers over the past eight years. That's enough PCs to cover a soccer field—more than 200 feet deep. Ateliers Sans Frontieres (ASF) is a French nongovernmental organization (NGO) that focuses on a range of social issues, including the digital divide, e-waste and unemployment. What do these two organizations have in common? They're both European-based Microsoft partners that have found effective, socially responsible ways to deal with the

growing problem of electronic waste. They refurbish used PCs that are still in good shape, providing customers with high-quality equipment, and they recycle equipment that is beyond economic repair.

RDC and ASF are among the more than 1,000 organizations in 60 countries that are part of the Community Microsoft Authorized Refurbisher (Community MAR) program. Through this program, Microsoft provides genuine operating system and office productivity software at a nominal cost to refurbishers, who load the software onto refurbished PCs and sell them at little or no cost to schools, nonprofit organizations and

<sup>1</sup> Computers in use pass 1 billion mark: Reuters citation of statistics sourced from Gartner, Inc., <http://www.reuters.com/article/technologyNews/idUSL2324525420080623> (June 2008).

other specially approved recipients.

Microsoft encourages refurbishment as a way of minimizing the electronic waste stream and making PCs available to people and organizations that might not otherwise be able to afford them.<sup>2</sup> Since a major proportion of the energy used during a computer's lifetime occurs during its production, extending a computer's useful life substantially reduces its carbon footprint.<sup>3</sup> Eventually, however, PCs become so old or broken that it does not make sense to refurbish them. RDC and ASF have each taken a unique approach to handling the recycling of computers at the end of their useful life.

## RDC: A Business Model for Refurbishing and Recycling IT Equipment

**R**DC began in 1991 as an auctioneer of used computer equipment. Today, it is a leader in the environmentally responsible handling of used computer equipment. One hundred percent of the equipment that RDC handles is ultimately refurbished or recycled.

Key to RDC's efforts is a comprehensive system for managing and tracking the used computer equipment it collects. Over two-thirds of the equipment is refurbished and then redeployed to the company from which it came, donated to a nonprofit organization or sold by RDC. Companies that send RDC their used equipment receive most of the revenue from the resale of refurbished PCs, with RDC taking a commission. RDC also derives revenue from fees it charges to collect used equipment from customer sites, erase data from hard drives and test refurbished machines for quality and functionality.

RDC's revenues from refurbishing and selling PCs totaled US\$40 million in 2007, twice what it earned just five years ago. The company, which has 175 employees and operations in Britain, France and Germany, is a subsidiary of Computacenter, Europe's largest independent supplier of IT equipment and services to businesses.

As a Community MAR, RDC has worked closely with Microsoft to adapt its refurbishment and recycling processes for



*RDC tracks used computer equipment from the time it leaves the customer's premises through refurbishment and re-use at a new site, or through disassembly and shipment to a licensed recycling facility.*

<sup>2</sup> Microsoft's corporate principles call for environmental stewardship through conservation, reuse, recycling and proper waste disposal.

For more information, go to [www.microsoft.com/about/corporatecitizenship/citizenship/businesspractices/environmentalprinciples.msp](http://www.microsoft.com/about/corporatecitizenship/citizenship/businesspractices/environmentalprinciples.msp).

<sup>3</sup> *Computers and the Environment: Understanding and Managing Their Impacts*. Ruediger Kuehr and Eric Williams, eds. Boston: Kluwer Academic Publishers, 2003.

## Refurbishing and Recycling PC's

### At a Glance

By refurbishing PCs for reuse, Microsoft Community MARs divert tons of working electronic equipment from the waste stream. Some refurbishers take the additional step of making sure that electronic equipment that is too old to be refurbished is properly recycled. Two leading recyclers are:

#### RDC

[www.rdc.co.uk](http://www.rdc.co.uk)

- Processed 3,000 tons of e-waste in 2007
- Employs 175 people and generates US\$40 million a year in revenues
- Worked with Microsoft to implement a comprehensive approach to refurbishment and recycling in Uganda with UNIDO

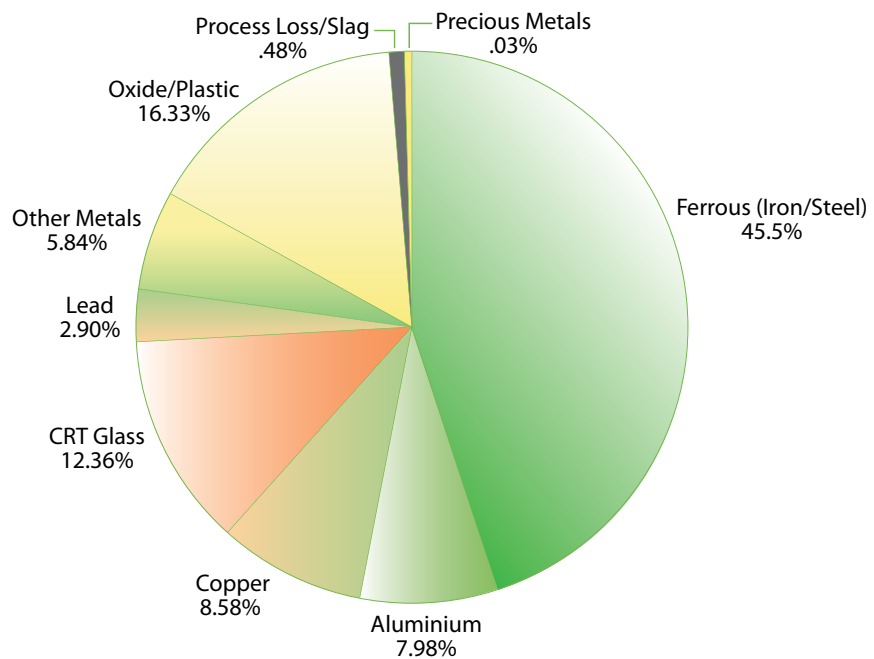
#### Ateliers Sans Frontieres

[www.ateliersansfrontieres.org](http://www.ateliersansfrontieres.org)

- Recycles 800 tons of PCs each year
- Refurbishes thousands of used PCs that are then sent to NGOs in Africa and Eastern Europe
- Provides refurbishment and recycling jobs to people with drug and other problems to help them integrate into the work force

## Recycling E-Waste Recovers Significant Resources

RDC provides each customer with a breakdown of the resources recovered from its discarded IT equipment. This chart shows the materials recovered, as a percentage of the total weight, from a typical customer with a collection of PCs, monitors and printers that have been disassembled and recycled.



use in developing countries. RDC worked with Microsoft and the United Nations Industrial Development Organization, for example, to help establish Uganda Green Computers Co. The enterprise was launched in 2008 with the capacity to refurbish 10,000 computers a year. It also includes a significant recycling facility.

About one-third of the equipment that RDC collects does not meet the high standards it requires for refurbishment. This equipment is disassembled and separated into as many as 18 categories of materials, including power supply units, computer cases, cathode ray tubes (CRTs) and circuit boards. Parts that can be reused are sold or saved as spare parts. Hard drives that cannot be securely erased are destroyed.

RDC partners with firms in Britain, Holland and Belgium that recycle virtually every element of the disassembled electronic waste and provides a detailed account of

what was recovered—down to the grams of gold, silver and palladium taken from each ton of waste. RDC negotiates deals with its recyclers that include charging them for some parts, such as CRTs, and getting credits for other parts, such as circuit boards. The several tons of circuit boards that RDC supplies its recyclers each year, for example, can generate substantial credits: A ton of scrap CPU chips can have a market value of about US\$80,000.

Since 2002, 92 percent of the materials that RDC has received has been recovered and reused. The remaining 8 percent, consisting of plastic coated with flame retardants, is ground into pellets that are burned as fuel by smelters and refiners and in other industrial operations.

RDC's responsible handling of discarded electronic equipment has attracted environmentally conscious customers. It also has helped RDC's bottom line. Six years

ago, the company began recycling packing materials that it had previously sent to landfills. Paper shredded to preserve the confidentiality of customer information was sent to a local zoo for use as animal bedding. Plastic film wrap, cardboard and polystyrene packing were all recycled. The savings from landfill fees and the additional earnings from recycling generated more than US\$125,000 in 2007. For a company that earned US\$1.7 million in profits in 2007, that's a substantial amount. "Green business is good business," says Gary Griffiths, RDC's Sustainability Manager.

### Ateliers Sans Frontières: Refurbishing and Recycling as Social Activism

Whereas RDC is a medium-sized, for-profit business that is doing well by doing good, Ateliers Sans Frontières (ASF) is a small NGO that started out refurbishing used sports equipment for distribution in countries such as Brazil and Algeria. In 2005, not long after the European Union

(EU) passed strict new rules for electronics recycling, ASF began refurbishing computers and distributing them along with its refurbished sports equipment. ASF employees, excited by this approach to extending technology to underserved communities, established affiliate organizations in Morocco, Algeria and Romania tailored to meet local needs. Morocco, for example, faces high unemployment among the nation's young people, so ASF Morocco established centers to train unemployed youth to maintain and repair computers. To increase technical literacy, ASF provided refurbished PCs to NGOs that established computer centers in underserved communities. Microsoft supported this effort by helping to develop a program to train teachers for the centers.

As ASF began soliciting more used computer equipment from large corporations, the organization found itself with a growing pile of electronic equipment unsuitable for refurbishment. ASF turned this problem into a positive force for change. It established a program to rehabilitate people



*By refurbishing computers and distributing them to NGOs in developing countries, ASF prevents tons of equipment from entering the waste stream.*



*E-waste is collected at a recycling center near Paris, where it will go through an elaborate separation process that will recover more than 90 percent of the materials, including substantial amounts of steel, copper and aluminum.*

*More than 1000 organizations in 60 countries are part of the Community Microsoft Authorized Refurbisher program.*

who find it difficult to hold onto regular jobs because of drug addiction and other problems by hiring them to disassemble unusable PCs.

Walking through the ASF warehouse on the outskirts of Paris, a visitor can see the workers dismantling computers and putting the parts into separate bins for aluminum, circuit boards, plastic and CRTs. The workers are referred to ASF by a government social welfare organization that also pays most of their salaries as a part of the rehabilitation process.

Corporations pay ASF up to 10 euros (about US\$16) per machine to handle the cost of collecting and disassembling PCs that can't be refurbished. The money helps support ASF refurbishment activities. ASF processes about 800 tons of electronic waste each year through this system.

The bins of recycled parts filled by ASF workers are collected by a large recycler that specializes in processing electronic waste. At a highly automated facility, a mountain of electronic refuse is separated into 11 categories. Hazardous waste such as ink cartridges and CRTs are separated out by hand

for processing by specialized plants at other locations. There are specialized facilities, for example, that can remove the toxic coating from CRT glass before it is recycled.

The nontoxic waste goes through a sophisticated process to separate out recyclable materials such as aluminum, plastic and ferrous metal. The separation process begins in a chamber where the e-waste is thrashed to pieces with a heavy chain. The pieces are then loaded onto a conveyor belt where smaller batteries and hard-to-handle components like electric motors are separated out by hand. The rest is shredded into pieces the size of pennies.

The tiny pieces then go through a finer separation process. At one point, a manhole-sized magnet pulls ferrous materials from a conveyor belt of mixed metals. At another point, the shredded pieces are propelled into the air by the conveyor belt, where a blast of air carries away light pieces of aluminum into a separate bin. Through this complex process, 90 percent of the waste is recovered for reuse.

Although the actual recycling is ultimately handled by large, specialized

recyclers, small and medium-sized Community MARs like RDC and ASF play an essential role in the process. By refurbishing PCs for reuse by people and organizations in need, they divert tons of equipment from the waste stream. By disassembling older PCs, they lower the cost of recycling waste and increase the amount of money that can

be made through the sale of parts. And by erasing data on hard drives or destroying the parts, they protect confidential information. Organizations like RDC and ASF are leading the way in demonstrating that electronic waste can be treated in a manner that is good for the environment, good for society *and* good for business.

## Regulating Electronic Waste, European Style

The EU's Waste Electrical and Electronic Equipment (WEEE) Directive sets collection, recycling and recovery targets for all types of electrical products, including computer and telecommunications equipment, consumer electronics and household appliances. Although the directive became effective in August 2005, EU member states took some time to translate it into local law. Britain was the last to implement the directive when it passed its WEEE legislation in July 2007.

The directive is based on the principle of "extended producer responsibility"—it makes manufacturers and importers of electronic equipment financially responsible for the recycling and disposal of the equipment at the end of its life. Distributors must offer to "take back" electronic waste from the public.

The WEEE Directive requires that 65 percent of IT e-waste be recycled and another 10 percent be recovered by re-use or as waste to energy, rather than dumped in landfills. The directive has already had an impact on a range of industry players. Waste management companies have invested in new e-waste management facilities, electronics retailers are implementing programs to take back used IT equipment and refurbishers have intensified efforts to improve recycling and recovery rates for end-of-life electronic products.

The EU's WEEE Directive affects PC refurbishers, including Microsoft Community MARs, in the following ways:

- *Since reuse of used equipment and components is encouraged, the activities of refurbishers are officially endorsed by the directive.*
- *Refurbishers that store, collect, treat, recycle or dispose of electronic waste may be required to have permits. They must keep records on all waste generated and sent to a licensed waste management company.*
- *Every organization involved in the process must be licensed to handle, store and treat the waste and must track and record the movement of waste. Government organizations must approve and track the transfer of waste across borders.*
- *Cathode ray tubes, batteries, toner cartridges, circuit boards and flame-retardant plastics must be separated out from other electronic waste for special treatment.*



*In 2007, Microsoft launched Unlimited Potential, which brings together the company's corporate citizenship efforts and many of its business investments to significantly broaden the reach of technology in underserved communities. Unlimited Potential aims to deliver the benefits of relevant, accessible and affordable software to the 5 billion people who today have no access to technology or the opportunities it affords, with a goal of reaching the next 1 billion people by 2015.*

*For more information, visit [www.microsoft.com/unlimitedpotential](http://www.microsoft.com/unlimitedpotential)*

*To learn more about Microsoft's Secondary PC program, visit [www.microsoft.com/SecondaryPCs](http://www.microsoft.com/SecondaryPCs)*

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Photos courtesy of RDC and Ateliers Sans Frontières