



# recycling computers



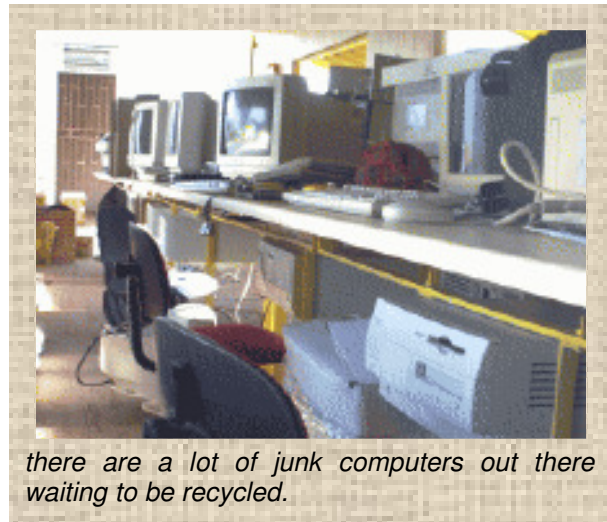
## what is it?

Basically, it's making computers last longer. Software companies are always bringing out new software that requires more processing power than its predecessors, which requires more powerful hardware, and so tends not to work too well on older computers. This results in criminally short lives for most computers. They can be recycled / made to last longer by a combination of a) a bit of tinkering, and b) using open source (free) software, which tends to require less processing power.

First, some history, to show the scale of the problem. At first, only large companies, universities and government agencies had the resources to buy and maintain large mainframe computers. With the development of the microchip, the personal computer appeared in the 1970s and became affordable for most people, although you still had to build them from kits.

The mouse and the graphical user interface were pioneered at Xerox PARC in Palo Alto, USA and by 1977 these innovations could be seen in the Apple II and others. IBM introduced a personal computer to the market in 1981 running Microsoft's MS-DOS operating system. With their huge distribution network, they quickly attained world dominance and to this day IBM 'clones' have around 95% of the global market, with the remaining 5% being Apple.

The World Wide Web appeared in 1992, and with fibre optic cables, it became possible to deliver video, real-time chat and 3D. This century has seen wireless networks allow mobile computing to become a reality, and computers are shrinking to mobile phone size. These innovations have



*there are a lot of junk computers out there waiting to be recycled.*

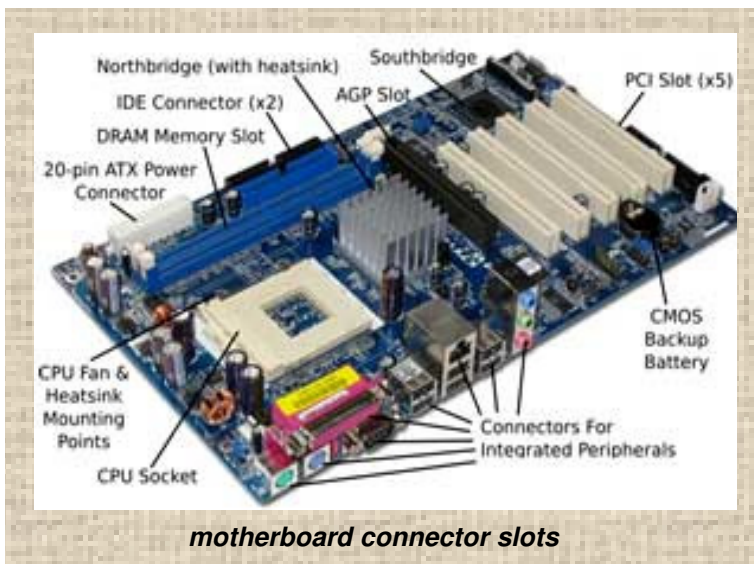
propelled a wider adoption of PCs/smartphones in people's work and social lives.

## what are the benefits?

So, with well over a billion PCs (in 2010) and rising rapidly, their short lives point to a massive environmental disaster looming.

The resources required to manufacture PC chips (huge amounts of water, minerals and electricity) are being depleted unnecessarily. Recycling slows down this process. Some machines are stripped to their raw materials in India and China and sold back to manufacturers, but it is more efficient to recondition and donate or sell cheaply to the developing world, opening up computer education and the web to people who cannot afford a new PC. The same applies to disadvantaged children in the West. With a rate of obsolescence of around three years, most computers are dumped in landfill, as they are perceived as having no function beyond their time of currency. Not only is this a waste of good electronic components and materials, but over time this creates highly toxic run-off that can infiltrate the water table.

Reuse is a far better option. Most users utilise only 20% of a computer's functionality. By replacing broken components and installing open source software, many computers can remain functional for many years at little cost. These can be good first machines for people unaccustomed to computing. They can also be turned into servers to hold data at a secure and/or remote location and act as a secure gateway to the internet.





*although sometimes daunting, working with computers is not rocket science - you just have to know where to stick the plugs*

## what can I do?

Most importantly, don't chuck your old computer away. You can have a go at revamping it yourself, with the aforementioned tinkering/open source, or you can give it to specialist companies who recycle them, often for the developing world.

If tinkering, you can learn about the standard components inside a computer by going on a course. The motherboard has various slots for memory and external devices such as power supply, hard disc and graphics/audio cards. Once you've been shown, it is very easy to hook up all the components - similar to sticking Lego blocks together when you were a child - as they all use slot connectors. You might require a pair of thin-nose pliers to adjust the jumpers for the hard disc, but no other tools are necessary.

If some item is not working you can find replacements for little or no cost by cannibalizing family and friends' old machines or buying parts at computer fairs. It would be unusual to pay more than £30 for a complete set of components and devices to get you up and running. Individual components are sold for £3-£5 each at fairs. You also have to install the correct type of RAM for the processor you have (there are tables available to look up) and install as much as you can, as it will help the machine and software to run faster.

So that's the tinkering part. The second part is open source. If you try and install a more modern

version of the Windows operating system on an old machine it may well not work due to the hardware not being powerful enough to run the software. Microsoft updates its Windows software every 3-4 years, which requires purchasing a licensed copy of the software for around £100 each version, and often necessitates the purchase of a new machine to cope with the bloated complexities of each new version. They also terminate technical support for each version after a few years, which 'encourages' users to buy newer versions just for the added support.

A simpler solution is to erase the hard disc and install a Linux operating system, which will put far less demand on the hardware. It's important to select the appropriate version of Linux for your hardware. Slackware / Debian is good for older machines, Ubuntu for a familiar interface, and Fedora for its simplicity and flexibility on machines with higher performance processors. You can buy these on disc at computer fairs for around £20 or download them free from the internet. Their great advantage is that they are backward compatible and will run on old machines.

Better still is the cost of a full set of open source programs that will run on these operating systems. You may have to pay a minimal fee for Linux Ubuntu (around £6), but you can download an office suite, graphics editor, DTP package and web design programs all for free. The equivalent cost would be several hundred pounds for the same type of software running on Windows Vista.

## resources

- LILI do a one-day course on recycling computers and open source
- [wasteonline.org.uk](http://wasteonline.org.uk) - list of companies that recycle computers around the UK
- [en.wikipedia.org/wiki/Motherboard](http://en.wikipedia.org/wiki/Motherboard) - about motherboards
- [en.wikipedia.org/wiki/Computer\\_memory](http://en.wikipedia.org/wiki/Computer_memory) - about RAM
- [britishcomputerfairs.com](http://britishcomputerfairs.com) - computer fairs
- [getgnulinux.org](http://getgnulinux.org) - get Linux
- [debian.org](http://debian.org) - Debian
- [slackware.org](http://slackware.org) - Slackware
- [ubuntu.com](http://ubuntu.com) - Ubuntu
- [fedoraproject.org](http://fedoraproject.org) - Fedora

Contact us or visit our website to find out more about our message, networks, factsheets, books, courses, products, services, magazines, links, forum, events and volunteering on organic farms. You can also become a Friend of LILI, receive our e-newsletter, and help us change the world.

*Low-impact Living Initiative (LILI), Redfield Community, Winslow, Bucks, MK18 3LZ*  
**tel: +44 (0)1296 714184 email: [lili@lowimpact.org](mailto:lili@lowimpact.org) web: [lowimpact.org](http://lowimpact.org)**  
*Registered in England. Company Ltd. by Guarantee no: 420502*