Office Products

A Guide to Sustainable Purchasing and Use

RESOURCE NSW

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MRI Australia
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RTS Imaging
Toner Express

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Disclaimer

This guide has been prepared in good faith. Whilst every effort has been made to ensure that the information provided is correct, Resource NSW does not endorse any of the goods or services discussed in the guide. It is your responsibility to ensure that any equipment or products you use are suitable and appropriate for their intended purpose.

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About this guide and how to use it

This guide introduces some of the waste issues and other environmental impacts associated with office equipment, and offers advice on how to minimise these impacts through appropriate use, purchasing and disposal.

Office equipment is a fast-moving area of product development, driven as it is by the rapid pace of change in information technology. In this highly competitive domain, where technologies are converging and companies merging, environmental performance is being taken up by manufacturers as a significant point of product differentiation.

Running office equipment is also expensive. In addition to the initial purchase or lease costs, there are ongoing costs for office consumables, staff time and waste disposal – all of which impact on your bottom line. Strategies that reduce environmental impact can often save you money too.

Product categories covered are:

- copiers
- printers
- fax and multi-function machines
- toner and ink cartridges
- computers

Most of the information has been taken directly from specification sheets, product literature and IT equipment manufacturers' websites.

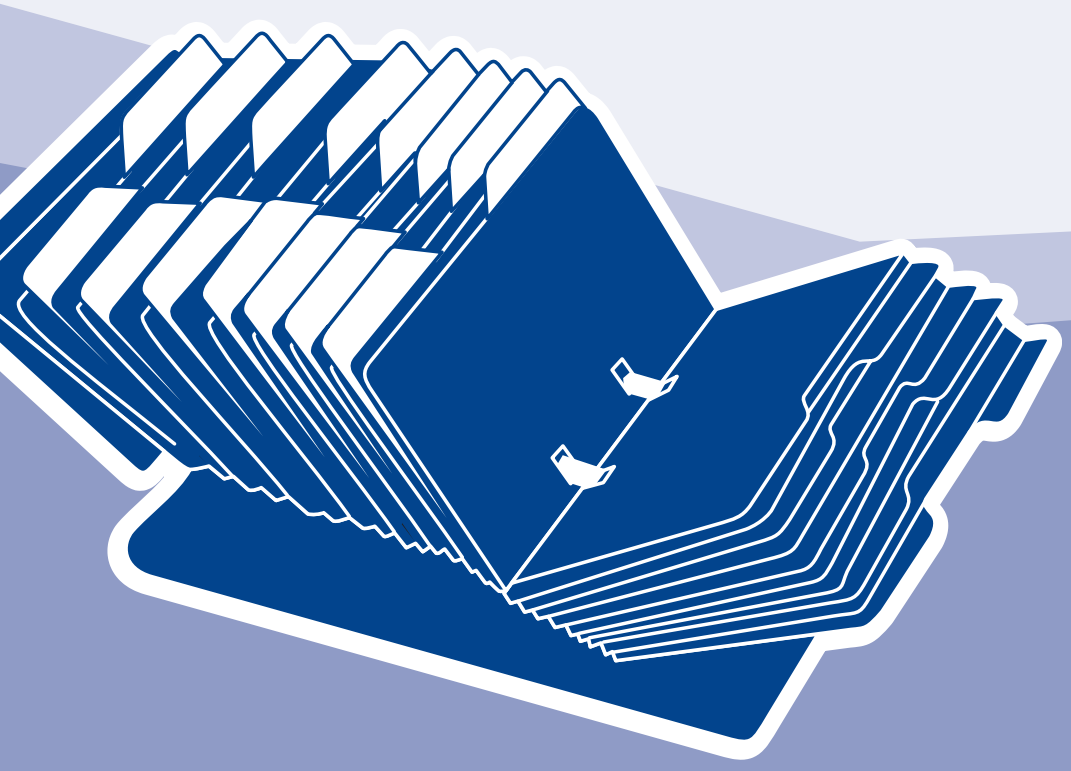
Each section begins with an **overview of environmental impacts** associated with each type of office machine: its marketing, manufacturing, functioning and disposal. This is followed by suggestions on **how to use the equipment in more sustainable ways.**

Basic pointers towards purchasing criteria are given for each product type. These are expanded in the central section **'Tools for Sustainable Purchasing'**.

This offers a diagnostic process to help you define your communication and information storage needs and to review environmental performance requirements before embarking upon a purchase.

While the relation between office technologies and **paper consumption** is addressed, types of printing paper are not. For this you should consult Resource NSW's companion publication, Know Your Paper: A Guide to Purchasing Recycled Content Office Paper.

Contents



1. Introduction

Why sustainable purchasing?

It is now well recognised that major environmental costs come with the benefits of modern lifestyles. Air and water pollution, deforestation, declining biodiversity, greenhouse-induced climate change, thousands of synthetic chemicals in soil and water causing genetic changes to living organisms – these are just some of the more familiar negative impacts arising from the products, infrastructures and services that support our way of life.

For people who live and work in cities and towns, environmental damage can seem distant from everyday life, and therefore easy to ignore. Yet it is the actions of millions of people doing ordinary things everyday that contribute to invisible, ongoing damage. Activities that impact on the environment are fundamentally structured into what we take to be normal.

Information technology, initially touted as 'de-materialised' and environmentally clean, is having significant environmental impacts, usually at great distance from where it is used. The combination of computers and affordable, easy-to-use printers has vastly increased paper output from nearly all offices, both as finished product and as waste. This increases the demand for pulp for making paper and thus the rate of harvesting of forests and, at the other end of the product life cycle, pushes up the demand for landfill space.

Low-cost colour inkjet printers are creating a new domain of waste – disposable ink cartridges – while at the higher-cost end of the market, colour laser printing is moving 'in-house' for presentation-oriented businesses, leading to increased paper use, wastage and the proliferation of unrecyclable colour toner cartridges.

The availability of low-cost colour printers is also increasing the demand for specialty papers for photo-quality printing. Many toxic chemicals are required to achieve the 'photo-real' qualities promised by manufacturers. Again, impacts are not apparent to consumers but occur at production and disposal stages, where hazardous waste has to be carefully managed to ensure it doesn't seep into soil and waterways.

Against this picture, a number of manufacturers, particularly in Japan and Europe, are developing programs to reduce the impacts of what they produce. There have been important achievements in eliminating or minimising the use of substances like heavy metals and halogens (which produce dioxins when burnt) in manufacturing. Product take-back and remanufacture are becoming more widespread, while the energy consumption of machines is declining on a per unit (though not overall) basis.

Also, many IT equipment manufacturers are making quite detailed environmental information about their products and processes available in annual reports and on their websites.

Opportunities and traps

The growing use of computers, email and the Internet presents the best opportunity yet for significantly reducing the use of paper, inks, toners, computer media (discs, CDs) and the waste associated with them. Business-to-business e-commerce is a particularly fruitful area for electronic communication and 'de-materialisation', leading to waste reduction.

But we cannot expect new technology to lead automatically to resource conservation and lower impacts. While individual IT products may offer efficiencies in resource and energy use, increases in productivity from using new equipment can lead to the generation of more documents produced at higher speeds.

You need to be aware of this structural condition of unsustainability and learn to work smarter to avoid traps such as these hypothetical examples:

- *A company installs a new IT system and significantly reduces paper used for administration and business communication, but at the same time it expands its paper-based direct mail marketing.*
- *A large organisation shifts entirely from paper-based records storage to using an off-site, totally electronic archive, but at the same time it begins generating and storing far more information than it did previously. This adds to the demand for server equipment, the space to house it and the energy to power it.*

These two examples underline the importance of commitment by organisations to substantial, long-range actions towards sustainability. It is not sufficient to focus on environmental problems in isolation: lower impacts in one area (such as less waste) may precipitate higher impacts in others (such as increased energy uptake and thus more greenhouse emissions). Conservation and waste management need to be applied across the board: to natural resources, to the material world of products and even to the apparently immaterial domain of electronic information.

Why it's so easy to act unsustainably

This guide draws attention to the pollution-reduction and waste-minimising features of some products. Brands and models compete on the basis of speed, print quality and ease of use. Their very raison d'être is to increase production (and therefore consumption of paper, toner, ink and energy), by making it possible to produce good-looking printed documents easily and fast.

Office equipment is generally designed to operate unobtrusively, requiring only limited input from us. Increasingly, it's the software doing all the work; what we know how to do is operate the interface. Smart equipment gives us freedom to focus on the content of our job, such as writing a report, or working out a budget. But this 'smartness' can also make us oblivious to the equipment itself and the resources it uses, like paper, toner and electricity. We tend only to become aware of office equipment when it breaks down (the same goes for appliances at home).

In the same way, lighting, ventilation, heating and cooling in offices are designed to optimise working conditions so that we are not distracted from our work by physical discomfort.

Is it little wonder then that modern offices have become places that use vast amounts of energy, chew up mountains of resources and generate tonnes of waste? It's not that people working in offices do not care about the environment, rather that we have become 'designed into' unsustainable modes of working by the designed environments we inhabit.

Working against unsustainability

Often it takes a major effort of imagination (and distraction from what you're meant to be doing!) to see the tree from which a piece of paper came or the pile of coal that was burnt to supply electricity to the computer you accidentally left on all night. But there is another way to become environmentally aware in the office, and that is to become aware of the office as an environment.

This involves three steps:

1. *Learning to recognise how computers, printers and other machines can, by their design, push your habits in more unsustainable directions.*
2. *Specifying your office equipment needs very carefully before purchasing (for example, consider: do I really need the higher speed, better print quality and other features that manufacturers are offering?)*
3. *Seeking to extend the life of your office equipment by understanding how it works, taking care of it and getting it repaired as soon as a fault is noticed.*

Becoming attuned to the designed and manufactured things around you and taking care of them is an essential part of environmental responsibility.

Being able to see the threads of unsustainability linking all these things means that more effective solutions can be developed. These will require more substantial changes to be made than occasional token actions, and they will take longer to implement. Effective solutions also require creative and careful thinking – which will be in increasing demand as the problems of unsustainability become more apparent to more people. So, seeking ways to make your office and work practices more sustainable in substantial rather than token ways could even put your organisation at an advantage.

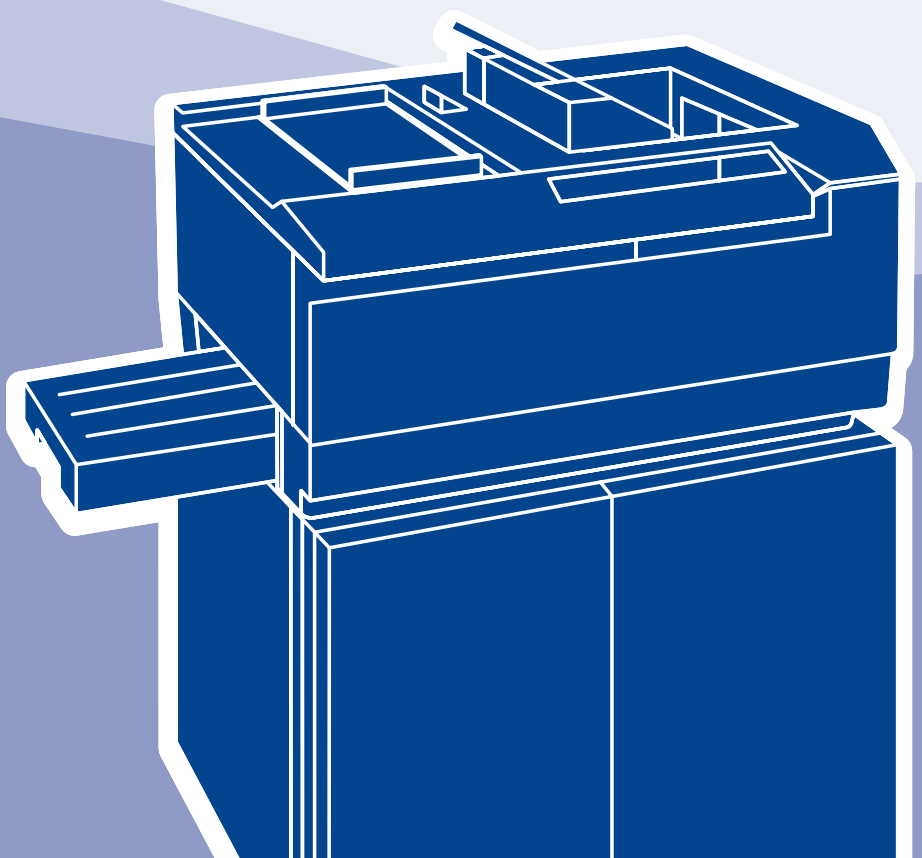
2. Copiers

Improvements in copying and printing technologies can unwittingly produce greater environmental impacts as machines are packed with more and more features which can easily encourage more printing and more copying.

The analogue photocopier with its limited range of functions used to be the mainstay of business document production. But today, as the digital platform becomes the basis of all office machines, the distinction between copiers and printers is breaking down. Many copiers now offer capability for networked printing, scanning and faxing, while many laser printers also function as copiers, scanners and fax machines.

The new digital machines are specifically designed to make high-quality, high-speed printing and copying very convenient and accessible.

In this highly competitive area of rapidly changing products, it is even more important to be clear about what your office's document production requirements are, in addition to any environmental commitments currently pursued by your organisation. This way you will be comparing brands and models on your own terms.



Many copiers have features that can assist in waste reduction – such as toner-saving, long-life components or 'single-pass duplexing', which makes double-sided copying as easy as single-sided. But remember, most machines and the software that drives them are also packed with features to encourage more copying and printing. This makes it even more important to apply environmental criteria when purchasing, but it's wasted effort unless it's followed up with actions to reduce the environmental impacts of using the equipment and of what you produce with it.

To compete with printers, copier manufacturers are including more and more functions. You should satisfy yourself that you will get the quality you want from all the features you need. You might end up paying more through increased inputs such as paper, toner and energy while simultaneously placing a greater strain on the environment.

Using a copier more sustainably

Do not copy

Most documents don't need to be physically copied. Emails and email attachments, intranets and network file sharing, electronic conferencing – any of these can usually satisfy most of the times we think we need to make copies.

Double-side

Use the automatic double-siding function if present, and if not, do it manually. This is one area where organisations can make significant financial savings in addition to reducing resource consumption and waste generation.

Keep paper in its sealed packet

When paper is exposed to air it absorbs moisture, which can adversely affect its performance in the copier. It's better to take only the amount you need for a job from the packet, then re-seal it.

Use recycled paper

Good-quality white papers with high percentages of post-consumer recycled content or non-tree-derived fibres are readily available. They are as reliable as virgin white paper for most uses (except very high speeds) and should be specified for all general copying tasks. In fact most manufacturers recommend or guarantee that their machines can work with recycled content paper. (For further information on brands and performance *see Know Your Paper: A Guide to Purchasing Recycled Content Office Paper* published by Resource NSW.)

Reuse paper

Keep unwanted single-sided copies in a tray beside the copier or in a designated paper cartridge. They can be used for printing drafts or, if dog-eared, cut up for notepads.

Recycle

Damaged paper, unwanted documents, paper that's been printed on both sides – all should be recycled. Always ensure a paper recycling receptacle is placed next to the copier and other convenient places. If your office is not currently recycling paper then your office is placing a greater strain on the environment and spending more on waste disposal than it needs to.

For further information on recycling, see Waste Reduction in Office Buildings - A Guide for Tenants, published by Resource NSW and available on their website www.resource.nsw.gov.au/officebuildings

Copy in black and white instead of colour

If you already have colour copying facilities, use them sparingly. Copying in colour uses additional resources, such as special papers, more chemicals and heavy metals (in the inks, toners, developers) than black and white. It is also much more expensive.

Turn copiers off

Try not to leave copiers on all day, even if they can power down. Set aside particular times in the day when copiers can be turned on for batch runs.

Purchasing a copier

The most important thing is to clearly define your needs before looking at what's available in the marketplace.

Use the two step checklist on pages 14–15 to define your needs and check that your specification is environmentally responsible.

Waste-reducing alternatives to buying a copier

Leasing or renting	Since the machine remains in the ownership of the lessor, it is more likely to be serviced in a way that lengthens its life. At the end of its service life, it can be returned to where its components and materials will be most useful.
Volume contracts	While not usual practice, contracts can be used to promote paper economy. For example, if you rent a copier on a volume plan, your monthly copy rate is estimated, and if you exceed this the length of the contract is shortened. A client could request a diminishing monthly volume and use this as a means of meeting reduction targets.
Document management services	For larger organisations, services that could be out-sourced range from office equipment management (repair, supplies, etc.) to complete production and distribution of all multiple-copy documents. Contracts need careful negotiation to achieve waste reduction goals. For example, contracts should include provisions to quantify and track paper use. Other factors such as using recycled content paper should also be considered.
Your local print shop	Smaller organisations can have the benefits of professional-looking multiple-copy documents on demand without investing in expensive equipment by using the services of fast print shops.
Electronic distribution	For regular newsletters, brochures, flyers and other materials sent from your organisation, consider electronic distribution. It's faster, more readily updated and allows you to deliver your information in colour and with photographs/graphics.

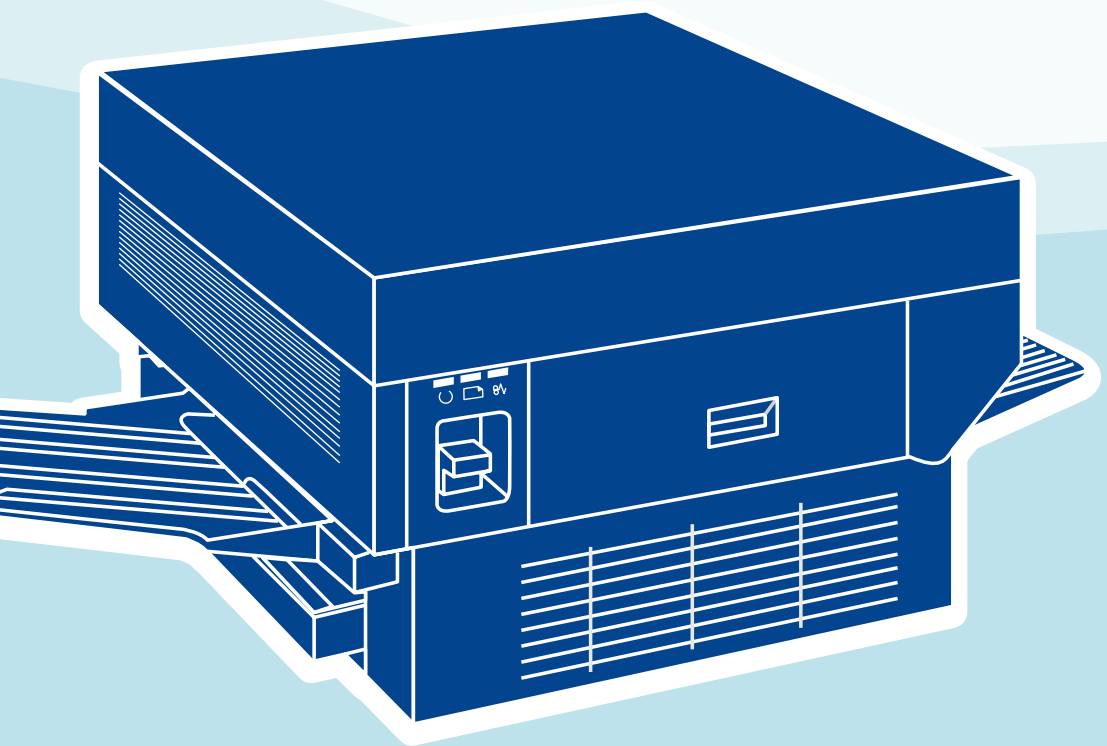
3. Printers

Office printing technology has exploded in the last decade, to the extent that there are close to a thousand models on the market at any one time. The clear distinction that existed a few years ago – laser for offices and inkjets for home use – has broken down as the price of laser printers has fallen and the print quality of inkjets has moved towards 'laser quality'.

A laser printer works by a laser beam creating an electrostatic pattern on a light-sensitive revolving drum; electrically charged toner (powdered ink) is then brushed across the drum, sticking only to the charged areas. The toner is transferred to a passing sheet of paper and heat fused to its surface. An inkjet printer works on a different principle: it has a moving print head which squirts microscopic drops of ink out of hair-thin nozzles.

Lasers print pages at significantly higher speeds than inkjets, which is why they are favoured in offices where print output is higher and/or more people will be using the printer.

Inkjet printers are slower and have marginally lower print quality than black and white lasers but they are cheaper. If you will be mainly printing in black and only occasionally in colour, a colour inkjet printer will not be as economical as a laser for black and white documents, as the ink cartridges need replacing more often than toner, costing you more and creating unnecessary waste.



Software-driven wastefulness

The successful interfacing of computers and printers has been made possible by the increasing compatibility of computer operating systems and printer drivers (the software that drives the printer). By following on-screen instructions almost anyone can link computer and printer and set themselves up to produce professional-looking documents in colour or black and white.

Ease of use combined with an endless choice of colours, fonts and page layouts encourages experimentation and printing of multiple drafts. The ubiquitous, convenient 'print' command favours printing documents over electronic storage. Even the help menu has an automatic print option. In the name of 'user friendliness', operating systems and software are actively encouraging more printing.

As business has become more locked into computer technology, competition in this domain is inextricably linked to business competitiveness in general. The price of computers, software and printers has tumbled, while speed, ease of use and quality of end product all continue to improve. This is what managers and purchasing officers have to consider in order to be environmentally responsible.

No wonder that rather than fulfiling early predictions of the paperless office, computer use has driven paper consumption to new highs!

Using a printer more sustainably

Avoid

Don't print: review draft documents on screen.

Don't print in colour when black and white is acceptable.

Reduce

Print less: resist clicking the print icon, especially when web searching or viewing emails.

Print double-sided: individual staff computers should have the duplex option set as default under printer settings (this can be one of the most effective ways of reducing resource consumption other than avoiding printing in the first place).

Reuse toner cartridges

If you have a laser printer, use remanufactured cartridge assemblies (see Toner and ink cartridges, page 18)

Reuse paper

Print drafts on paper that has already been printed on one side: place trays around the office to collect suitable paper. If your printer has two trays, allocate one for draft printing.

Unwanted single-sided copies can be cut up, stapled or bound and then used as notepads. Damaged paper, unwanted documents, paper that's been printed on both sides – all should be recycled. Always ensure a paper recycling receptacle is placed next to the printer and in other convenient places. If your office is not currently recycling paper then your office is placing a greater strain on the environment. Recycling paper can save you money by reducing the amount of waste directed to landfill: see Resource NSW's publications on Waste Reduction in Office Buildings.

Use recycled paper

Good-quality white papers with high percentages of post-consumer recycled content or non-tree-derived fibres are readily available. They are as reliable as virgin white paper for most uses (except very high speeds) and should be specified for all general copying tasks. In fact most manufacturers recommend or guarantee that their machines work with recycled content paper. (For further information on brands and performance *see Know Your Paper: A Guide to Purchasing Recycled Content Office Paper,* published by Resource NSW).

Maximise lifespan

Care for your printer: keep it dust free; do not use force if there is a paper jam or other problem.

Familiarise yourself with manufacturer's care and maintenance recommendations and follow them.

Minimise waste

If it is possible on your system, check the colour ink supplies before starting to print to avoid running out halfway through a page.

Conserve energy

Make sure the Energy Star function is activated. This causes the machine to power down when not in use, which could cut a printer's electricity use by over 65 per cent.

Designate set times of the day for batch printing. This way you can save energy by not having the printer idling in stand-by mode all day. Keep it switched off at the wall socket when not in use. This also minimises pollutant emissions.

At the end of the day, turn off those machines not needed overnight.

Purchasing a printer

The most important thing is to clearly define your needs before looking at what's available in the marketplace.

Use the two step checklist on pages 14–15 to define your needs and check that your specification is environmentally responsible.

4. Fax and multi-function machines

Are fax machines redundant now that everything from messages to long documents and even full-colour images can be transmitted via email and incoming faxes can be received into your computer?

It would seem so, given that the latest generation of fax machines offers many functions as well as faxing. Extra functions go beyond phone and message recording, offering scanning, printing and copying, in colour or black and white. But beware, as speed is usually slower.

These 'convergent machines' incorporate the same technologies as printers and copiers, using either the laser or inkjet principle (see Printers, page 8).

They thus have the same potential for wastefulness as printers, encouraging the use of paper, and requiring replacement of toner, ink cartridges and print heads.

Most operate with standard A4 bond paper. Thermal paper faxes have an added waste dimension, which is the requirement to photocopy faxes onto bond paper for storage, because thermal paper is not suitable for record storage. However, thermal fax machines are less common now.

Faxing has become a habit: it's so easy just to slip something in the fax machine and send it. Many machines also have features such as automatic printing of error and activity reports and generate these even if they are not needed. But if you wish to eliminate waste generated this way you can generally configure the machine not to do this (the instruction handbook should tell you how) or intervene on the spot to cancel the function.

The significant environmental impacts of fax and multi-function machines are the same as for printers *(see Printers):*

- paper use
- waste toner assemblies
- waste ink cartridges
- energy use
- manufacturing impacts

Using a fax or multi-function machine more sustainably

Avoid faxing: stop and think before printing something to fax. Why not email it instead?

Configure your fax machine so that it does not automatically print activity and error reports.

As fax machines cannot print double-sided, load up the tray with paper already printed on one side to receive incoming faxes.

If your fax machine has the capability, configure it to receive incoming faxes on your PC or file server, instead of as paper copies.

When sending faxes, do not use a blank cover sheet, unless it is absolutely necessary for privacy.

See also Using a printer more sustainably, page 9.

Purchasing a fax or multi-function machine

Assess all your office print communication needs before looking at brands and models. It's very likely you can get by without a fax machine. If you are setting up a new office, a fax modem and a convergent printer/copier would be a more efficient combination than a fax machine that also prints and copies.

Choose an Energy Star compliant machine – that is, one that will automatically power down to 15–45 watts when not in use. This can reduce energy costs by up to 50 per cent. But make sure that all functions can power down, and ensure that the power-down function gets activated on installation.

Look for models that have an 'ink save' or 'toner save' mode.

Use the two step checklist on pages 14–15 to define your needs and check that your specification is environmentally responsible.

5. Tools for sustainable purchasing

This section provides checklists that help you make sure that your specification for office equipment is appropriate and environmentally responsible.

Checklists for sustainable purchasing

■ Step 1. Define your needs ☑ Tick appropriate box.

1. Document distribution and storage

What percentage of your work group's output is in print form?

- ❑ 0–20%
- ❑ 20–40%
- ❑ 40–60%
- ❑ 60–80%
- ❑ 80–100%

Consider: What is distributed and stored only in electronic form (e.g. pdf files, tape or CD)? Could this be expanded? Are you considering your e-storage and distribution needs at the same time as thinking about copier/printer purchase? Could some or all of your print output be out-sourced?

2. Document size

What is your most common document size?

- ❑ 1–5 pages
- ❑ 5–20 pages
- ❑ 20–50 pages
- ❑ 50–100 pages
- ❑ 100+ pages

3. Multiple copies

What is your most common multiple copy requirement?

- ❑ 1–20 copies
- ❑ 20–40
- ❑ 40–100
- ❑ 100–200
- ❑ 200+ copies

Use your answers to questions 1, 2 and 3 to work out whether your copying needs are HIGH, MEDIUM or LOW VOLUME. For example, low-volume copiers (i.e. with speeds of around 12-18 copies per minute) may be sufficient for you if:

- less than 20% of your output is in print form, and/or
- most of your documents are under 5 pages, and/or
- you usually produce less than 20 copies of each document.

The higher the speed, the greater the capital and energy costs of the machine.

Consider: If your copying needs are very low, do you need a copier at all?

4. Duplexing

What percentage of your documents are printed two-sided?

- ❑ 0–20%
- ❑ 20–40%
- ❑ 40–60%
- ❑ 60–80%
- ❑ 80–100%

Consider: Would you like to increase this percentage? Then look for a machine with duplexing capability.

5. Network capability

How many computers need to be connected to the copier/printer?

- ❑ 0–5
- ❑ 5–10
- ❑ 10–20
- ❑ more than 20

If more than 5, prioritise software capability/compatibility issues when selecting a printer/copier.

6. Readers

Who/what are your documents mainly produced for ?

- ❑ Internal use
- ❑ External use (functional)
- ❑ External use (presentational)

Use your answers to determine your print quality requirements. For example, if most documents are produced for internal use you are unlikely to need a photo-quality colour printer.

Your answer will help you determine whether you need a COLOUR or MONO printer/copier.

7. Extra functions

What do you actually need?

- ❑ Printing (if a copier)
- ❑ Copying (if a printer)
- ❑ Scanning
- ❑ Faxing
- ❑ PC Faxing
- ❑ Collating
- ❑ Stapling
- ❑ Envelope printing

Consider: Do you already have machines in your office that do these things? Will including these functions in the new machine make them redundant? If so, do you have an environmentally responsible pathway for disposing of them (e.g. on-selling, donation, return for remanufacture)?

8. Booklets

Do you have a requirement to produce booklets?

❑ yes

❑ no

This affects whether you need features like paper folding, saddle-stitching, cover insertion.

Consider: Does this have to be done on an in-house copier or could it be out-sourced?

■ Step 2. Environmental performance

Copiers and printers have environmental impacts over their whole life cycle.

Some materials used in manufacturing their components are environmental pollutants, such as the heavy metals lead and chromium. Halogen and bromine used as fire retardants in plastic casings can emit dioxins in a fire. And at end of their life, the machines usually end up in landfill.

But the most significant impact of printers and copiers arises from their use. They consume large amounts of resources – paper, toner and electricity – and generate volumes of waste throughout their useful life.

In response, and driven by new government regulations (such as Japan's 'Law on Promoting Green Purchasing' and the US Government's Energy Star program) environmental performance is becoming an increasingly significant competitive factor for office machine manufacturers. Most have environmental policies, many publish annual Environmental Reports, some have ISO 14000 (Environmental Management System) accreditation and some have programs for redesigning their products to have lower environmental impacts. This information can be used in making purchasing decisions.

What are your environmental performance requirements?

☑ Tick appropriate box.

❑ Double-sided printing/copying capability

A policy of always using both sides of a page will produce significant savings in paper consumption. This can be facilitated by choosing a copier that has duplexing facility. Some machines offer 'stackless' or 'single pass' duplexing which means double-sided copies can be produced at the same speed as singled-sided.

Look for machines that have duplexing as a standard feature or optional extra.

❑ Recycled paper capability

The quality of recycled copy/printing paper has improved dramatically since it was first introduced a decade ago. Many manufacturers state that their machines can take recycled paper. In fact most copiers and printers should be able to use it. If you're recycling paper but not using recycled content paper, then you're not closing the loop by purchasing the goods remanufactured from the paper you have recycled. For further information about paper types refer to Know Your Paper: A Guide to Purchasing Recycled Content Office Paper, produced by Resource NSW.

Look for manufacturers' statements about recycled paper capability.

❑ Toner saving

Printing in 'draft' or 'economode' uses less toner. This saves money as well as reducing environmental impacts. Some manufacturers have long-life toner cartridges, and there are also some copiers that recycle unused toner within the machine.

Look for 'toner save' mode, long-life toner systems or recycling of unused toner within the machine.

❑ Component waste minimisation

The most wasteful system is the all-in-one toner, developing unit and drum because when the toner runs out, other still-functioning components are unnecessarily thrown away. Less wasteful machines separate these components and a few also have very long-life drums. Long warranties are also a sign that long-life components have been used.

Look for machines where toner, developing unit and drum are separate units; look for long warranties. If you do select a machine with an all-in-one unit, check that it can use remanufactured cartridges as this reduces the amount of material sent to landfill.

❑ Low environmental impacts in manufacturing and operation

Manufacturers are working to eliminate bromine, lead and halogens used in manufacture, and the ozone emissions caused by electrical charging during the printing/copying process.

Look for manufacturers' statements that pollutants have been eliminated or reduced.

❑ Energy performance

Most energy is used in copying or printing, but up to a third of peak capacity can be used just to keep the machine on stand-by. The energy-save or sleep mode uses much less (down to 5 watts). But the machine should have rapid warm-up time from sleep mode to encourage the use of that function. Check that 'add ons' like document feeders and collators also power down with the rest of the machine.

Assess information provided on maximum and stand-by energy consumption, and energy save/sleep modes.

❑ Remanufacturing capability and the use of recycled materials and components

This trend is growing, ranging from the use of a percentage of recycled plastics in the manufacture of new machines to the collection and remanufacture of old machines and components. Canon and Fuji Xerox both have remanufacturing plants in NSW; some companies send used machines and components offshore for remanufacture or recycling.

Look for manufacturers' statements about their recycling and/or remanufacturing programs.

Information on products that satisfy your requirements may be obtained through manufacturers' brochures and also websites. Manufacturers websites provide the most up to date product information and many have "help" sections where any queries regarding product performance etc may be submitted for response. Exploring different manufacturers' websites or other, independent, online resources may also allow you to compare models that are not present in your local retail outlet, further enhancing the opportunity to choose the right product. Below is a list of some manufacturers' product websites.

Manufacturers:

Brother
www.brother.com.au/as_oc/area_top.html

Canon
www.canon.com.au

Epson
www.epson.com.au

Fuji Xerox
www.fujixerox.com.au

Hewlett Packard
www.hp.com.au

IBM
www.ibm.com/au

Konica
www.konica.com.au

Lexmark
www.lexmark.com.au

Minolta
www.minolta.com.au/index2.html

Oki
www.oki.com.au

Ricoh
www.ricoh.com.au

Sharp
www.sharp.net.au

Toshiba
www.toshiba.com

Kyocera Mita
www.kyoceramita.com.au

Summary checklist for sustainable purchasing

Complete this page and use it to summarise your print/copy/fax needs and environmental performance requirements after you've done the diagnostic exercise on pages 14-15. You can then use the table to advise office product sales consultants about the parameters your office requires for the machine you wish to acquire.

Basic functional requirements

- Copy/print volume – high, medium, low? _____
- Duplexing function? _____
- Network capability for how many machines? _____
- Colour or black and white? _____
- Print/copy on A3 and A4 paper? _____

Print quality

- Letter or photo quality? _____

Additional functions

- Copying (if a printer)? _____
- Printing (if a copier)? _____
- Scanning, faxing, PC faxing? _____
- Collating, stapling, envelope printing? _____
- Paper folding, cover insert, saddle-stitch finishing? _____

Environmental performance

- Easy-to-use double-sided printing/copying? _____
- Recycled-content paper capability? _____
- Toner-saving feature? _____
- Component waste minimisation, e.g. separate print drum? _____
- Separate ink tanks for individual colours? _____
- Ability to use remanufactured toner cartridges? _____
- Reduced environmental impacts in manufacturing and operation? _____
- Energy performance? _____
- Remanufacturing capability and the use of recycled materials and components? _____
- Warranty – length? covers items such as remanufactured or refilled toner/ink cartridges and/or recycled content paper? _____
- Other important factors? _____

_____

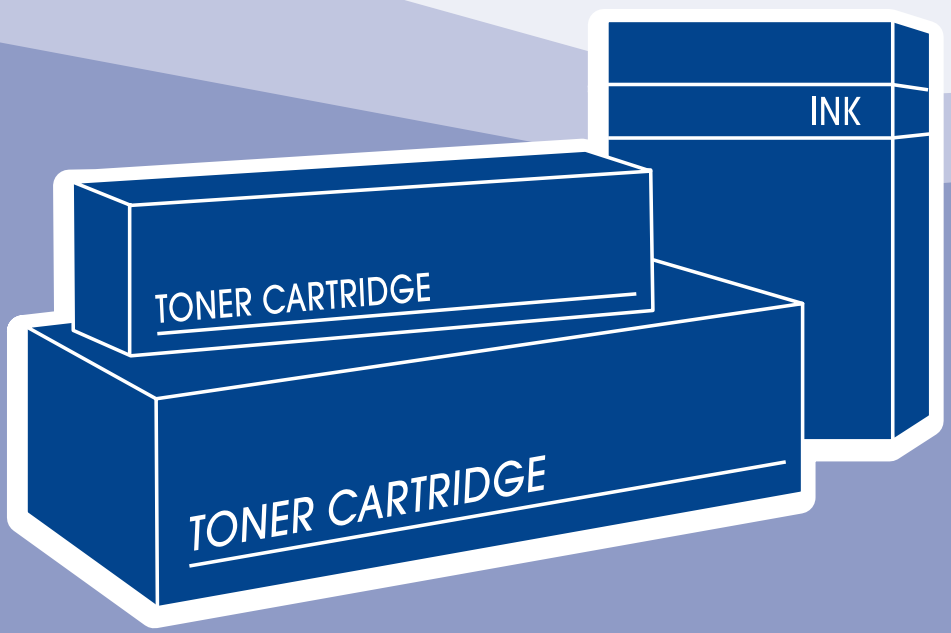
_____

_____

6. Toner and ink cartridges

For most laser printers, when you replace the toner cartridge you are replacing the whole print engine (*see Printers*). This is very wasteful, so it's not surprising that many companies (around 350 Australia-wide) now collect, remanufacture and on-sell used toner cartridges. About 10 years ago, this was quite a crude 'drill and fill' operation, with only the toner being replaced. Today, the industry is more developed: the print engine assembly is dismantled, inspected and cleaned, worn parts are replaced and products are tested. There is sometimes further recycling in the remanufacturing process with spent toner being supplied to bitumen manufacturers for use in road resurfacing.

Remanufactured toner cartridges are now a well-established product with a number of reputable suppliers.



Laser printer cartridges

One disincentive to using remanufactured cartridges has been the fear that it would void the printer's warranty. This is not generally true. Also, most remanufacturers offer warranties on their products, with some offering repair or replacement costs for any printer that becomes damaged by using one of their remanufactured cartridges.

Inkjet printer cartridges

The most wasteful inkjet system is one that combines print head and ink tank, because every time you need new ink a print head gets thrown away. Also wasteful are systems where all three colours are only available as one unit – for example, you may have plenty of red and blue, but you have to throw these away because you've run out of yellow! Generally, the more expensive printers' ink and print heads last longer before needing to be replaced. So a cheap printer is not necessarily cheap in the long run.

Do-it-yourself inkjet refill kits are available but can be messy. Some printer manufacturers, such as Epson, warn against using non-proprietary products. There are some companies that remanufacture and refill used ink tanks, some of them sourcing their inks from the same suppliers that the printer manufacturers use. If you intend to use non-proprietary products, check that this will not void your printer's warranty and make sure the ink supplier gives satisfactory guarantees.

Fax machine and photocopier cartridges

A small number of companies supply remanufactured and refilled printing supplies for fax machines and photocopiers.

Using and purchasing cartridges

Buy remanufactured

Buying remanufactured toner cartridges reduces the amount of waste going to landfill and helps conserve resources. Currently, remanufactured products comprise about 27 per cent of toner cartridge sales in Australia. This is impressive, but clearly there is still much room for improvement.

Recycle your used cartridges

Some suppliers of remanufactured cartridges and office supply companies will pick up your used ones. Arrangements vary; sometimes there is a minimum quantity per pick-up and sometimes even a rebate.

Buy recycled or refilled ink tanks

Recycled or refilled ink tanks are available for a few different brands.

Or buy separate print heads and ink tanks

Non-proprietary brands which consist of reusable print head and replaceable ink tanks are available for many models of inkjet printers.

7. Computers

Computers have dramatically changed the nature of work and how things are produced and distributed in almost all sectors of the economy. Computerisation increases productivity and the speed and volume of product output, but in so doing contributes to increased resource and energy use as well as waste generation.

Most computers have an effective life of only four or five years, not because they break down or wear out, but because of the cycle of obsolescence created by the synergy between software and hardware: newer software requires faster processing speeds, more memory and storage space leading to the need for hardware upgrade or replacement; improved hardware encourages the development of more sophisticated software. And so the cycle continues.

Hundreds of different materials are used in computers and their manufacture, some of which are known to be hazardous: lead and cadmium are used in circuit boards; lead oxide and barium in monitor cathode ray tubes (CRTs); mercury in switches and flat-screen monitors; and brominated flame retardants can be found on printed circuit boards, plastic casings and cable insulation.

There are additional problems when computers are disposed to landfill, both because of their sheer bulk (millions of computers have been landfilled over the last two decades) and because of hazardous materials. The long-term impacts of computer disposal to landfill in NSW is unknown, although some studies have been completed in Europe and the United States. A recent report for Environment Australia estimated that 900,000 computers were dumped in landfill in Australia in 2001 and that there are about 3.6 million redundant computers 'in storage' that will most likely end up disposed to landfill.

Laptops are even more prone to disposal as their fate is limited to the life of particular brands with proprietary components. This means that unlike desktop clones, which have generic modular components, they are more difficult to upgrade and repair, although their compact size makes them easier to store when no longer needed.

Other peripheral equipment is also proliferating: speakers, external memory drives, scanners and digital cameras arrive and often render earlier technologies redundant. Likewise, some new brands of computer are being designed to function solely as network machines, with no floppy drives and even minimal hard disk memories. Discarded floppy disks and CD-ROMs are also a waste issue. Where floppy disks could be reused in theory (with a few companies reclaiming never-sold software disks and reformatting them), most software CD-ROMs are non-rewritable and simply end up in landfilll.

Although individual computers do not have high energy demands compared to other office equipment, the large number of computers and their extended hours of operation do result in high office energy consumption. Most of the energy is expended in projecting images onto the screen. Computer processors (CPUs) also use significant amounts of energy, enough to require cooling devices like fans, which further increase overall energy demand.

Desktop computers generally draw about 40 to 50 watts in operation and their cathode ray tube (CRT) monitors 50 to 100 watts (average about 60 W). Laptop computers are much more energy-efficient: including their liquid crystal display (LCD) screens they use only between 15 and 25 watts. LCD flat screens are now becoming more readily available for desktop computers, which could prompt more energy savings as they use significantly less energy than standard cathode ray tubes. On the other hand, if the slimmer, space-saving LCD screens start displacing CRT monitors before they reach the end of their functional lives, this will increase waste volumes. In this case, a decision to replace the screen may include evaluating the relative merits of the low energy input for an LCD screen versus disposal impacts of an old CRT monitor.

Using computers more sustainably

Most organisations now invest heavily in IT equipment, but are still massively under-utilising its potential for reducing the volume of materials used at work.

Networked systems, when used to their full capacity in terms of knowledge management, enterprise management and customer relations management through the Internet and intranets, can make significant reductions in materials used, especially paper and travel logistics.

Consider that:

- a **well-designed intranet** can provide easily accessible, comprehensive, online information for employees without the need for hardcopy
- a **well-designed website** can provide easily accessible, comprehensive, online information for **suppliers and contractors** without the need for hardcopy
- a **well-designed website** can provide easily accessible, comprehensive, online information for **customers and clients** without the need for hardcopy promotion.

Other strategies for harnessing the power of computerisation to work more sustainably include:

- Introducing **electronic invoicing, payment and accounting** systems.
- Where possible, maximising the capacity for **teleworking** to minimise transport eco-impacts (but only where there is also an environmental management plan covering the energy consumption and waste production of working from home).
- Developing a **well-organised e-filing system with backup procedures.** This will minimise the number of things you feel you need to print or copy onto multiple disks. Your computer's memory will slowly get clogged by drafts and unused files. Purging files should be part of regular maintenance.
- **Taking care of your computer.** Computers are relatively sensitive instruments that must be kept free of dust and moisture and away from light and heat. Move computers as infrequently as possible. Similarly, treat laptops with care.
- **Turning it off.** Very few computers need to be on all the time. Those that do, because they are scheduled to do activities at night or are communication points, do not need their monitors on, and can be programmed to power down (see Energy Star below).
  It is untrue that frequently turning a computer on and off shortens its life. When you are leaving your desk for a meeting or lunch, get into the habit of turning your computer off rather than leaving it to the Energy Star program to shut it down. And don't rely on screen savers – they are not designed to save energy.

Purchasing and leasing computers

In summary, the key problems to work against when purchasing computers are:

- Bulky waste
- Toxic waste and
- Energy consumption/greenhouse gas emissions.

Your purchasing strategies should seek to reduce all of these. Adopting the following principles may be a useful approach:

- Retain and use existing computers and components for the full length of their functional lives.
- Purchase secondhand computers instead of new.
- Lease new computers instead of buying them.
- If buying a new computer, base your purchasing decision on its capacity for extended lifespan.
- Purchase or lease the most energy-efficient models.
- Have an environmentally responsible disposal strategy in place before replacing any equipment.

To make these principles less abstract, here are some common 'need' situations, and how they can be met in less wasteful ways. You can use these scenarios to help you more clearly define your own computing needs. It might even save you money.

Scenario: **"I need a new computer."**

There's really no such thing as 'a computer' in itself; a computer is a series of components – monitor, keyboard, processing unit – linked together, and within these, there are sub-components – processors, motherboard and so on – that do the work. Decide which elements are really unsatisfactory before replacing everything.

☑ Tick what you really need:

- ❑ Additional software
- ❑ Upgraded operating system
- ❑ Faster processor
- ❑ More memory
- ❑ Improved monitor/screen
- ❑ Improved keyboard
- ❑ Improved casings
- ❑ Other:

Scenario: **"I want to upgrade to the latest operating system and be able to run new applications."**

It's often assumed that if a computer is a few years old it won't be powerful enough to run newer, more powerful software. If your computer works well, it probably doesn't need to be upgraded. The disk drive may be showing up as nearly full, but consider what unused applications and files could be dumped or moved elsewhere (for example, to a zip disc) to free up space for new applications. If more computing power is actually needed you don't have to buy a complete new computer. You can upgrade or add in new components, such as an extra hard drive.

Scenario: **"Everything is unsatisfactory – the keyboard is worn out, the screen is going dim, the casings are damaged, it's not powerful enough. I really do need a new computer."**

Do you need a new one, or just one that's better than what you have now? Consider buying a secondhand machine. Perfectly good working computers with many years of working life left are often discarded by companies when changing contractors or updating their systems. With modular components, these can easily be upgraded.

You don't even have to *buy* one. You'll only have the same problems again in a few years' time. Why not lease a computer instead? Since the computer remains in the ownership of the lessor, it is more likely to be serviced in a way that lengthens its life. At the end of its service life, it can return to where its components and materials will be most useful.

Scenario: **"For other reasons, I still need to buy a new computer."**

In this case, make sure you purchase a computer with the capacity to be upgraded. There should be extra slots on the motherboard so you can add more memory and upgrade sound and graphics cards, extending the life of your purchase. Laptops are more limited in terms of upgrade options (though their energy consumption is lower).

What about the old computer?

You should work out an environmentally responsible disposal strategy for your existing computer. Before purchasing or leasing consider what to do with your redundant equipment. Can you sell it to a used computer shop? Send it to auction? Donate it to a charity?

Computer recycling and re-use

In Europe and Japan, in response to Extended Producer Responsibility legislation, increasing numbers of manufacturers are implementing product take-back schemes, taking back old computers and other electronic products for remanufacture or recycling. Such activity is much more limited in Australia. There are some companies in NSW currently recovering and recycling computers:

For corporate and government organisations:	MRI (Aust) Pty Ltd, HMR group, ESR Pty Ltd and Anglo Metals Pty Ltd recover and recycle computers from the corporate and government sectors. These and other companies in the Yellow Pages refurbish, recycle and/or recover the precious metals from computers. When purchasing or leasing computers, larger businesses can negotiate a take-back clause in the contract.
For small businesses and individuals:	Computerbank Australia (www.computerbank.org.au), GreenPC (www.greenpc.com.au) and Ernies Charity Recycling (02 9660 4115) all take unwanted computers, refurbish them and hand them on to charities and community organisations. Resource NSW and the Australian Information Industry Association are undertaking a Computer Collection Pilot in western Sydney in 2002/3. The ultimate aim of this trial is to provide information for the development of a national voluntary scheme for the collection and recycling of waste electronic equipment, focussing on collecting and recycling waste computers and peripherals from households and small businesses.

Is there any difference between brands?

Some companies are more advanced than others in phasing out the use of toxic substances in manufacturing. The following computer manufacturers have eliminated halogens and/or lead from some or all of their products:

Halogen Free:	Apple (casings) Hitachi (printed circuit boards) IBM (casings) Panasonic (some PCs & monitors) Sony (some casings and printed circuit boards) Toshiba (some models of laptops)
Lead Free:	Fujitsu (some products) NEC (lead-free solder in components) Oki (some products) Panasonic (lead-free solder in some products) Sony (lead-free solder in most products) Toshiba (some models of laptops)

The Silicon Valley Toxics Coalition Clean Computer Campaign, in the USA, conducts an annual 'Computer Report Card' which assesses the environmental performance of manufacturers of desktop and laptop computers, monitors and printers.
They are rated according to:

- 1. Use of hazardous materials
- 2. Extended producer responsibility/product take-back (in the USA)
- 3. Occupational health and safety
- 4. Ease of accessing company environmental information on-line.

For the 2001 report card, 28 companies were assessed. Those with the best scores were, in rank order:

- 1. Canon
- 2. Toshiba
- 3. IBM
- 4. Fujitsu
- 5. Sony
- 6. NEC
- 7. Hewlett Packard
- 8. Brother
- 9. Apple

Complete results and scores of other companies can be found at www.svtc.org/cleancc/pubs/2001report.htm

What about energy consumption?

Lease or buy the most energy-efficient Energy Star compliant computer that meets your needs. There is little difference in terms of operational environmental impacts between brands and models of computers. The main differences are in energy usage, with laptops being more energy-efficient than desktop models.

Nearly all computers these days are Energy Star compliant, which means they can be set to automatically power down when not in use, turning off first the screen and then slowing down the processor – even turning the whole machine off after a period. Energy Star computers should be set to power-saving mode by default, but if this function is not activated, it needs to be turned on. When purchasing or leasing make sure you specify that the Energy Star features are activated.

Don't be satisfied with just an Energy Star compliant computer. There are many models on the market today that exceed Energy Star performance by a wide margin, with some powering down to close to zero watts. Such models are listed on the US EPA's Product Database (www.epa.gov/appdstar/estar/products.html). Once you've decided on your functional needs, ask the manufacturers about the operational, stand-by and off-mode wattages of their range of models and choose the one with the lowest energy demand.

But remember, even when a computer has turned itself off through power management software, current is still flowing, enough to listen out for a wake-up call and have the system ready for quick pick-up. It is never completely turned off, unless you switch it of at the machine (or at the wall). Increasingly, on/off switches are disappearing from the front of computers as manufacturers are using power management as a way of delivering always-on, 'no wait time for boot-up' systems, not as a way of delivering energy savings.

Energy Star

Energy Star is now a widely accepted standard for good practice energy consumption for electronic equipment. The program, developed by the US Environment Protection Agency, sets benchmarks for the energy performance of different kinds of electronic equipment such as computers, printers, copiers, scanners, fax and multi-function machines. Energy Star has been taken up around the world and in Australia is promoted by government agencies, such as SEDA in NSW.

Suppliers of Energy Star computers and monitors must:

Configure personal computers so that they power down automatically to 30 watts or less after a period of 15 minutes inactivity

Configure personal computers so that they switch connected Energy Star monitors into a low power mode after 15 minutes of inactivity

Ensure that monitors are capable of entering the low power mode when connected to a correctly configured computer (monitors cannot do this by themselves). This usually happens through a signalling protocol called Display Power Management Signalling (DPMS)

Ensure that the computer will be compatible with the purchaser's network system (e.g., Novell NetWare, Windows NT, LAN Manager, etc) and will not disconnect from it when in low power mode. (Problems were discovered with some operating systems, for example Windows NT4, over-riding the Energy Star power-down functions by defaulting to full power mode. This can be rectified by the use of a software program called Energy Management Option, or EMO, which has been trialled by the Australian Greenhouse Office.)

In NSW, the Sustainable Energy Development Authority (SEDA) has an Energy Star Memorandum of Understanding with these suppliers:

Acer, Apple, Brother, Canon, Compaq/Hewlett Packard, Epson, Fuji Xerox, Harvey Norman, IBM, Intel, Kyocera, Lexmark, Microsoft, Minolta, Ricoh.

8. References

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Ricoh Corporate Environmental Division, Ricoh Group Sustainability Report 2001, Tokyo, 2001.

Resource NSW, Know Your Paper: A Guide to Purchasing Recycled Content Office Paper, Resource NSW, 2002.

Product literature

Brother, Canon, Epson, Fuji Xerox, Hewlett Packard, Lexmark, Kyocera Mita, Konica, Minolta, Ricoh, Sharp, Toshiba.

Websites

www.resource.nsw.gov.au/officebuildings
(Resource NSW website on office waste reduction)

www.WRAPP.nsw.gov.au
(NSW EPA website on waste reduction for government)

www.seda.nsw.gov.au
(NSW Sustainable Energy Development Authority's website with further information on energy efficiency)

www.choice.com.au/articles/a102060p1.htm
(Choice magazine article on issues in IT and computer recycling)

www.vital.nsw.edu.au
(on Environmental Sustainability and IT)

www.canon.com/environment/index.html
(Canon - environmental information)

www.canon.com.au
(Canon - product information)

www.ecooffice.com.au
(Nature Conservation Council of NSW website on sustainable office practices)

www.sharp-world.com/corporate/eco/
(Sharp - environmental information)

www.xerox.com.au
(Fuji Xerox product and environmental information)

www.svtc.org/cleancc/pubs/2001report.htm
(Silicon Valley Toxics Coalition)

www.bertl.com
(Business Equipment Research and Test Laboratories)

This guide contains the tools and knowledge to help you make more environmentally aware decisions about buying,using and disposing of office equipment. Limiting the amount of waste and other environmental impacts associated with your office is something you can now influence.

For more copies of **Office Products: A Guide to Sustainable Purchasing and Use** and more information about office waste reduction, visit the Resource NSW website at **www.resource.nsw.gov.au/officebuildings**

OUR ENVIRONMENT

it's a living thing

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