



Natural Resources
Canada

Ressources naturelles
Canada



ecoENERGY
an ecoACTION initiative



ENERGY STAR[®] FOR OFFICE EQUIPMENT

SIMPLE STEPS TO AN ENERGY-SMART OFFICE



Canada^{ca}

Aussi disponible en français sous le titre :
ENERGY STAR® pour les équipements de bureau
Étapes simples pour créer un bureau éconergétique

Cat. No. M144-63/2009E (Print)
ISBN 978-1-100-12837-5

Cat. No. M144-63/2009E-PDF (On-line)
ISBN 978-1-100-12838-2

© Her Majesty the Queen in Right of Canada, 2009

**To obtain additional copies of this or other free publications on energy efficiency,
please contact:**

Energy Publications
Office of Energy Efficiency
Natural Resources Canada
c/o St. Joseph Communications
Order Processing Unit
1165 Kenaston Street
PO Box 9809 Station T
Ottawa ON K1G 6S1
Tel.: 1-800-387-2000 (toll-free)
Fax: 613-740-3114
TTY: 613-996-4397 (teletype for the hearing-impaired)



Recycled paper



ENERGY STAR[®] for Equipment

Simple Steps to an Energy-Smart Office

TABLE OF CONTENTS

Introduction..... 2

STEP 1

Know your needs 3

STEP 2

Look for the ENERGY STAR[®] symbol 7

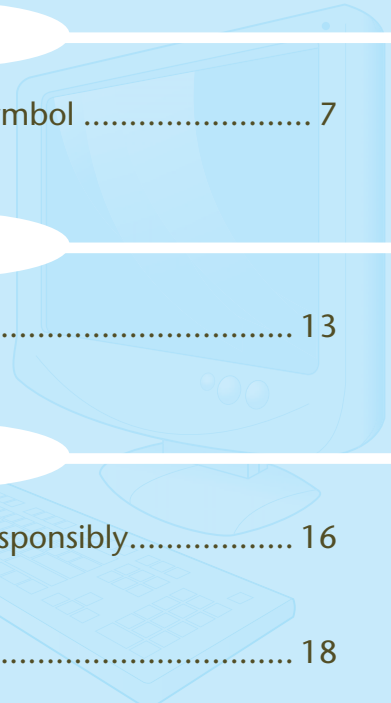
STEP 3

Use equipment wisely 13

STEP 4

Dispose of used equipment responsibly..... 16

For more information 18



Electricity to run office equipment represents a significant cost of doing business today. Whether you operate hundreds of work stations or a small office in the home, wasted energy is wasted money. It also creates unnecessary greenhouse gas (GHG) emissions that are a leading cause of climate change, as well as other pollutants that contribute to urban smog and acid rain.

The good news is that it does not have to be this way. Selecting energy-efficient office equipment will save you money and help the environment – and it is as easy as looking for ENERGY STAR®, *the* international symbol for energy efficiency.

Of course, buying an energy-efficient product is only part of the solution. This guide describes a simple, four-step process to creating and operating an energy-smart office:

DID YOU KNOW?

ENERGY STAR is a great tool to help businesses and consumers save energy and money, but its real goal is to contribute to a cleaner, healthier environment. The relationship is simple: The more you need energy, the more you produce GHGs and other emissions that can be harmful to the environment.

- Step 1: know your needs
- Step 2: look for the ENERGY STAR symbol
- Step 3: use equipment wisely
- Step 4: dispose of used equipment responsibly

Buying energy-efficient products and using them wisely makes sense for all Canadians. This guide will be of assistance to everyone, from procurement professionals in large organizations to small business owners and people who buy office equipment for personal use in the home or to telework.

Step 1: Know your needs

The first step in creating an energy-smart office is to have a good understanding of your performance requirements and expectations. Equipment that is too large, too powerful or too sophisticated for your needs will cost more to purchase and use more energy than necessary to get the job done. Undersized machines, on the other hand, may have to work harder than intended, which will burn up electricity and could shorten the machine's lifespan.

What to look for

No matter what type of office equipment you purchase, make sure it has power-management capabilities that automatically switch the machine into an energy-saving mode when it is not actively being used (this is mandatory for ENERGY STAR qualification).

Computers

When purchasing a computer, it is essential to ensure that the machine has the functions you need for the tasks you want to perform. At the same time, keep in mind that adding unnecessary hardware will likely increase a computer's energy requirements. As a rule, the faster the processor speed, the larger the memory; and the more optional components you select, the greater the energy consumption.



DID YOU KNOW?

When thinking about performance requirements, energy efficiency should be near the top of your list. Buying a product that gets the job done efficiently and uses as little energy as possible makes good business sense.

Laptops can be an energy-efficient option for many applications, both inside and outside the office. A study completed in the United States in 2003 found that laptops were clear energy efficiency winners over desktop units – in some cases using five times less energy.

Monitors

The type of display technology you choose for a computer system has an important impact on energy consumption. The most common technologies are the following:

- LCD (liquid crystal display) models are the most common type of monitor in use today and are extremely energy efficient compared with the old CRT (cathode ray tube) technology. An LCD colour monitor consumes only 10 to 20 percent of the electricity of a colour CRT monitor.
- LED monitors consume little energy, produce excellent colour quality and feature bright, uniform screens. Although this technology is relatively new to the computer world, some manufacturers are already using LEDs in all of their laptop models.
- CRT monitors, once the norm for desktop computers, are largely a technology of the past. Their low purchase price is more than offset by increased electricity consumption and costs.

Imaging equipment

Printers, photocopiers, scanners and multi-function devices (which combine printing, photocopying and scanning in a single machine) can be big energy consumers in a typical office.

- Consider an inkjet, rather than a laser, printer. An inkjet machine will produce near-laser quality but at a slower speed and use up to 95 percent less energy. Inkjet photocopiers and multi-function devices may also be suitable for less-demanding needs.
- On a cost-per-page basis, laser printers are the most cost-effective option when a machine is used to print more than 200 pages per month because they eliminate the cost of ink. If you print below 200 pages per month, inkjet is the more cost-effective option.
- Consider equipment that can print or copy on both sides of the paper. This will reduce your paper consumption and costs, as well as the amount of energy and fibre (trees) used for paper production.
- Although there may be trade-offs in speed and capacity, multi-function devices can be a good fit for certain operations, such as home-based businesses and small offices. They not only eliminate the need to purchase multiple machines but also reduce idle energy costs (only one machine is running, rather than four) and space requirements.



DID YOU KNOW?

High-quality or high-speed printing and copying usually require more electricity, but top-end machines may provide this service using less energy per copy than smaller machines. Ask the vendor to include electricity consumption in the per-page cost comparison; this can help you match your needs with the most productive machine for the job.

Servers

Data centres are one of the fastest growing uses of electricity in Canada and around the world. Natural Resources Canada estimates that energy use by data centres doubled in Canada over the past five years and is expected to double again, to close to 10 billion kilowatt hours (kWh), by 2011.

Servers are the single largest energy-consuming component of a data centre. There is a tendency to waste server capacity by overbuilding and under-utilizing systems. One way to avoid such a problem is to gradually build server-system capacity over time. Incrementally building a system reduces short-term capital costs, allows you to take advantage of new technologies as they become available, and can reduce energy consumption and costs because you will not be operating servers that exceed your requirements.

However, data centres are complex environments, and servers are only one of several components that affect their operation. Before making any changes, consider using the services of a specialist to help you reorganize your data centre in ways that will save energy and money while maximizing performance.



Step 2: Look for the ENERGY STAR® symbol

Look for the ENERGY STAR symbol on

- computers (desktops and laptops)
- monitors
- imaging equipment (printers, fax machines, scanners, photocopiers, multi-function devices, digital duplicators and mailing machines)
- servers
- external power adapters
- bottled-water coolers

DO NOT STOP AT OFFICE EQUIPMENT

Office equipment should be just your starting point. Many other products are eligible to use the ENERGY STAR symbol in Canada, including appliances, home electronics, lighting, heating and cooling equipment, certain commercial equipment, and windows, doors and skylights. More information is available at energystar.nrcan.gc.ca.



Figure 1 The ENERGY STAR symbol



The ENERGY STAR symbol appears on a wide range of products sold in Canada.

To qualify for ENERGY STAR, products must meet strict technical specifications endorsed by the Government of Canada. Requirements vary from one product category to another, but typically a product must be from 10 to 65 percent more efficient than standard equipment to be allowed to carry the ENERGY STAR symbol.

MYTH VERSUS FACT

MYTH: ENERGY STAR qualified equipment is more expensive to purchase.

FACT: ENERGY STAR qualified equipment typically costs no more to buy than conventional equipment, but it will save you money through reduced electricity consumption.

MYTH: ENERGY STAR qualified equipment does not perform as well as conventional equipment.

FACT: A requirement for ENERGY STAR qualification is that a product must not sacrifice functionality, performance, ease of use or reliability to achieve premium levels of energy efficiency.

MYTH: It is hard to understand the ENERGY STAR symbol.

FACT: The power of the ENERGY STAR symbol is in its simplicity. No special knowledge is needed to select an energy-efficient product, because the technical evaluation has been done for you.

How much can you save with ENERGY STAR?

The amount of money you save by purchasing ENERGY STAR qualified products depends on several factors, including the size of your office (the number of employees and the amount of equipment you use), the equipment-using habits of employees and local utility rates. Two case studies are presented here to show the potential energy, cost and environmental benefits.

First case study: the medium-sized company

Table 1 compares ENERGY STAR qualified equipment with conventional equipment in a typical office of 200 employees. It shows how much money the offices could expect to save under normal operating conditions, as well as the potential savings in GHG emissions. You can do your own calculations based on average electricity rates in your province or territory by using the handy ENERGY STAR Simple Savings Calculator, available on-line at energystar.nrcan.gc.ca.



**Comparison of ENERGY STAR qualified equipment
with conventional office equipment in a hypothetical office
(200 employees)**

Type of equipment (quantity)	Annual energy costs for ENERGY STAR qualified equipment ¹ (\$)	Annual energy costs for conventional equipment (\$)	Annual energy cost savings by using ENERGY STAR qualified equipment (\$)	Lifetime energy cost savings by using ENERGY STAR qualified equipment ² (\$)	Lifetime energy savings by using ENERGY STAR qualified equipment (kWh)	Lifetime GHG savings by using ENERGY STAR qualified equipment (kilograms of carbon dioxide equivalent)
Personal computers (180)	5,320	7,719	2,400	8,037	87 768	21 427
Monitors (180) ³	1,754	6,806	5,052	16,920	184 785	45 112
Laser printers (18) ⁴	499	865	366	1,481	16 732	4 085
Fax machines (9)	189	316	127	512	5 790	1 413
High-speed photocopiers (6)	808	875	67	316	3 690	901
Scanners (6)	17	32	15	49	540	132
Total	\$7,867	\$16,313	\$8,027	\$20,085	299 305 kWh	70 070 kg of CO₂e

¹Calculations were based on \$0.11/kWh.

²Assumed product lifetimes are four years for personal computers/monitors, six years for laser printers, five years for fax machines, six years for high-speed copiers and four years for scanners. The time value of money has been considered.

³Based on a 19-inch LCD screen.

⁴Based on a small to medium-sized laser printer (11–20 pages per minute).

In this case study, the savings represent the following:

- 15.5 cars off the road
- 7706 trees planted, as you remove the need for trees to sequester CO₂ emissions
- 26 239 round-trips from Halifax to Montréal, by car, if you could also trade the CO₂ emissions saved



Second case study: the business at home

Businesses of all sizes can win with ENERGY STAR. By purchasing an ENERGY STAR qualified computer and monitor, a businessperson operating from a home office can save about \$139 in electricity costs over the expected four-year life of the machine (based on an average electricity price of \$0.11/kWh).

HOW MUCH POWER DOES A COMPUTER USE?

Typical electricity consumption over 24 hours by an ENERGY STAR qualified personal desktop computer and 17-inch LCD monitor:

- Left "on" – 1200 watt hours (Wh) (computer without power-management features enabled)
- In deep-sleep mode – 60 Wh (ENERGY STAR qualified computer and monitor with power-management features enabled)
- Turned "off" – 24 Wh

Using power-management features can reduce electricity costs by \$25 to \$75 a year per computer.



An ENERGY STAR qualified medium-range multi-function device can deliver additional energy cost savings of about \$38 over six years, not to mention capital cost savings from purchasing one machine instead of several machines.

The environment wins as well: when you select ENERGY STAR qualified equipment, your home office will reduce GHG emissions by 480 kg over four years, the equivalent of planting 12 trees. With more than 1 million Canadians working out of their homes (according to the 1996 census of Canada), the total energy cost savings would be more than \$40 million per year. GHG emissions would be reduced by 210 000 tonnes (t) per year.

DID YOU KNOW?

Equipment must be shipped from the factory with its power-management capabilities fully activated to qualify for the ENERGY STAR symbol.

Other benefits

Compared with conventional equipment, ENERGY STAR qualified office equipment produces less heat by powering down when not in use. This contributes to a cooler, more comfortable workspace and may extend equipment operating life.



SAMPLE PROCUREMENT LANGUAGE

"The vendor must provide products that are qualified to use the ENERGY STAR symbol and meet the ENERGY STAR specifications for energy efficiency. Complete product specifications and an up-to-date listing of qualified products are available at oee.nrcan.gc.ca/energystar/."

ENERGY STAR qualified computers can also reduce noise from fans and power supplies and electromagnetic emissions from monitors, compared with conventional products.

Step 3: Use equipment wisely

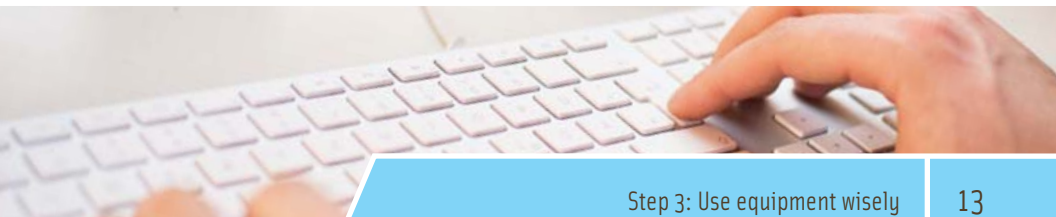
Buying ENERGY STAR qualified equipment is a sure way to reduce energy consumption, save money and cut GHG emissions. But the process does not begin and end there – how office equipment is used is also important.

Planning

- Are your computers backed up in the middle of the night? If so, could this be done just as easily during normal business hours?
- Do you receive fax messages during off-hours? If not, does your fax machine need to be turned on at these times or could you install a call-activated switching device?

Educating staff

- Consider launching an awareness and promotional effort to make staff aware of the opportunities and actions needed to achieve energy savings. Remind them that using less energy is not only good for business but also helps protect the environment.
- Make sure employees are aware that screen savers are not an energy-saving feature (they protect screen phosphors) – in fact, some screen savers increase energy consumption.





Using the technology properly

- Turning equipment off manually when it is not in use is the easiest and best way to eliminate unnecessary energy consumption (see the box on standby power consumption on page 15). Encourage staff to do this whenever possible, and show leadership by example.
- If your computers and servers have power-management capabilities, make sure they are activated.
- Consider using virtualization technology, which allows multiple, software-based virtual machines to run on a single server. This technology allows a server to run up to 20 times the number of computer applications.
- Decommission “comatose” servers (servers that are no longer running applications or are running applications that are no longer needed). Consolidate servers and storage equipment in data centres.

Minimizing printing requirements and using paper wisely

- Communicate and store information electronically whenever possible. Communicating electronically is fast and efficient and uses less energy than producing text or images on paper. Storing information electronically, rather than on paper, can also save money and space.
- Use both sides of the paper to reduce paper costs and save filing space.

- Reuse paper for draft printouts and note taking. Inkjet machines handle used paper, although this practice is not recommended in laser printers due to possible jamming and damaging of the fuser mechanism.
- Purchase recycled paper as much as possible – and make sure that used paper ends up in the recycle bin, not in the trash.

DID YOU KNOW?

Refilled ink cartridges are now widely available for inkjet machines, usually at less cost than for new cartridges. As well, most manufacturers and many retailers offer free recycling of empty ink cartridges.

STANDBY POWER – WHEN “OFF” MEANS “ON”

Standby power refers to the use of electricity by an electrical device when it is technically turned “off.” Many devices use standby power to operate a built-in clock or timer or to keep a machine in a state of semi-readiness to be launched into active mode. Others, like battery chargers for cell phones and external power adapters for laptop computers, consume power simply by being plugged in, even if the device they power is fully charged or disconnected.



Standby power consumption is a growing problem in Canada and elsewhere. Efforts are underway globally to reduce the standby power consumption of all devices to 1 W or less, but until that happens, it is a good idea to pay close attention to these “phantom loads.”

Purchasing ENERGY STAR qualified products will go a long way to minimizing standby power consumption. An ENERGY STAR qualified computer, for example, uses 70 percent less electricity than a model that does not have power-management capabilities.

Turning off equipment when it is not being used will give you even more control over standby power consumption. Consider using a power bar – a simple flip of a switch can cut power to several devices at the same time, eliminating standby power consumption and possibly extending the life of the equipment.

Step 4: Dispose of used equipment responsibly

DID YOU KNOW?



“Between 1992 and 2000, Canadians disposed of enough personal computers and monitors to fill approximately 1000 Olympic-sized swimming pools, but only about 10 percent was recycled or refurbished for reuse.”— Waste Management Guide for Small and Medium Enterprises

Disposal of information technology and telecom equipment is a growing problem in Canada, and governments at all levels are working with the electronics industry to develop a national industry-funded take-back and recycling program for post-consumer electronics. The Canadian electronics industry is also designing cleaner products that

contain fewer hazardous components and can be more easily upgraded or recycled.

What can you do?

Equipment users have a fundamental role to play in the environmentally responsible disposal of office equipment.

The best choice when you no longer need equipment or decide to upgrade is to find out if it can be used by others:

- Try to negotiate a trade-in or take-back with the manufacturer or dealer from whom you are purchasing new equipment.
- Find an organization that is involved in electronic-equipment reuse. Some organizations will pay for certain components, handle others for free or charge a

handling fee, depending on the age of the equipment.

- Local schools or community groups may welcome a donation of a used computer, printer, fax machine, copier or scanner.

DID YOU KNOW?

The Computers for Schools program, led by Industry Canada, has already saved more than 350 000 computers from going to landfills.

If no one is interested in the equipment, send it for recycling, rather than to a landfill. Recycling prevents contaminants, such as lead, cadmium and mercury, from entering the environment when electronic equipment breaks down in a landfill. Recycling also supports the recovery and reuse of valuable commodities, such as steel, glass, copper, aluminum, plastic and precious metals.

In some parts of Canada, electronic waste recycling is mandatory. Check with your municipal or provincial/territorial government to see if it offers an end-of-life electronics recycling program. If not, use the Yellow Pages or the Web to find a recycling facility in your area.

Additional information on electronic waste management is available on Environment Canada's Web site at www.ec.gc.ca. (select Pollution and Waste and then Waste Management).

DID YOU KNOW?

Environment Canada estimates that personal computers and monitors disposed of in Canada in 2005 contained the following:

- 3012.0 t of lead
- 4.3 t of cadmium
- 1.0 t of mercury



Natural Resources Canada's Office of Energy Efficiency (OEE) promotes the international ENERGY STAR symbol in Canada and monitors its use. In addition to this guide, the OEE offers other tools and resources to help you purchase energy-efficient equipment. Available online at energystar.nrcan.gc.ca, these include the following:

- the Simple Savings Calculator and Simple Savings Summary Tool
- the booklet entitled *Look for ENERGY STAR to Identify the Most Energy-Efficient Products*
- the *ENERGY STAR® Purchasing Guide*, recommended for procurement professionals in government, institutions and the private sector
- the fact sheet entitled *Standby Power – When “Off” Means “On”*

The OEE also has many free publications that will help you understand how to save energy at home, at work and on the road. At the same time, you will be saving money and helping the environment.

For more information, visit OEE Web sites at oee.nrcan.gc.ca and energystar.nrcan.gc.ca. To order ENERGY STAR publications, call the publications line at 1-800-387-2000 (toll-free).



For other free publications, contact

Energy Publications
Office of Energy Efficiency
Natural Resources Canada
c/o St. Joseph Communications
Order Processing Unit
1165 Kenaston Street
PO Box 9809 Stn T
Ottawa ON K1G 6S1
Tel.: 1-800-387-2000 (toll-free)
Fax: 613-740-3114
TTY: 613-996-4397 (teletype for the hearing-impaired)

NOTES



Natural Resources Canada's Office of Energy Efficiency

*Leading Canadians to Energy Efficiency
at Home, at Work and on the Road*

Canada