

OCTOBER 2006

*How Canada's information and
communications technology
and consumer electronics industries
are demonstrating leadership
in protecting our environment*

Designing for the Environment



Electronics Product
Stewardship Canada

DESIGNING FOR THE ENVIRONMENT

Almost every Canadian household includes at least one electronic product — a television set, a PC or a notebook computer. When purchasing these items, Canadians increasingly consider the environmental aspects of the product, such as energy consumption and recyclability.

Canadians are able to choose more energy-efficient products because electronics manufacturers are dramatically altering their designs to produce longer-lasting, more energy-efficient and less-polluting equipment. They have invested significantly in the environmental performance of their products. Their efforts affect all phases of the product, from the initial research and development, to the selection of suppliers, through to manufacturing and marketing. These “greener” products are not only better for the environment, but they also appeal to consumers due to better performance, reduced costs and overall convenience.

Manufacturers are also producing more environmentally sound products by moving to eliminate environmentally sensitive chemicals. Some are developing and manufacturing devices that deliver more functionality, and reduce costs and resources needed in production, packaging, transportation and end-of-life management. Others are creating take-back programs for end-of-life electronics. Today, consumers can find a wide range of electronic products that can be used more efficiently and can be recycled in a more environmentally responsible manner.

Canada’s electronics industry is leading the way to develop initiatives that are both environmentally efficient and economically attractive. The efforts detailed in this report focus on five key areas of improvement: chemical management; energy efficiency; materials management; design for recycling; and product expandability.



Chemical
Management



Energy
Efficiency



Materials
Management



Design for
Recycling



Product
Expandability



Chemical Management

Canada's electronics industry targets environmentally sensitive chemicals

Finding safer flame retardants for today's electronics

BROMINATED FLAME RETARDANTS (BFRs) are a group of chemicals that have been used in the manufacturing of many products — from electronics to furniture and carpets — to reduce the spread of fire with flammable materials, such as plastics. The use of flame retardants is often a mandatory safety requirement for electronic products, due to the combination of plastics and electricity. Although quite effective as flame retardants, BFRs' ability to persist in the environment has raised concern over their use and effect on human health.

Until recently, approximately 40 per cent of polybrominated diphenyl ethers (PBDEs) — one kind of brominated flame retardant — were used in the outer casings of computers, printers and televisions. Manufacturers are now using alternatives to BFRs that both meet new environmental standards and prevent fire risks. Electronics producers are, for example, replacing the plastic exterior casings of notebooks with lightweight metals that eliminate the need for flame retardants without compromising fire safety.

Others now use an inherently flame-resistant plastic, polyphenylene sulphide (PPS), for the casings of electronics. Another promising option, currently at the research phase, is the use of biobased plastics that may negate the need for brominated or phosphorus-based flame retardants. These alternatives have less environmental impact, while still assuring consumers of the fire safety of their electronic products.

In previous years, the manufacture of many electronic products used chemicals and metals that are potentially harmful to the environment. For example, older computers contained up to three kilograms of lead. Now, with an increased emphasis on environmental responsibility and the demands of the "green" consumer, manufacturers of electronic products are targeting the reduction or removal of environmentally sensitive metals, chemicals and flame retardants from their products.

Often, this translates into significant reductions in, and even the elimination of, selected materials in the production of various electronics. These are:

- lead
- mercury
- cadmium
- hexavalent chromium
- selected flame retardants.

Manufacturers of electronic products available in Canada are also working to eliminate other environmen-

tally sensitive substances from their products. Their actions include:

- the elimination or reduction of lead and lead soldering: tin/silver/copper alloy is one alternative that is replacing the tin/lead solder used to attach electronic components;
- elimination of, or reduction in use of, polyvinyl chloride (PVC): PVC is often used in cabling and power supplies;
- elimination or reduction in the use of flame retardants: companies are switching to alternative flame retardants that are more environmentally sensitive yet do not compromise product fire safety;
- reduction in the use of mercury: companies are working with their suppliers to find environmentally sound alternatives to the small amounts of mercury found in fluorescent lamps, such as those used in the backlighting system of most liquid crystal display (LCD) display panels.

FAST FACTS

- Eighty-five per cent of Canadian consumers are willing to spend more on electronics that are environmentally friendly.
- A large majority of Canadian consumers — ninety-six per cent — prefer purchasing products that can be recycled at the end of their life.
- Ninety-two per cent of Canadians prefer buying products that are manufactured utilizing environmentally conscious processes.
- Eighty-eight per cent of Canadians agree they are willing to spend more for an electronic product because of the environmentally friendly options it offers, such as being energy efficient, producing less waste and being made of recycled materials.
- While ten per cent of Canadians rank an environmentally friendly product as the most important factor they consider when buying a television, thirty-eight per cent say price is the most important factor.
- Canadians are among the most likely in the world to have rewarded a company for being socially responsible.
- Canadian consumers are among the most demanding of companies regarding environmental protection.
- Ninety-two per cent of Canadians said the more socially and environmentally responsible a company is, the more likely they are to purchase its products or services.

(Sources: Canadians' Opinions and Attitudes on Purchasing Environmentally Friendly Consumer Electronics, Pollara Research for Sharp Electronics Canada, 2005; and Expectations for Corporate Social Responsibility Rising with Clear Consequences for Not Measuring Up, GlobeScan survey for HP Canada, 2005)



EPEAT PERFORMANCE

EPSC MEMBER COMPANIES have endorsed a progressive new tool to certify the environmental attributes of their products. The Electronic Product Environmental Assessment Tool (EPEAT®) will help government and institutional purchasers evaluate, compare and select desktop computers, notebooks and monitors based on their environmental attributes.

These performance standards encourage manufacturers to design products to be used longer, be more energy efficient, be easier to upgrade and recycle, and have a reduced environmental impact. The EPEAT rating system includes 23 required criteria and 28 optional performance criteria organized in eight product performance categories:

- reduction and elimination of environmentally sensitive materials
- materials selection
- design for recycling
- product longevity
- energy conservation

- product take-back
- packaging
- corporate performance.

EPEAT evaluates electronic products according to three tiers of environmental performance — Bronze, Silver and Gold. Bronze meets all 23 required criteria, Silver meets all required criteria plus at least 50 per cent of the optional criteria and Gold meets all required criteria plus at least 75 per cent of the optional criteria.

"This standard will change the marketplace and measurably reduce the environmental impacts of computers," says Jeff Scott, director of the Waste Management division of the U.S. Environmental Protection Agency. "It is an excellent example of government, industry, environmentalists and academics collaborating to address an issue and improve the environment."

For more information, visit www.epeat.net



Energy Efficiency

Electronic product manufacturers are striving to be ENERGY STARS

Saving energy — as simple as hitting a switch



TODAY'S ELECTRONICS are often manufactured with built-in energy-saving features such as low standby power mode, as well as user-activated power options. Utilizing these features can be as easy as turning on or off a switch. Power management features can save hundreds of dollars annually in electricity

costs and help to reduce greenhouse gases. Most printers have sleep modes, while ENERGY STAR power management features are standard in both Windows and Macintosh operating systems. When idle, monitors and computers are placed into a low-power sleep mode. Simply moving the mouse or striking any key on the keyboard awakens them from their sleep state within seconds. ENERGY STAR estimates that by enabling monitor and computer power management, individual users could save up to \$75 (USD) on their electricity bill, per desktop, annually.

According to the U.S. Environmental Protection Agency, companies spend more than \$1 billion per year on electricity for computers and monitors that are turned on when they don't need to be. This leads to the unnecessary production of millions of tons of greenhouse gases accumulated during the production of electricity. Turning off computers or enabling low-power sleep modes, via the ENERGY STAR features, could save countries millions of dollars in electrical production costs. Modern computers are designed to handle 40,000 on/off cycles — and they are not likely to approach that in an average five- to seven-year lifespan.

Faced with ever-increasing electricity rates, Canadian consumers are demanding that the products they purchase be more energy efficient. In a recent survey by Pollara Inc. and Sharp Electronics of Canada Ltd. on Canadian attitudes toward purchasing environmentally friendly electronics, nearly 40 per cent of consumers said energy conservation is the environmental issue that concerns them most. The electronics industry responded to consumers' concerns by signing on to the ENERGY STAR program. Created by the U.S. Environmental Protection Agency in 1992 and administered in Canada by Natural Resources Canada, ENERGY STAR is a voluntary labelling program that identifies and promotes energy-efficient products in order to reduce greenhouse gas emissions. The ENERGY STAR program is working to increase the energy efficiency of computers, printers, imaging equipment, televisions and other audio-visual products.

Computers and monitors were the first products to carry the ENERGY STAR label, although many did carry the features of the ENERGY STAR program years before it was introduced. The program now encourages such power management features as sleep and low power modes. It also offers an added benefit to consumers: they can easily identify the products that are top of their class for energy efficiency. Many products available to Canadian consumers have been designed to meet the ENERGY STAR program and some are designed to surpass the requirements.



Materials Management

What's small and 'green'? Today's most innovative electronic products

When computers and printers first appeared in offices in large numbers, they were massive pieces of equipment, sometimes the size of furniture, and required vast amounts of raw resources to produce. Now, just 20 years later, powerful computers slip easily into a briefcase, large screen televisions hang on the wall and portable music players fit thousands of songs into the palm of the hand. Advancements in technology and the miniaturization of components have reduced the amount of resources required to produce electronic products. Many difficult-to-recycle plastics are being replaced with lighter, more durable metals such as aluminum and magnesium, making products more durable and valuable to recycle. As well as managing the volume of materials being used in their products, manufacturers are also incorporating new, environmentally responsible materials, such as vegetable-based and recycled plastics, recycled propylene and recycled glass, into their designs.

Doing the right thing with mercury



MERCURY HAS TYPICALLY been used in a wide range of electronics equipment, including lamps, switches and some types of batteries. The use of mercury switches in electronics has largely been eliminated and the Canadian battery industry has announced its commitment to eliminate the use of mercury in button cell batteries — the only batteries that continue to contain small amounts of mercury. Although the use of mercury-containing lamps continues in products such as LCD displays, optical scanners of photocopiers, scanners

and fax machines, they are used as an energy-efficient alternative to traditional materials. While Canada's electronics industry continues to work to reduce the amount of mercury used in these products, it is also working to develop alternative technologies. One alternative to the use of mercury-containing bulbs is organic light-emitting diode (OLED) lights. This type of LCD backlighting has a longer lifespan and uses less power than fluorescent lighting systems that contain mercury. OLED lights, currently used in cellular phones and notebook computers, will be more broadly used once economies of scale are achieved.

Electronics recycling done right

THE ELECTRONICS INDUSTRY in Canada has set the bar high for electronics recycling, and in doing so is becoming a global leader. Working through Electronics Product Stewardship Canada (EPSC), the industry has developed the Recycling Vendor Qualification Program (RVQP) to assess and qualify vendors that will recycle electronic products. The standards are high to ensure protection of the environment, worker health and safety, and regulatory compliance. The Recycling Standard ensures that:

1. Electronics are processed and recycled in a safe and environmentally sound manner.
2. Electronic equipment is kept out of landfills.
3. Neither whole electronics nor electronic scrap is exported to developing nations.
4. No prison labour is used to process electronics.
5. All staff members working for a recycler are protected by a comprehensive health and safety program.

Each of these commitments will be verified by comprehensive, independent, environmental auditors.

For more information, visit www.epsc.ca/recycle



Design for Recycling

Today's strategies for improved recycling begin at the design stage

According to a national survey by Pollara Inc. and Sharp Electronics of Canada Ltd., 96 per cent of Canadians prefer to buy products that can be recycled at the end of their performance life. They do not want to see electronic products added to landfills; nor do they think these products should be shipped to developing nations. In response, manufacturers are developing electronics that are easier to dismantle, sort and recycle. The result? More efficient recycling that involves environmentally responsible processes, produces less waste and contributes materials back into the production of the next generation of electronic products. A reduction in the number of screws and screw types used can lessen half the time required for disassembly. Using international standards for marking parts enhances the ability to identify plastic resins and recycle the plastic. Avoidance of painting

and varnishing of plastic material helps with the material's value for recycling. Information gathered on product recyclability is now communicated to the product designers so that improvements in the recycling process can begin in the design phase. Some design innovations include:

- fewer screw types and numbers of screws
- more snap-fit parts
- minimized gluing and welding of different parts
- increased use of highly recyclable materials such as aluminum.



Product Expandability

Multi-functional electronics are a boon to consumers and the environment

Not long ago, consumers had to purchase a variety of electronic products to fulfill their communications, entertainment and information needs. Today, electronics manufacturers are no longer just designing products for single-use applications; instead, many electronic products are multi-functional units.

A single product can perform an array of tasks — a notebook computer can function as a portable work station; can provide wireless, high-speed Internet access; and can be used as a media entertainment centre with the ability to play DVDs and MP3s and to view television broadcasts. As a result, consumers need less equipment for the tasks they want to carry out and there is less duplication and waste at the end of life for these products.

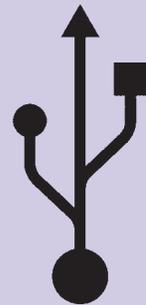
New electronic products are also incorporating design features that extend product life or allow for replaceable parts so that products do not enter the waste stream prematurely.

Responding to consumer demands and making products versatile and enduring

TECHNOLOGY KEEPS improving at lightning speed. Electronics manufacturers are using new technology to not only make things easier and more convenient for the user but to expand on what is already there. USB (Universal Serial Bus) and Bluetooth® are two technologies that allow the user freedom to connect and add while reducing the materials needed to do so.

USB was designed to be used with desktop computers and now has applications for video game consoles and controllers, PDAs and televisions. USB allows peripherals to be connected or disconnected without powering down or rebooting the computer. As of 2005, the vast majority of peripherals on the market are able to take advantage of USB technology.

Bluetooth® is a new, promising technology that is being incorporated into many electronics. This technology, which ends the need for cables and wires, provides a way to connect and exchange information between PDAs, mobile phones, notebooks, desktop computers, printers and digital cameras via a secure, low-cost, globally available short-range radio frequency.



Canadian electronics companies are continuously working to bring environmentally sound products to consumer, business and institutional markets. EPSC member companies' websites provide tangible examples of individual products that integrate many of the design-for-the-environment improvements profiled in Designing for the Environment.

The EPSC website contains a section linking readers to members' environmental pages. To find out more, follow the links at www.epsc.ca/dfc

ELECTRONICS PRODUCT STEWARDSHIP CANADA

The electronics industry's voice for environmental stewardship in Canada

Electronics Product Stewardship Canada (EPSC) is a not-for-profit, industry-led organization created through the joint efforts of the Information Technology Association of Canada (ITAC) and Electro-Federation Canada. Its membership is comprised of more than 20 leading Canadian electronics manufacturers that are working to design, promote and implement sustainable solutions for the recycling of end-of-life electronics. EPSC members have clearly taken an environmental leadership role by working with stakeholders to create effective industry-led environmental stewardship programs across Canada, by investing in design for environment improvements to their products and processes, and by establishing an innovative vendor qualification program for the responsible recycling of end-of-life electronics.

FOUNDING PARTNERS



ELECTRO-FEDERATION
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**Electronics Product
Stewardship Canada**

CONTACT US

Electronics Product Stewardship Canada (EPSC)
220 Laurier Avenue West, Suite 1120
Ottawa, Ontario K1P 5Z9

For more information, visit www.epsc.ca

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