Research
SPOTLIGHT
A Publication of the Texas Senate Research Center • March 2006

E-Waste Dilemma

"Americans discard more than 100 million computers, cellphones, and other electronic devices each year. As 'e-waste' piles up, so does concern about this growing threat to the environment."

—Elizabeth Royte, e-gad!, Smithsonian. August, 2005.

The Information Age has created a society that is global, informed, wired, and connected. The technological advances of the Information Age have also generated massive amounts of discarded electronics waste, or e-waste. Every year, an estimated 100 million computers and other electronic devices break or become obsolete and are discarded. E-waste is not limited to personal computers, but includes office equipment, monitors, cell phones, keyboards, printers, scanners, personal digital assistants (PDAs), iPods, televisions, VCRs, DVD players, household appliances, microwave ovens, and all the cords, cables, mice, and peripherals and accessories for those devices.

Disposal of e-waste can be inconvenient, expensive, labor-intensive, and even dangerous. When electronic devices are disposed of in landfills, some valuable materials contained in the devices are wasted. When properly managed, some materials in e-waste, including copper, gold, and aluminum, can be a source of reusable secondary raw materials. But some materials such as lead, cadmium, and mercury, can be toxic and can contaminate the environment; if deposited in a landfill, these materials can leach into the soil and water, and burning the e-waste may create dangerous airborne emissions. Researchers report that prolonged exposure to some of the metals has been shown to cause abnormal brain development in children, and nerve damage, endocrine disruption, and organ damage in adults.

Industry Response

The Electronic Industries Alliance (EIA), a partnership of electronic and high-tech associations and companies whose mission is "promoting the market development and competitiveness of the U.S. high-tech industry through domestic and international policy efforts," representing the $400 billion United States high-tech and electronics industries, testified before the United States House of Representatives Subcommittee on Environment and Hazardous Materials in September, 2005. In the testimony EIA representatives stated that they are actively working "to reduce the environmental impact of electronic products and manufacturing processes where technically feasible through policy and advocacy work and voluntary industry design for environment [*sic*] tools." EIA witnesses also noted the industry's "concrete achievements" such as its involvement with the Environmental Protection Agency (EPA) Plug-in to eCycling campaign for the "proper recovery and management of well over two billion pounds of used electronics products"; compliance with the European Union Directive on the Restriction of Hazardous Substances (the RoHS Directive) to take effect in 2006; and the development of a consumer outreach program and website, known as the Consumer Education Initiative, to inform the public of the options available for electronics recycling.

EIA representatives stated that "any discussion of electronics recycling must recognize the intense competitive pressures within [the] industry, and the potential impacts that any given recycling system could have on the competitive balance." EIA supports shared responsibility in addressing the issue in establishing "a viable recycling infrastructure in which all the major stakeholders—manufactures, retailers, government, nongovernmental organizations, and recyclers—participate based on their unique expertise and capabilities."

EIA representatives also testified that compounds such as lead and mercury are present in some electronics products because they provide clear safety, performance, and energy efficiency benefits and that, although some substitute materials are being developed, the compounds cannot yet be replaced in all applications. In some cases, no technically or environmentally suitable alternatives exist. EIA agrees that these compounds can and should be appropriately managed at the end of life and that reusing and recycling electronics at the end of life is the environmentally preferable option.

According to EIA, federal action can help promote safe and appropriate recycling by creating a streamlined and uniform regulatory framework that removes artificial barriers and encourages the free flow of used products. EIA noted specific initiatives, including the establishment of consistent regulatory definitions of key terms and defining the scope of covered products; the establishment of a flexible third party organization to help with data reporting, compliance, and financing; broad consistency in labeling, product information, and regulatory reporting requirements; and assessment of whether additional recycling regulations or standards are necessary to ensure the safe and environmentally sound management of used electronics.

Other industry-coordinated programs, such as providing credit for a computer trade-in or a tax deduction for computer donations, have been initiated by individual companies. Dell, Epson, Hewlett-Packard, Gateway, IBM, and Office Depot now offer donation, trade-in, and recycling options to

their customers, with some offering free recycling or rebates. Apple announced in June, 2005, that it will accept old iPods at all of its stores for free recycling. Dell is reported to be "carving a rapidly growing business out of disposing of customers' old computers." Dell says that customers largely are driving the change.

UsedComputer.com lists nonprofit organizations that are interested in receiving equipment that they can either use or resell, but explains that they are not interested in equipment that they will have to pay to dispose of. These organizations include the National Cristina Foundation, which maintains a database of prescreened charitable organizations in need of certain electronic equipment for training and educational purposes; Gifts in Kind America, which does not restrict itself to just computer and office equipment; Education Assistance, Ltd., which accepts "newer" computers and excess inventory from corporations nationwide; Goodwill Industries, which has established its Computer Recycling Services, specializing in collecting, refurbishing, and selling used computer equipment; Computers for Schools, a Chicago-based organization with affiliates in 34 states that refurbishes Pentium PCs and Macintoshes for distribution to needy schools; and The Salvation Army, which accepts equipment in working condition.

Products That Are Considered Consumer Electronics

Televisions and Monitors
Computers
Computer Peripherals
Audio/Stereo Equipment
VCRs
DVD Players
Video Cameras
Telephones
Fax and Copying Machines
Cellular Phones
Wireless Devices
Video Game Consoles

Source: U.S. Environmental Protection Agency

Environmentalist and Community Responses

Environmental activist organizations such as Greenpeace, Friends of the Earth, the European Environment Bureau, and the Silicon Valley Toxics Coalition (SVTC) continue to pressure the high-tech electronics industry to do more to address the issue of rising toxic contamination from obsolete computers, televisions, and other gadgets that have been shipped overseas. Some environmental activists have accused the industry of fighting efforts by environmentalists and the European Union to pass laws that would make electronics manufacturers responsible for the environmental and health damage that the manufacture, use, and disposal of their products could cause. SVTC asserts that "the public should not have to pay extra taxes for waste-management costs of hazardous materials that producers choose to use in electrical and electronic equipment."

Electronic devices were probably the most popular gifts purchased in the recent holiday shopping. Communities like Austin, Texas, have long offered Christmas tree recycling to area citizens, but this year Waste Management Inc. teamed up with Goodwill Industries of Central Texas to do the same for e-waste. The landfill company is now accepting computers, monitors, keyboards, cell phones, fax machines, digital cameras, and printers at the company's Austin Community Landfill at no additional charge.

Federal Response

In November, 2005, the United States Government Accountability Office (GAO) issued its Report to Congressional Requesters entitled Electronic Waste; Strengthening the Role of the Federal Government in Encouraging Recycling and Reuse. GAO was asked to summarize information on the volumes of, and problems associated with, used electronics; examine the factors affecting their recycling and reuse; and examine federal efforts to encourage recycling and reuse of these products.

GAO reported that the growing volume of used electronics may pose environmental and health problems if not managed properly; cost, regulatory factors, and consumer inconvenience deter recycling and reuse of used electronics; and federal regulatory framework governing used electronics provides little incentive for recycling or reuse. GAO also concluded in its report that federal efforts to increase recycling and reuse of used electronics can be strengthened.

The GAO report states that the EPA has spent about $2 million on several programs such as the Federal Electronics Challenge to encourage recycling and reuse of used electronics. GAO states that although the voluntary EPA programs show promise, the programs' success is limited by the lack of EPA authority for requiring federal agency participation.

GAO further states that:

> *In the absence of federal actions to address these concerns, an emerging patchwork of state requirements to encourage recycling and reuse may place a substantial burden on manufacturers, retailers, and recyclers, who incur additional costs and face an uncertain regulatory landscape as a result.*

Hazardous Waste

1. **Lead** in cathode ray tubes and solder.
2. **Arsenic** in older cathode ray tubes.
3. **Selenium** in circuit boards as power supply.
4. **Polybrominated flame retardants** in plastic casings, cables, and circuit boards.
5. **Antimony trioxide** as flame retardant.
6. **Cadmium** in circuit boards and semiconductors.
7. **Chromium** in steel as corrosion protection.
8. **Cobalt** in steel for structure and magnetivity.
9. **Mercury** in switches and housing.

State Responses

Shifting costs for managing discarded computers and electronics to brand owners and producers has created an incentive to improve product design and to reduce the use of toxic materials. Some activist groups, such as The Computer TakeBack Campaign, are calling for legislative solutions and are encouraging state-level policy reform requiring brand owner-financed collection and recycling of hazardous electronic products. A number of states are developing e-waste legislation; until recently, most of the legislation has called for voluntary action, but a few states have enacted mandatory recycling and reuse of certain e-wastes.

California

California was the first state to introduce advanced recovery fee e-waste legislation. The Electronics Waste Recycling Act (S.B. 20), signed into law in 2003 and amended in 2004, requires consumers and businesses that purchase computer monitors, televisions, and other video display devices to pay an "advanced recovery fee" to support the cost of collection and recycling. Depending on the size of the screen, the fee ranges from $6 to $10. The fee is collected by the retailer at the time of sale and retailers remit collected fees to the state on a quarterly basis. These funds are deposited into a special e-waste account, and payments are made from this account to qualified recyclers to properly recycle the devices. The California e-waste system is similar in structure to waste tire fees in place in many states.

The Consumer Electronics Retailers Coalition reports that store owners are opposed to the California approach because "the extra fee may cause more people to buy their computers and televisions online."

California's Electronic Waste Recycling Act also calls for a reduction in hazardous substances used in certain electronic products sold in California and for the issuance of a directive recommending environmentally preferred purchasing criteria for state agency purchases of certain electronic equipment.

The California Legislature also enacted the Cell Phone Recycling Act in 2004, making it mandatory for companies that sell mobile phones in the state to recycle returned handsets. The legislation makes it unlawful to sell, on and after July 1, 2006, a cell phone in the state to a consumer unless the retailer of that cell phone complies with the Act. The Act requires a retailer selling a cell phone in the state to have a system in place for the acceptance and collection of used cell phones for reuse, recycling, or proper disposal; requires the state department of toxic substances control to post on its website an estimated state recycling rate for cell phones; and requires a state agency that purchases or leases cell phones to certify that the agency's vendors are complying with the Act.

Maine

In 2004, the Maine Legislature enacted legislation mandating the recycling of all waste televisions and computer monitors generated by households starting in January of 2006. This law establishes a system in which consumers, municipalities, and manufacturers share responsibility for ensuring that electronic items are properly recycled to reclaim all usable materials and prevent the release of toxins into the environment. The state requires that towns collect and transport computer monitors and televisions to consolidation facilities. Once the devices arrive at the consolidation facilities, manufacturers become responsible for costs and may allow the facility to ship the devices to an accredited recycler and be billed by the facility or to take possession of the devices for recycling. Manufacturers must develop a plan for the collection and recycling or reuse of the devices by the January, 2006, deadline. Manufacturers are not required to establish or operate consolidation facilities in Maine, but they must ensure that all geographic areas are "conveniently" served.

Maryland

Maryland enacted e-waste recycling legislation in May, 2005. Maryland's Statewide Computer Recycling Pilot Program (H.B. 575) is considered a hybrid of California's advanced recycling fee and Maine's shared responsibility law. Maryland's legislation calls for computer makers that have produced more than 1,000 computers on average each year since 2002 to register with the state and pay an initial fee of $5,000. Manufacturers may choose to either pay $5,000 annually into the State Recycling Trust Fund, which will provide grants to counties for the development and implementation of computer recycling programs, or pay an initial $5,000 fee and $500 annually thereafter and take back their computers from consumers at no cost to the consumer.

A spokeswoman for Clean Water Action asserts that the Maryland law "puts the onus on counties to recycle and will cost taxpayers if too little money is collected."

Massachusetts

In 2000, Massachusetts became the first state to ban cathode ray tubes (CRTs) from disposal in landfills. Table 310, Code of Massachusetts Regulations, 19.017 (Waste Disposal Regulation), restricts or prohibits the disposal, or transfer for disposal, of certain components of the solid waste stream. A competitive bidding process established Electronic-Cycle, Incorporated, as the "official CRT recycler for three statewide programs, and several corporations, counties, and waste haulers." Another Massachusetts-based company, CRT Recycling, collects both the regulated and nonregulated computer/electronic waste from schools free of charge and accepts delivery of this material free of charge from municipalities, businesses, and residents. CRT Recycling reroutes this material away from local landfills to various vendors and nonprofit organizations.

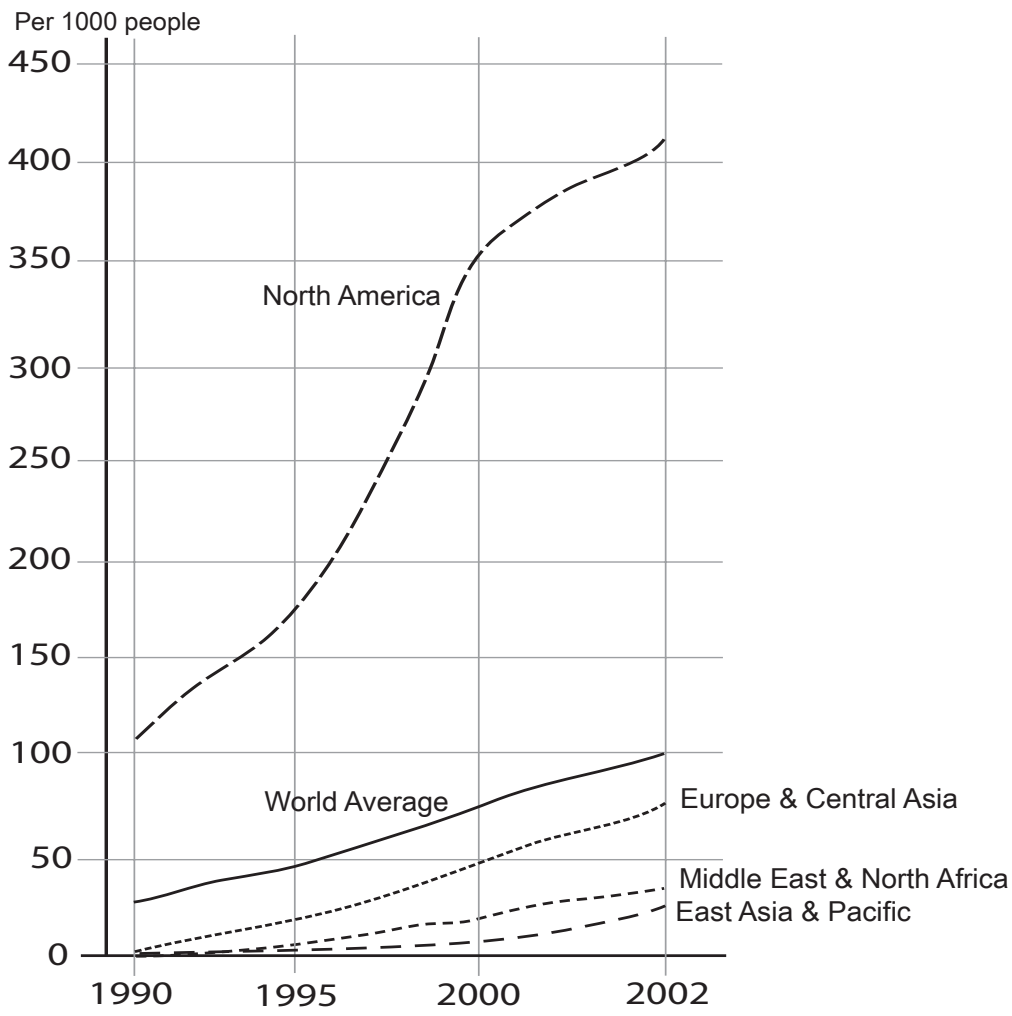
Texas

The 79th Legislature, Regular Session, 2005, passed H.B. 2793, relating to the removal and collection of convenience switches from motor vehicles. Due to the presence of mercury-containing convenience light switches in motor vehicles, mercury can be emitted to the atmosphere when shredded vehicles are melted in high temperature processes as part of the steel recycling process. The United States Environmental Protection Agency is expected to pass regulations this year requiring the reduction of mercury emissions and will recognize state removal programs as a method of compliance.

Regional Response

Recently, northeastern states have been working cooperatively to address e-waste management issues through the Northeast Region Electronics Management Project. The project, which is a collaborative effort between the Northeast Regional Recycling Council and the Eastern Regional Conference of the Council of State Governments, seeks to develop a coordinated, unified legislative approach to end-of-life electronics management in the region. Throughout 2005, legislators and legislative and state environmental agency staff have met with a variety of stakeholders from electronics manufacturing companies, retail companies, recycling companies, environmental groups, and state and local recycling coordinators in an effort to forge a consensus on key elements of electronics legislation.

Participating entities—Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, the U.S. Virgin Islands, and Vermont—have released two drafts of model legislation so far. Some of the key issues they are focusing on concern which products will be covered by the legislation, how an end-of-life electronics system will be financed, and how to best encourage green design.



Conclusion

Solutions to the e-waste dilemma lie with all stakeholders, including the individual consumer, who must be informed about available options and willing to make the effort to dispose of and recycle e-waste responsibly.

Although there is not yet clear agreement on the best approach, the consumer electronics industry and environmentalists seem to agree that various approaches in different states, giving varying responsibility to manufacturers, retailers, and state and local government, could result in a "costly and ineffective patchwork of regulation." Stakeholders also agree that any approach must be cost-effective for business and convenient for consumers in order to be successful.

—by Samm Osborn, SRC

For More Information

Analysis of Five Community Consumer/Residential Collections: End-of-Life Electronic and Electrical Equipment. U.S. EPA Region 1. April, 1999. www.epa.gov/region01/programs/csifinal.pdf

Electronic Product Recovery and Recycling Baseline Report: Recycling of Selected Electronic Products in the United States. National Safety Council. May, 1999. www.nsc.org/ehc/epr2/baseline.htm

Plastics from Residential Electronics Recycling Report 2000 American Plastics Council. April, 2000. www.plastics.org/top_level/info.html

End of Life Computer and Electronics Recovery Options for the Mid-Atlantic States, 2nd Edition Mid-Atlantic Consortium of Recycling and Economic Development Officials (MACREDO). March, 2000. www.libertynet.org/macredo/comelc.htm

Electronics Reuse and Recycling Infrastructure Development in Massachusetts U.S. EPA Region 1 and Massachusetts Department of Environmental Protection. September, 2000. www.epa.gov/region01/compliance/solid/jtrfinal00.pdf

Recycling Used Electronics: Report on Minnesota's Demonstration Project Minnesota Office of Environmental Assistance. April, 2001. www.moea.state.mn.us/plugin/index.cfm

WasteWise Update: Electronics Reuse and Recycling. U.S. EPA. October, 2000. www.epa.gov/wastewise/pdf/wwupda14.pdf

Source: U. S. Environmental Protection Agency

Sources:

About ElectroniCycle. Where We Are Headed. http://www.electronicycle.com. 2002.

Electronic Industries Alliance. Website: http://www.eia.org/news_about/ (accessed January 11, 2006)

Electronic Waste: Strengthening the Role of the Federal Government in Encouraging Recycling and Reuse. United States Government Accountability Office Report to Congressional Requesters. November, 2005.

Kelderman, Eric. No Consensus on Recycling Electronic Junk. Stateline.org. December, 2005.

Knight, Danielle. Sony Monitoring Environmental Activists. InterPress Service. September 22, 2000.

McCurdy, Dave, president and CEO, Electronic Industries Alliance. Testimony before the Subcommittee on Environment and Hazardous Materials, United States House of Representatives. September 3, 2005.

Zehr, Dan. Disposing of Computers Becomes a Big Business. Austin American-Statesman. October, 4, 2005.

Research SPOTLIGHT
A Publication of the Texas Senate Research Center

Requests for back issues and/or additional copies should be addressed to:
Senate Research Center
P.O. Box 12068, Austin, TX 78711 or call 512-463-0087
To view this and other SRC publications, visit our website at http://www.senate.state.tx.us/SRC