



RISK BULLETIN

Electronic Waste and E-Cycling

INTRODUCTION

The demand for newer, superior technology is shortening the expected lifetime of electronic goods. As a result, electronic waste is now a significant component of landfill waste. In response to this rapid increase in electronic waste, electronic recycling, or e-cycling, of these unwanted goods has become a viable alternative to disposal. Waste generators and waste management firms face a variety of risk factors and a myriad of emerging regulations when recycling or disposing of electronic waste.



E-cycling is the reuse of consumer electronic goods either through donation/resale for continued use by others, or through de-manufacturing and recycling of the individual components. Currently many electronic items are accepted for e-cycling programs, including televisions, monitors, computers / peripherals, and telephones (including cellular).

Other disposal options for obsolete electronic goods include:

- **Long term storage:** A common 'end' for electronic goods is storage, either on a small scale in a closet or large scale in a warehouse

full of other electronic devices. This solution is not practical as it is costly and temporary.

- **Municipal landfills:** Disposal in municipal landfills is now banned entirely in five states, and others discourage disposal of electronics because of environmental concerns related to the metals and plastics they contain. Additionally, some individual landfills ban disposal.
- **Return to manufacturer or vendor:** Purchasing agreements allow users to return electronic goods to the manufacturer or vendor.

BENEFITS RELATED TO E-CYCLING

As with other reuse and recycling programs, numerous benefits are attributed to e-cycling, including:

- **Conservation of landfill space:** according to EPA studies, electronics now make up between one to four percent of the municipal solid waste stream, and that percentage is projected to increase in the future.
- **Reduction in the quantity of toxic materials** (lead, mercury, cadmium, chromium, and brominated flame retardants, etc.) that may enter the environment.
- **Conservation of natural resources** via re-use and recovery of equipment, individual components, and materials.
- **Refurbishment and donation** of functioning electronic equipment may provide a tax benefit for the original owner.

For the manufacturer of electronic equipment, participation in an e-cycling program may reduce

their long term product liability related to inappropriate disposal of obsolete equipment. E-cycling may also provide a competitive advantage, because many private and institutional buyers are “buying green” and considering the environmental impact of the electronics equipment that they are acquiring, including packaging, recycled content, and disposal/re-use/e-cycling options.

RISKS RELATED TO E-CYCLING

What are the risks of e-cycling to the consumer who generates electronic waste? What are the risks involved for the companies which accept electronic waste in order to recycle it?

Risks to generator

- **Data Theft:** The primary risk associated with recycling electronics goods is the theft of information on the device. This ranges from sensitive data stored on a computer hard drive to a list of business contacts stored on a cellular phone. Many electronic recyclers advertise state of the art data removal technology.
- **Liability:** A potential risk of e-cycling is the liability from improper disposal of goods by the company contracted for e-cycling. Once an electronic device has been disassembled, the component parts may be subject to more stringent hazardous waste disposal regulations under the Resource Conservation and Recovery Act (RCRA).
 - An example of this is mercury switches contained within an electronic device. Contained within the device, a mercury switch is not considered hazardous waste. However, if the switch is completely removed from the device for disposal, the switch is considered hazardous waste. Generally, if the device is broken down to the circuit board level and the switch remains on the circuit board it is not considered hazardous waste, it is considered scrap metal. Therefore, how an

electronic device is broken down for recycling changes the determination of whether the components are considered hazardous waste or not and how they need to be disposed of.

- **Cost:** The cost associated with labor and disposal of electronic goods de-manufacturing is generally passed on to the generator of the waste.
- **Availability:** Not all communities have an e-cycler locally and will require that the generator retain the electronic devices until transfer to an e-cycler can occur. Therefore, the electronic goods must be stored in a safe storage environment until transferred to the e-cycler. Climatic events can destroy functional electronic goods reducing the potential for reuse. Data theft is also a concern during this storage period.
- **Proper Selection of a Recycler:** Questions the electronic goods consumer should consider when choosing a recycler include: how does the company verify data removal and security? How does the company handle the de-manufacture and final disposal of all components, raw materials, and hazardous materials generated? Can the company provide a list of references to which they currently provide service? An extensive list of electronic recyclers can be found on the International Association of Electronics Recyclers website (www.iaer.org).

Risks to Recyclers

- **Market for Used Goods:** Due to the demand for newer, superior technology the market for re-use of electronic goods is diminishing. Even charities and other non-profit organizations are becoming overwhelmed with donations and sometimes refuse the donations or require disposal of their older equipment in exchange.
- **Costs:** The cost of disassembling electronic goods generally is greater than the value of the raw materials obtained in the disassembly.

- **Fluctuating Material Prices:** The market price of the recovered components and raw materials is a concern for the industry.
- **Changing Regulations:** The cost of recycling electronic goods is often greater than the value of the recycled materials; therefore the industry is often dependent on state and federal regulations that require the recycling of electronic goods. These regulations typically generate fees to help offset the costs associated with e-cycling. Currently state laws require the manufacturer, consumer, or government to pay for recycling. Without these regulations the consumer would be responsible for the cost of recycling, which could lead to a decrease in recycling of electronic goods.
- **Disposal of Unusable Recycled Materials:** Component parts of a disassembled electronic device may be subject to more stringent RCRA hazardous waste disposal regulations than the original device. For example, used circuit boards are considered scrap metal and are exempt from hazardous waste regulations. If separated, circuit boards contain several hazardous metals including lead, chromium, and mercury.

FEDERAL REGULATIONS

Large Generators

Electronic waste disposal by businesses, schools, government agencies, etc. that generate over 100 kilograms of hazardous waste per month are regulated under RCRA. Currently businesses and other organizations that discard less than 100 kilograms per month of hazardous waste (including used cathode ray tubes) are not regulated under most federal requirements.¹

Small Generators

Since 2003, at least three separate bills have been proposed on the federal level in the House of Representatives to limit electronic waste by

small generators and individuals (less than 100 kilograms of hazardous waste per month). Only one of these bills is currently under review. None have been enacted.

- The National Computer Recycling Act was introduced in 2003, 2005, and 2007. This bill would create a fund generated by the collection of Advanced Recovery Fees (ARFs) from the consumer at the time of purchase. The fund would be managed by the Environmental Protection Agency (EPA). This national legislation is similar to legislation already enacted in California.
- The Tax Incentives to Encourage Recycling Act was introduced in 2004 and 2005. This bill provides a tax credit to manufacturers of computer, cellular phone, and television equipment to operate an environmentally sensible recycling program for use by consumers who want to discard the equipment.
- The Electronic Waste Recycling Promotion and Consumer Protection Act was introduced in 2005. This bill focuses on utilizing tax credits (to both manufacturers and consumers) as an incentive to encourage the building of a recycling infrastructure and motivate consumers to recycle.



STATE REGULATIONS

The overall trend nationally appears to be eliminating cathode ray tubes (CRTs) and other display devices from landfills first with other large electronic devices likely to be banned over time. Currently California, Maine, Massachusetts, Minnesota, and New Hampshire have banned disposal of CRTs into municipal landfills.

Nine states have also passed electronics recycling laws: California, Connecticut, Illinois, Maine, Maryland, Minnesota, Oregon, Texas, and Washington. As all these state programs were recently enacted or yet to be enacted, the practical effects of these new laws are not yet known; however, generators and recyclers should continue to track emerging federal and state requirements. Many other states are evaluating formal programs and legislation or have begun to sponsor voluntary collection and recycling events. Whether your state has a formal program or not, protocols for electronic waste handling should be developed to maximize compliance and recycling benefits and reduce risks and liabilities.

REFERENCES

www.epa.gov/ecycling
 www.ciwmb.ca.gov/electronics
 www.maine.gov/dep/rwm/ewaste
 www.mde.state.md.us/eCycling
 www.pca.state.mn.us/oea/stewardship/electronics-law.cfm
 www.deq.state.or.us/lq/electronics.htm
 www.ecy.wa.gov/programs/swfa/ewaste
 www.ecyclingresource.org

¹ <http://www.epa.gov/epaoswer/hazwaste/recycle/ecycling/rules.htm>

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