

Healthier Choices for Electronic Equipment: From Procurement to End-of-Life

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Technological advances in all electronic equipment, particularly computers, continually shorten their useful life, resulting in a complex and rapidly growing waste stream. Computers, televisions, lab analyzers, EKG monitors and other types of biomedical equipment contain many hazardous constituents — from lead in cathode ray tube (CRT) monitors, chlorinated plastics in cable wiring, brominated flame retardants in circuit boards to mercury in LCD displays. CRTs alone contribute almost one third of the lead found in the municipal waste stream. Improper management or disposal of electronic equipment poses a significant threat to public health and the environment.

Healthcare facilities need to manage their electronic equipment in a way that controls costs, protects data and complies with federal, state and local regulations. Compliance with the Health Insurance Portability and Accountability Act (HIPAA) which mandates that end-of-life* data security and privacy requirements are met adds complexity to end-of-life management for health care facilities. CRTs contain as much as 8 pounds of lead and are known to fail the RCRA Toxicity Characteristic Leaching Procedure (TCLP). They MUST be managed as a hazardous waste — they may NOT be managed as municipal solid waste. Failure to comply with hazardous waste regulations by improperly disposing of electronic equipment in municipal landfills or incinerators can result in potentially serious violations.

By 2004, computers could add as much as 4 billion pounds of plastic, 1 billion pounds of lead, 2 million pounds of cadmium and 400,000 pounds of mercury to the solid waste stream. It is estimated that, by 2007, there will be more than 680 million computers that will require proper end-of-life

management. Currently, 95 percent of discarded computers end up in the solid waste stream, headed for disposal in landfills or incinerators. This is not an option for healthcare.

What questions should you be asking electronics recyclers to ensure that you are going “beyond compliance” to implement an environmentally responsible approach? What options are available at the point of purchase that will make end-of-life management easier and more cost effective? Hospitals for a Healthy Environment (H2E) recommends the following 10-step guide to help you develop and implement a comprehensive electronics management program — one that combines existing end-of-life management considerations with improved procurement practices — resulting in environmental and health improvements.

Step 1: Procure Environmentally Preferable Electronic Equipment with Manufacturer Take-back Requirements

Purchasing decisions provide an opportunity to select electronic products that are both cleaner and safer from design through end-of-life. Exercise your procurement power and choose environmentally preferable electronic products.

Look for manufacturers that have demonstrated product improvement on key environmental and health attributes related to both the product and the manufacturing facility including, but not limited to:

- Reduction of toxic constituents, particularly lead, cadmium, mercury, polyvinyl chloride and brominated flame retardants

*End-of-life management refers to disposal options that include recycling and reuse.

- Manufacturer lease and take-back options
- Durability
- Repairability
- Expandability and upgradeability
- Made from recycled content materials or renewable resources
- Recyclability
- Energy efficiency
- Clean manufacturing practices

Environmental labels or eco-labels are an efficient way to quickly evaluate which products are environmentally preferable. The TCO Swedish eco-label is recognized worldwide for its sound criteria. Some, although not many, products sold in the US display the TCO label. Include the TCO criteria in your manufacturer bid specifications or ask your vendor to supply you with a list of available TCO certified products or products certified by other widely accepted eco-labels.

Give preference to environmentally friendly electronic products by using your procurement power to leverage manufacturer take-back. Leasing or purchasing agreements with manufacturer or vendor take-back provisions relieve you of the responsibility to manage expensive end-of-life electronic equipment and extends the useful life of the materials. According to E-Scrap News, over the past three years the average bid price to handle mixed computer scrap has risen more than 40 percent, from 16.0 cents per pound in 2001 to 23.1 cents per pound in 2003. Potentially higher upfront costs can be justified when the total cost of ownership – buying, use and end-of-life disposition – is considered.

Manufacturer take-back programs provide a strong incentive for environmentally preferable design changes that encourage easy disassembly, in turn making it easier to recover materials for reuse in new products, minimizing the quantity and toxicity of materials used, improving the ease of which equipment can be

upgraded and creating an effective market-based recycling infrastructure. New laws in Europe and Asia are requiring electronics manufacturers to provide free and convenient take-back of their products at the end of their useful lives. These laws are starting to be introduced in the U. S.

Be sure to ask for details about take-back programs to ensure that your equipment will be reused, refurbished and/or recycled in an environmentally responsible manner. You will want to build specifications into the take-back provisions that require proof of reuse or responsible recycling, using the questions outlined in Step 5 as your guide.

Tools

- **Environmentally Preferable Procurement Guidelines for Information Technology (IT) Equipment in Health Care** - This set of simple fact sheets, produced by Health Care Without Harm and the Computer TakeBack Campaign, provides the first steps purchasers can take towards procuring environmentally safe electronic equipment. In this set of fact sheets is the Procurement Matrix for Original Equipment Manufacturers and Vendors which is a checklist to ask for products and practices that are protective of public health and the environment.
<http://www.hcwh.org/goinggreen>
- **A Guide to Environmentally Preferable Computer Purchasing** - This guide, produced by the Northwest Product Stewardship Council, summarizes various environmental labels to help buyers determine if computer equipment is environmentally friendly and to help them include environmentally preferable attributes as part of their purchasing criteria.
<http://www.productstewardship.net/productsElectronicsEPPGuide.html>
- **Green Design Index** - The Silicon Valley Toxics Coalition's web site provides a list of specification comparisons that different eco-

labels require of their environmentally certified computer products, a list of TCO labeled and toxic constituent-free equipment, and a report card that compares and measures the environmental qualities of electronic equipment and the environmental performance of companies.

<http://www.svtc.org/cleancc/greendesign/>

- **Bid Specification Resources** - The Center for a New American Dream has compiled a comprehensive list of bid specification resources available.
<http://www.newdream.org/procure/products/computers.html>
- **Leasing: A Step Toward Producer Responsibility** - This report explores the ways in which leasing and servicing (selling the function of a product rather than the product itself) can affect product ownership, management at end of life, and product design for a variety of companies and products.
<http://www.informinc.org/leasingepr.php>
- **EPA's e-Cycling Program** - This website provides links to companies that offer leasing, take-back, asset recovery and trade-in programs. <http://www.epa.gov/reg3wcmd/eCyclingtrade.htm>

Step 2: Understand the Universal Waste Rule

Cathode ray tubes (CRTs) fail EPA's RCRA toxicity characteristic test. They are, therefore, subject to the hazardous waste regulations of RCRA Subtitle C unless they are generated by a conditionally exempt small quantity generator. EPA is currently proposing to streamline the RCRA management requirements for used CRTs and glass removed from CRTs that are sent for recycling by qualifying them as "Universal Waste." As such, they may be shipped without meeting all of the hazardous waste requirements. EPA is also clarifying the status of used CRTs sent for reuse. Currently, four states have banned CRTs from landfills

(California, Maine, Massachusetts and Minnesota) and others are likely to follow.

Tools

- For more information on the Universal Waste Rule, go to <http://www.epa.gov/epaoswer/hazwaste/id/univwast.htm>

Step 3: Comply with The Health Information Portability and Accountability Act (HIPAA)

HIPAA obligates health care facilities to assess the potential for patient information disclosures and develop and implement policies that will provide a reasonable level of safeguards.

To avoid potential liabilities and penalties from patient and employee data being disclosed during end-of-life management of electronic equipment, hospitals must set up a process, internally or with a recycler or independent contractor, for permanently deleting and making patient information inaccessible from hard drives, floppy disks and compact disks. Deleting information from the hard drive does not ensure total data erasure.

You can maximize the safety of your data by:

- Having a written policy and process to ensure patient and employee information stored in an electronic format is either destroyed before the device is reused or the potential for data security breaches during end-of-life management is eliminated.
- Documenting the physical security of the machine, from the time that it becomes idle to the time that the hard drive is erased. If you are using a vendor to destroy data off-site, ensure that there are measures in place to track and control the machine during storage, shipping,

receiving and processing and until data erasure is complete.

- Auditing your data erasure process to ensure that the data erasure software applications you are using are not flawed and can perform data destruction in a wide variety of circumstances, including multiple hard drives per machine, erasure of hidden sectors, and more. There are no industry-wide standards for data erasure programs, and the wide range of equipment makes the data erasure process complex. Always thoroughly test the erasure systems for effectiveness before investing in them.
- Seeking documentation from your vendor detailing successful data erasure.
- Controlling the transportation of electronics so as not to allow unauthorized access during end-of-life management.

Tools

- Disk Sanitization web page from HIPAA Advisory from Phoenix Health Systems. Includes the Department of Defense guidelines and white papers on electronic data destruction methods. <http://www.hipaadvisory.com/tech/disksan.htm>

Step 4: Assess Options for End-of-Life Electronics

Reduce your electronics discards by maintaining and keeping your equipment as long as possible. This is the most environmentally sound option, since manufacturing a 55-pound computer generates 139 pounds of waste, including 49 pounds of hazardous materials. A typical computer's lifespan is only 2-3 years, but it can be extended by 1-2 years with some upgrading. A good monitor can last 6-7 years or more and can be used with your next system.

Reuse, within your organization or

through a charitable donation program, is an environmentally preferable option. Extending the life of electronic products minimizes the pollution and resource consumption associated with making new equipment. It is important, however, to track the destination of your equipment by serial number and to ensure that the new owner, when done with your equipment, is committed to ultimately utilizing a recycling vendor with environmentally sound recycling practices. Organizations that take back the equipment that they either sell or donate facilitate this type of accountability.

Do not donate non-working equipment or pieces of equipment that are part of a larger system, unless you have checked with the reuse organization to ensure that they can accept and refurbish non-working equipment. The age of the equipment, the processor speed, and hardware and software compatibility may limit your opportunities for reuse.

Charitable organizations can provide documentation of your donation, so that it may be applied toward your federal income tax return. Hospitals may be able to take advantage of the 21st Century Classrooms Act for Private Technology Investment. Under this legislation, corporations can deduct the full purchase price of computers if the equipment is no more than two years old. Hospitals may also utilize annual depreciation deductions; in essence, receiving double tax benefits.

Recycle. If electronic equipment is too old to be reused or is broken beyond repair, it can be disassembled to salvage parts and sell reclaimed materials. Many types of electronic equipment, such as computers, monitors, printers and scanners, contain materials suitable for reclamation and use in new products. These materials include plastic, glass, steel, aluminum, copper, gold, silver, and other metals. Since electronics recycling operations typically require a mix of automated processing and

manual labor, both of which have costs, there will probably be a charge associated with recycling your electronic equipment. Keep in mind, however, that you may be able to negotiate a free or reduced charge for this service when you are purchasing new equipment.

Step 5: Select an Electronics Recycler and/or Reuse Organization

Not all organizations are equally equipped to meet your needs or to protect human health and the environment. Once you have identified potential recyclers and/or reuse organizations, ask them the following questions to make your selection:

- What type of electronic equipment does the recycler accept?
- Where will the equipment be processed and materials be recycled?
- How will the electronic equipment be processed? What equipment is used? Is the recycler or reuse organization in compliance with OSHA requirements for worker safety?
- What materials (e.g., glass, plastics, metals, etc.) result from processing? Which will be recycled and which managed as solid waste?
- What are the end markets for each of the materials that are recycled?
- What is the recycler's CRT glass recycling rate? See Step 6 for more information on how to calculate this rate.
- Does the recycler or reuse organization have a zero landfill goal?
- Is there a reuse or remanufacturing component?
- Does the recycler export or broker for export electronic equipment that is either not working or that cannot be certified as repairable?

- Will the recycler or reuse organization provide you with a list by serial number of the ultimate disposition of your equipment?
- Does the recycler or the reuse organization allow third party audits of their facilities?
- Will the recycler or reuse organization provide you with a Certificate of Recycling?
- Does the recycler offer data security and Certificates of Data Destruction in accordance with HIPAA?
- Does the recycler or reuse organization have the necessary permits and site identification numbers—federal, state and local?
- Are there any federal, state or local enforcement actions against the vendor?
- Are the workers being paid fairly?
- Can the recycler or reuse organization provide references?
- What are the transportation arrangements?
- What is the estimated cost for the services to be provided by the recycler or reuse organization?
- If donated, does the organization provide you with documentation of your donation, so that you may apply it toward your federal tax return?

Tools

- The **Electronics Recycler's Pledge of True Stewardship**, originally signed by 15 electronics recycling firms representing 22 facilities throughout North America, contains the most rigorous environmental and social criteria for dismantling and recycling of electronic wastes. The text of the pledge and the up-to-date list of recyclers that have signed it can be found at: http://www.svtc.org/cleancc/recycle/pledge_signers.htm
- The **International Association of Electronics Recyclers (IAER)**, the trade association for the electronics recycling industry, maintains a

comprehensive quality-controlled database of organizations that are involved in electronics recycling. <http://www.iaer.org/search/>

- The **Share the Technology** website provides a way for donors and potential recipients to connect no matter where they are in the country. <http://www.sharetechnology.org>

Step 6: Give Preference to Vendors that Recycle Electronic Products Domestically

Export of electronic equipment is a common practice. Fifty to eighty percent of the electronic equipment collected for recycling is being exported to Asian countries with limited infrastructure to accommodate the hazardous properties of electronic waste. Workers, including children, are often directly exposed to lead and other hazardous materials when dismantling electronic equipment.

Preferably, select a domestic electronic recycler that has signed the Electronics Recycler's Pledge of True Stewardship agreeing to uphold a set of both social and environmental criteria. If it is not feasible to use one of these firms, make sure that only electronic equipment in working condition or that can be certified repairable is exported. This increases the likelihood that the equipment is being reused or repaired appropriately and not being shipped under the guise of being repairable when in fact it is not.

You can calculate the CRT glass recycling rate to determine if a recycler is exporting your equipment rather than recycling it. Take the pounds of processed CRT glass that the recycler sent to glass smelters in any given year and divide it by the pounds of all electronics accepted for recycling in the same year. If the CRT glass recycling rate is below 5%, you can be sure that the recycler is an exporter and not a recycler.

Export of non-working hazardous electronic waste must be done in accordance with the Basel Convention and other relevant international laws and agreements (go to <http://www.basel.int/> and search on "OECD" [Organization for Economic Cooperation Decisions] for a list of documents related to export of hazardous waste). If your electronic waste is being exported, it is important to confirm that the exporter can meet, among other things, notice and consent procedures designed to inform importing countries about the hazardous nature of the waste.

Exported electronic equipment must be wrapped to ensure against breakage and individually manifested by make, model, year and condition. You should also perform a due diligence audit by contacting the export markets that a prospective vendor uses. It is important to ask your vendor every few months about export business practices, because they can change and vendors are unlikely to inform you of a change in their management strategy. You may wish to establish a regular reporting period so that export practice verification becomes an automated process.

Step 7: Establish a Process for Internally Managing End-of-Life Electronics

- Designate an area within your facility to store discarded electronics.
- Make sure employees know whom to call when they are ready to discard electronic equipment.
- It is essential that you clearly understand what the vendor expects of you in terms of sorting, packing, and labeling your end-of-life electronics. Gaylords and pallets with stretch film are the most common packing techniques. When using pallets and stretch film, the first step is to stack the materials – generally no more than chest height – being sure to balance them carefully. Beware that

equipment can shift when it is being lifted onto the truck, so be sure to wrap the pallets very tightly.

Step 8: Keep Records

- Requiring, and receiving, a Certificate of Recycling can help to promote the credibility of your program, provide a degree of quality assurance from the vendor, and provide a comfort level about long-term legal liability of your discarded electronic equipment.
- The best way to establish and gauge success of your electronics reuse and recycling program is to keep track of the number and weight of the pallets or gaylords you transport for recycling and/or reuse as well as the costs.

Tools

There is a sample Certificate of Recycling at: http://www.nerc.org/adobe/survey/UsedElecRecySurvey_section4b.pdf.

H2E has a data collection template to help you collect comprehensive waste data on a monthly basis at: <http://www.h2e-online.org/pubs/wastemgttemplate.xls>.

Step 9: Educate Employees

Inform your employees about the environmental footprint of electronic equipment and your decision to purchase or lease environmentally preferable electronic equipment, to reduce your discards, and to reuse and/or recycle all discarded equipment. This effort is key to your success.

Step 10: Questions? Problems? Use the Resources Available to You

- Contact H2E: h2e@h2e-online.org, 1-800-727-4179.
- Use the H2E website, www.h2e-online.org to obtain additional resources.

- Use the H2E listserv to find out what other H2E Partners are doing to recycle their end-of-life electronic equipment.
- Ask your recycling vendor or reuse organization.
- Ask local, state and federal environmental officials.



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