RESPONSIBLE PURCHASING GUIDE

Office Electronics

Copiers, Fax Machines, Printers, Multi-Function Devices, Mailing Machines, and Power Adapters

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RPN
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About this Guide

The Responsible Purchasing Guide for Computers is published by the Responsible Purchasing Network in print, as a PDF file, and on the web. Print and PDF copies are available to the public for purchase. The online edition includes additional resources available only to members of the Responsible Purchasing Network, including searchable product listings, multiple policy and specification samples, comparisons of standards, and related documents. Visit www.ResponsiblePurchasing.org to purchase a copy or to access the members-only web-based edition of the Guide.

About the Responsible Purchasing Network

The Responsible Purchasing Network (RPN) was founded in 2005 as the first national network of procurement-related professionals dedicated to socially and environmentally responsible purchasing. RPN is a program of the Center for a New American Dream (www.newdream.org) and guided by a volunteer Steering Committee of leading procurement stakeholders from government, industry, educational institutions, standards setting organizations, and non-profit advocacy organizations.

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Overview

Creating and exchanging documents is a function shared by all businesses, government agencies, and other organizations of all sizes and geographic locations. Document technologies have changed, but office electronics (printers, copiers, fax machines, scanners, multi-function devices, mailing machines, power adapters and others) will continue to be a significant part of any office for the foreseeable future.

Over the past decade, there have been significant shifts in the practices and technologies used by organizations to create and exchange documents:

- The costs of printing and document management are staggering. These costs account for up to 10% of an organization's annual revenues (Hawkins, 2007) even though, according to some industry estimates, office paper use nationwide has been on a slight decline in recent years (Ringquist, 2006). Some organizations still project increases in office paper use. For example, the Federal Government expects continued growth in paper consumption through 2020 (The Federal Network for Sustainability, 2007).

- Document imaging technologies are changing. Analog copying has been replaced by digital technology, which produces not only higher-quality prints but also enables copiers to be connected to computer networks and serve as printers, scanners, fax machines, and even e-mail stations. With the rise of these multi-function devices (MFDs), the boundary between copying and printing equipment is rapidly disappearing.

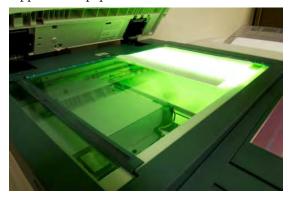- Document printing practices are changing. The wide availability of electronic communication and document exchange has shifted the practices of document production from "print and distribute" (where the author produces and distributes hard copies of documents) to "distribute and print" (where the author distributes digital documents by e-mail or the web and readers print them). Thus, the costs and environmental impacts of printing are being shifted from the author to the reader.

These changes bring new financial and environmental challenges, but also offer new opportunities to address their impacts. This *Purchasing Guide* describes the components of a successful responsible office electronics procurement program, including copiers, fax machines, printers, scanners, multi-function devices (MFDs), mailing machines, and power adapters. Computers and monitors are covered in the companion *Responsible Purchasing Guide for Computers*. Below we provide an overview of each section of the *Guide*.

Social and Environmental Issues
The social and environmental issues section of this *Guide* addresses the impacts of imaging equipment on energy consumption, use of hazardous substances, indoor air quality, and end-of-life management. There are impacts associated with manufacturing, using, and disposing of equipment, and also impacts from the related consumables (i.e., toner, cartridges, drums, etc.) and paper used with the equipment.

Thus, the overarching procurement goal is to reduce the environmental and social impact of the entire printing operation, including equipment, supplies, and paper.

As described in this *Guide*, responsible office electronics have the following characteristics:

- Matches an organization's document management and production needs;
- Is energy efficient and contains other environmentally preferable design features;
- Enables organizations to reduce waste associated with supplies and paper; and
- Comes with options for responsible end-of-life management.

Best Practices
The best practices section of this *Guide* offers a selection of practices for developing, implementing, and monitoring a successful responsible office equipment purchasing program. These practices can be grouped as follows: establish a balanced stakeholder team; conduct a baseline assessment of office equipment and its impacts; explore product and maintenance options; set goals; adopt policies to help guide those goals; review purchasing standards and specifications; and improve staff practices.

Cost, Quality, and Supply
The cost, quality, and supply section of this *Guide* demonstrates how responsible office equipment is widely available and generally comparable to conventional models. Overall, equipment represents a small part of the cost of an organization's printing operation, with consumables, paper, maintenance, and energy costs accounting for the majority of the cost. Thus, even though some environmental features, such as duplex units and ENERGY STAR power management functions, may increase equipment purchase price slightly, these costs are quickly recouped in paper and energy savings.

Policies
Formally adopting a strong policy stating social and environmental principles helps establish a framework for implementing a successful program. The policies section of this *Guide* provides model policies that outline the importance of buying environmentally preferable office equipment, identify desired human health and environmental product attributes, and mandate their preferential purchase. Leading institutions, such as the States of Arizona and Delaware, the City of Berkeley, Alameda County, and Villanova University, have policies mandating responsible office equipment procurement.

Specifications
The specifications section of this *Guide* provides sample contract language for responsible office equipment procurement. At a minimum, contract specifications should address these considerations for product performance and vendor practices: energy consumption, hazardous substances, indoor air quality, end-of-life management, paper use, and remanufactured toner and inkjet cartridges.

Standards
The standards section of this *Guide* discusses and compares leading certifications and registration programs for office equipment. As recommended, buyers should stipulate that office equipment meets credible environmental standards, including: ENERGY STAR, EcoLogo, and GREENGUARD.

Products
There are over 1,000 ENERGY STAR qualified copiers, printers, fax machines, scanners, multi-function devices (MFDs), mailing machines, digital duplicators and power adapters. EcoLogo also has registered products. A searchable list is available on www.ResponsiblePurchasing.org.

♻ Social and Environmental Issues

Office electronics have a range of social and environmental impacts, including: energy use, hazardous substances, waste, and air quality. By choosing more environmentally preferable equipment, institutions can decrease the energy use of imaging equipment by up to 60%, reduce pollution and risks to human health, minimize waste, and improve indoor air quality.

Energy

According to the U.S. Energy Information Administration, electronic equipment is responsible for up to 26% of energy use in a typical office building (The Cadmus Group, 2007). Using equipment with ENERGY STAR power management features is an easy way to reduce energy consumption. ENERGY STAR-labeled equipment enters an energy-saving "sleep" mode after a defined period of inactivity, maintaining functionality on low power when not in full use. Time spent in low-power mode helps equipment run cooler and last longer, saving on air conditioning and maintenance costs. In certain products, ENERGY STAR registered equipment uses 90% less electricity than conventional models.

Unplugging electronic equipment at the end of each day eliminates standby or "vampire" electricity use. The US Department of Energy estimates that five to 10 percent of electricity used in this country is used for standby power, adding up to as much as $10 billion per year in extra energy costs. A more convenient way to avoid these extra costs is to turn off power strips—although the power strips themselves can use a small amount of electricity, even when turned off. Power strips exist that automatically shut down on a set schedule, avoiding the need to manually shut them down each day.

Hazardous Substances

Office electronics contain hazardous substances, including cadmium, lead, mercury, and brominated flame retardants such as polybrominated biphenyls (PBBs) and diphenyl ethers (PBDEs). These hazardous substances pose human health risks if not disposed of properly. Unfortunately, much discarded electronic equipment ends up in the municipal waste stream, potentially leaching into air, water, and soil. For example, 40% of lead and 70% of heavy metals found in landfills, including mercury and cadmium, originates from discarded computers and other electronic equipment (SVTC, 2004). Minimizing or eliminating hazardous substances from such equipment helps reduce the environmental and health effects associated with these devices.

Air Quality

Emissions from electronic equipment, particularly printers and copiers, can contribute to indoor air pollution. In poorly ventilated areas with high concentrations of such equipment (e.g. designated copy rooms in offices), levels of ozone may be elevated, causing decreased lung function, asthma, throat irritation, coughing, and other respiratory ailments. Volatile organic compounds (VOCs), particulate emissions resulting from dust, paper debris, and residue from toners and inks may also be present and aggravate the respiratory system. Indoor air quality is most important to consider when purchasing high-output equipment for production facilities. Specifying imaging equipment that reduces potentially harmful emissions can significantly improve the health of building occupants.

See AQS, 2008 in the Endnotes section of this Guide for a detailed report on indoor air quality impacts of office equipment.

End-of-Life Management

Electronic waste is an increasing portion of the solid waste stream, currently comprising one-to-four percent of U.S. municipal solid waste. The volume of electronic waste is expected to increase by three to five percent annually — nearly three times faster than the overall municipal waste stream (SVTC, 2004). However, electronic equipment has components that can be remanufactured or recycled at the end of their useful lifecycle, conserving resources and eliminating unnecessary waste from landfills. In fact, many manufacturers have asset management programs that allow them to remanufacture equipment as well as reuse some equipment components.

Purchasers can address end-of-life management by including the following considerations in their procurement contracts:

▸ Design for the environment provisions, including use of recycled and bio-based plastics in equipment housing, increased product longevity and upgradability, and design for easy disassembly and recycling.

▸ A take-back provision, which would require the manufacturer to accept equipment at the end of its useful life for reuse, recycling, or disposal.

▸ Contracting with responsible recyclers to ensure that as much recyclable material as possible gets reused and the workers extracting the materials are fairly treated.

Waste from Imaging Supplies

Imaging supplies (or consumables) represent a significant cost and as well as a waste stream in an office building. All printing technologies produce waste, but some produce more than others:

▸ Inkjet printer technology creates the greatest volume of waste. It often takes up to 30 inkjet cartridges to produce the same output as a single laser printer cartridge (Cornelius, 2007). The amount of waste increases for color output using multi-color cartridges, since they require replacement when only one color runs out. While sending cartridges to be remanufactured is an option that reduces the environmental impact of inkjets, this option is rarely available for cartridges that do not include print heads. Manufacturers of inkjet consumables as well as other parties may offer additional recycling programs for empty cartridges in particular areas.

▸ All-in-one (AIO) cartridges, typically used in laser printers, are less wasteful, but they do contain significant amounts of valuable materials. A typical toner cartridge contains: 40% plastic; 40% metal; and 20% rubber, paper, foam, and toner. About 97% of cartridge components can be reused and recycled (ACWMA, 2004). Remanufacturing options for all-in-one toner cartridges are widely available. Most, if not all, cartridge manufacturers also offer free return programs for these products.

▸ Traditional copier technology (so called component-based systems, in which the toner container is sold separately from the drum) reduces consumables waste upfront. While the toner containers offer similar print yields as laser toner cartridges, the drums in these systems are more durable and do not

have to be replaced as often. Although toner containers are typically made from recyclable plastics, many office buildings lack recycling programs for plastics. In order to minimize the environmental impact of consumables waste from component-based systems, purchasers should seek suppliers or third parties that provide toner container and drum recycling options.

▸ Solid ink printers and MFDs use ink that comes in solid blocks and melt it to produce liquid ink before applying it on paper. Since the ink comes in solid blocks, there is no need for an ink container or cartridge, which eliminates most of the consumables waste.

Paper Usage
A typical business office generates about 1.5 pounds of waste paper per employee each day. Financial businesses generate more than two pounds per employee daily (PA, 2006). Paper production is extremely water intensive and requires many chemicals that can end up in waterways and harm wildlife. Using paper with high levels of recycled content ensures that less virgin pulp is used—the quality of recycled content paper has improved dramatically in recent years, and plenty of manufacturers offer paper with recycled content. Federal government offices will be required to use paper with a minimum of 30% post-consumer recycled content under the October 5, 2009 Executive Order signed by President Obama, and many jurisdictions have paper contracts for 100% post-consumer recycled content.

Choosing paper that is processed chlorine-free ensures that less harmful chemicals were involved in the manufacturing processes. Looking for forestry management labels ensures that any virgin pulp comes from sustainably managed, non-old growth forests. For more information on paper, refer to the RPN Paper Standards Comparison Chart by visiting www.ResponsiblePurchasing.org.

Within offices, recycling used paper keeps raw material from entering the waste stream. Purchasing responsible electronic equipment and changing staff practices can help reduce this waste.

This section highlights best practices for developing, implementing, and monitoring a successful responsible electronic equipment purchasing program. Core practices include: form a balanced stakeholder team; measure baseline inventory and impacts; choose the best equipment mix; decide on the acquisition method; set goals; adopt a policy; evaluate standards and specifications; improve practices; and measure progress.

Form a Team

The first step is to assemble a balanced range of stakeholders to work on the issue, including: procurement staff involved in ordering equipment, supplies, and paper; information technology staff; management; end users; environmental consultants and/or advocates; and other interested staff as appropriate. Together, the team should decide on and implement plans regarding the procurement and use of electronic equipment, including a plan for measuring and reporting results.

Baseline Data

Gather baseline data on inventory, consumption, cost, and human and environmental impacts related to electronics procurement. Data should include:

- Imaging equipment currently in use
- Number of prints and copies produced by each piece of equipment
- True cost and environmental impact of each piece of equipment, measured in terms of:
  - Equipment cost or lease rate
  - Cost of consumables
  - Cost of maintenance
  - Cost of paper
  - Cost of energy (if possible)
- Disposal options for existing equipment and associated costs and environmental impacts
- Plans for purchasing printers, copiers, fax machines, scanners, MFDs, mailing machines, and power adapters.

The information above can be collected by looking at printer and copier counters and purchasing records. Print management software is also available to help compile data and answer questions such as:

- Which software applications are responsible for the highest printing volume?
- What is the average document size sent to each printing device?
- Which workstations are the heaviest users of which printing devices?

Some suppliers may provide baseline assessment services, though these supplier assessments may not be entirely impartial in interpreting the results.

Once the equipment usage data are collected, compare them to the output capacity of the equipment and determine if the current machines are being used to their fullest capacity, or if there are opportunities to consolidate and reduce the amount of equipment in operation. Eliminating redundant machines at the outset can be a quick way of reducing overall impacts and costs. Record baseline data in a way that makes it easy to track changes over time.

Choose the Best Equipment Mix
After examining the baseline, choose the best combination of equipment or service to meet the organization's needs. Key tips for choosing equipment include: eliminate analog machines, reduce inkjet printing, connect copiers to computer networks, limit color, explore multi-function devices, consider remanufactured equipment, and buy remanufactured toner and inkjet cartridges.

▸ Eliminate analog machines. With the current advances, digital machines represent by far the best value. A digital copy costs the same or less than an analog copy, but the quality is higher. Additionally, digital copiers offer a range of paper saving functions, such as being able to print two or more pages of a document on one side of a single sheet.

▸ Reduce inkjet printing. Inkjet printers cost more than printing devices that use toner, in part because of the significant amounts of consumables waste. While inkjet systems are necessary and cost-effective for some applications (e.g. large format printing), organizations should limit the purchase of desktop inkjet printers. Additionally, organizations should work to reduce the volume of documents sent to the inkjets already in use by removing some of those devices and establishing policies for using them to print only small documents.

▸ Connect copiers to computer networks. Most, if not all, digital copiers can be connected to computer networks and used as printers. Networking copiers makes financial sense since fewer dedicated printers will be needed (as well as fewer supplies and less service) and costs-per-copy will be lower. Prints generated by a network copier are cheaper than those produced by a laser printer. Personal printers should be eliminated—having a central print and copy area cuts down on the amount of machines needed.

▸ Limit color. Although color printing is becoming more affordable, the low costs of color may be misleading. Print costs are usually based on page coverage, i.e. the percentage of the page actually covered by ink or toner. Page coverage for color prints is typically higher than for monochrome ones, and the cost of color toner is sometimes 10 times higher than monochrome (Cornelius, 2007). Color printing devices also produce more consumables waste.

▸ Explore multi-function devices (MFDs). Especially for smaller offices with low equipment usage, an MFD—a copier, printer, fax machine, and scanner all-in-one—can be the most economical and environmental option. Buying one machine with multiple functions can result in cost savings of over 150% compared to several single-function machines and also significantly reduces maintenance costs. Another advantage is that many MFDs are upgradeable, allowing purchasers to start with basic functions such as copying and printing and later add faxing and scanning (SoC, 2006).

▸ Consider remanufactured equipment. A secondary market for digital copiers and other higher-cost imaging equipment is emerging. The imaging technology industry has a long tradition of equipment remanufacturing, which helps not only to reduce waste, but also provides purchasers with lower-cost opportunities to purchase quality equipment. Today, remanufactured digital copiers with a reasonable warrantee can be found for a fraction of the cost of a new digital copier, often from the same supplier as new machines.

▸ Buy remanufactured toner and inkjet cartridges. Switching from disposable to remanufactured toner and inkjet cartridges can save resources and money by reusing components rather than disposing of them after one use. Most manufacturers accept spent cartridges, and a take-back provision can easily be included in procurement specifications (CA, 2006b).

Decide on the Acquisition Method

As with many other office functions, document production is associated with significant administrative burdens. Organizations often have separate suppliers for different types of equipment, maintenance, and consumables. Thus, decisions on how to meet the organization's printing and copying needs require balancing environmental considerations with cost and administrative requirements. Consider the following options:

‣ Outright Purchase. This is the most straightforward way to obtain copy or print services. The drawbacks are the need to pay for equipment upfront and deal with end-of-life management. Government organizations may have access to a Tax Exempt Lease Purchase (TELP) acquisition option, which helps to pay equipment costs over time.

‣ Equipment Leasing. Leasing imaging equipment can be an attractive alternative to purchasing, depending on: the organization's needs; the replacement/upgrade schedule for equipment; and the agreement terms with the leasing company. This option allows equipment to be upgraded or replaced when better technology enters the market and puts disposal responsibility in the hands of the contractor. In this circumstance, procurement specifications should require responsible disposal of used equipment by contractors.

‣ Cost-Per-Copy Contracts. In a cost-per-copy contract, an organization purchases copy services rather than copying equipment. The contractor is responsible for providing imaging equipment, consumables, maintenance, training, and more, depending on the terms of the contract. NASA has experienced considerable success with this option, estimating that it will save $4.5 million over their five-year contract. Since the contract combined all of NASA's printing and copying needs into one contract rather than several, it also saved administrative costs and time associated with the contracting process (EPA, 2006a).

A cautionary note on cost-per-copy contracts is necessary. A typical cost-per-copy contract includes a guaranteed minimum copy volume per month. Above that minimum number, suppliers charge for each additional page, sometimes with a ceiling above which copies are more expensive. Anecdotal evidence shows that, in order to avoid extra charges, organizations tend to overestimate their printing and copying volumes when setting guaranteed copy minimums. As a result, some of them pay for copies they never make. In other words, there is a higher cost-per-copy than originally projected. For organizations that have set such "safe" printing minimums, cost-per-copy contracts provide limited or no incentives to reduce printer and copier usage since charges will be the same regardless of a reduction in the number of copies.

Set Goals

Critically examine the baseline data, identify areas for improvement, and set goals for reducing paper use and energy consumption, and lowering costs. Identify specific strategies for meeting those goals: for example, projecting the paper savings from double-sided printing and the electricity savings gained from using ENERGY STAR power management features.

Adopt a Policy

Formalize the organization's commitment to purchasing environmentally preferable electronic equipment and operating and disposing equipment in a responsible manner. This commitment could be a stand-alone policy on imaging equipment procurement or can be folded into an overall responsible purchasing policy. See the **Policies** section of this Guide for model policies from leading institutions.

In addition, maximizing the environmental and financial benefits of responsible purchases may not be possible without additional changes to other, non-environmental policies as described in the **Improve Practices** section below.

Evaluate Standards and Specifications
After determining goals and establishing needs, draft specifications for contract bids. There is no need to start from scratch—evaluate the standards and specifications used by other institutions and included in this *Guide*, which can greatly ease the transition to new products. See the **Specifications** section for sample contract specs from leading institutions and the **Standards** section for details on leading certifications.

Improve Practices
Buying environmentally preferable imaging equipment is an important step, but the actual benefits depend on how that equipment is used. There are significant opportunities to reduce the cost, environmental, and health impacts of printing even without buying new equipment. Some general tips for document management include:

1. Manage as much information as possible electronically
2. Print only what is necessary at the lowest cost and using devices with the lowest environmental and health impacts
3. Store printed documents to be easily found instead of reprinted

Efforts to achieve efficiency in the use of imaging equipment cannot be an afterthought and will often require advance planning, changes in policies, and educating and engaging staff. Below we offer a menu of options for improving efficiency, including: set up equipment features, make duplexing mandatory, make changes to non-environmental policies, examine printing needs and workflows, go beyond hardware, train staff, and reuse one-sided paper.

1. **Set up equipment features.** Since new equipment has been obtained (or a decision was made to use existing equipment in a more responsible way), ensure that basic efficiency features are enabled:
   a. Connect copier to the computer network. Work with the IT department or service provider and the copier vendor to ensure that staff is able to use the copier as a network printer.
   b. Ensure that ENERGY STAR features are enabled on all imaging equipment. Ask vendors to activate ENERGY STAR power management features before delivery and provide user manuals and/or technical support to ensure that these energy-saving benefits are maximized.
   c. Use surge protecting power strips. Turn off equipment from the power strip at the end of the day so they are not drawing electricity when they are not in use. Though there are little data available on commercial buildings, 5% of U.S. residential electricity use, or over $4 billion, is lost to this so-called "standby" power every year (LBNL, n.d.)

2. **Make duplexing mandatory.** The cost and environmental benefits of double-sided printing and copying are obvious. Experience shows that having double-sided printing available as an option is not enough to ensure efficient paper use. It is recommended that the default print and copy modes be switched from single-sided to double-sided. Follow these steps:
   a. Set up the equipment. First, work with the IT department or service provider to set printer drivers for all imaging equipment with duplexing capabilities to use double-sided printing as a default setting. Second, change the default copier settings to double-sided copying as well. "Two-sided to two-sided" copying is an effective default mode as it makes sure that documents that were printed double-sided don't get copied single-sided by mistake.
   b. Train staff. Address the following issues:
      - In some cases, single-sided printing and copying will be necessary. Explain that single-sided output will continue to be available and how to access it.
      - Some pre-printed documents (such as hardcopy letterhead and forms) need to be placed into paper trays differently depending on whether it is set to print on one side or both. Explain that the pre-printed documents will be placed in paper trays to accommodate double-sided printing and add or change instructions on the

equipment concerning how pre-printed documents should be placed in paper trays if they are empty.

3. **Make changes to non-environmental policies.** Work with relevant policy makers to ensure that efforts are supported by official organization-wide policies. In addition to legitimizing the changes in imaging equipment use and purchasing, policies and other communications from upper management are effective staff education. Such additional policies may include the use of mandatory duplexing, turning off equipment for the night and weekend, restrictions on the use of inkjet printers, changes in filing processes, etc.

   One recommended change is the introduction of an official printing policy that could state that documents that are longer than a certain number of pages cannot be printed to personal inkjet printers and that very long documents should be directed to larger component-based machines with low print costs (e.g., copy machines connected to the computer network). It may also be important to evaluate the organization's record keeping policy to determine which documents need to be printed and retained in hardcopy and which ones may only need to be stored electronically.

4. **Examine printing needs and workflows.** Use information from the baseline assessment and from co-workers to identify ways to reduce overall printing volume.
   a. Switch to electronic workflows. Many organizations achieve significant savings by migrating to electronic information exchange, i.e. sending documents over email or posting them on the web (Hawkins, 2007). Utilize internal shared drives to store commonly used documents instead of handing hard copies to each employee.
   b. Reduce the number of printed reference documents. Make employee handbooks and other reference documents available electronically on the computer network, intranet, or internet instead of giving each employee a copy. This will simplify searching the documents and make them easier to update.
   c. Change the way printed documents are used. Circulate reports and forms as opposed to distributing multiple copies. If specific readers need only specific portions of a report, provide them only with the relevant parts.
   d. File paper documents more efficiently. A sizable number of documents are printed out again and again because staff cannot locate the original copy (Garris, 2007). Encourage staff to store documents that they use routinely in a way that is easily accessible to them. Review and improve the organization's filing procedures.

5. **Go beyond hardware.** A wide range of software is available to help organizations improve how information is handled:
   a. Use electronic time sheets, project tracking, and reporting tools. An abundance of software tools are available to enable organizations to collect, aggregate, analyze, and report such information electronically. Electronic tools reduce printing needs, save staff time, and enhance the ability to analyze information.
   b. Explore print routing software. Software tools are available to help enforce printing policies with pop-up messages that gently encourage staff to send documents to appropriate printing devices and/or automatic print job routing based on the organization's policies.
   c. Explore electronic document management systems. A relatively new industry of helping organizations manage information electronically is growing. A wide range of companies currently supply software that can help organizations reduce printing needs, save time accessing necessary information, and enhance compliance with record-retention regulations.

6. **Train and engage staff.** As with any organizational change, success depends on staff participation.

a. <u>Train staff to manage files electronically and to print smartly.</u> Assess staff training needs and provide a "refresher" on topics that may not be so basic for some:
- How to print only specific pages in a document.
- How to select paper size and print orientation.
- How to print only selected areas in spreadsheets.
- How to use the "Print Preview" function.
- How to save e-mails on the hard drive.
- How to use the "find" feature in Word (or other text processor), PDF, and HTML documents.

b. <u>Encourage the use of additional environmentally preferable features.</u>
- Size reduction features available on many copiers, allowing for two pages of a book or periodical to be copied onto one side of one sheet of paper. Similar multiple-page printing options are available on printers and MFDs.
- Security code features, which hold a print job in printer memory until the person who needs the document comes up to the machine and enters a password. This feature helps to reduce the need for individual desk printers in offices that handle sensitive information, as well as reduces the amount of unclaimed paper jobs often left on printer beds.
- Scanning and storing documents electronically or emailing them.

c. <u>Decide whether to talk about remanufactured supplies.</u> Most staff do not need to know whether remanufactured or new supplies are being used as long as the supplies perform well. If necessary, pilot remanufactured supplies on one or two machines to get comfortable with product performance and work with staff who print to those machines to identify any issues.

7. **Reuse one-sided paper.** Many organizations are effective in collecting and reusing paper with printing on one side. They place trays to collect such paper near printers and copy machines and encourage staff to separate one-sided sheets for reuse. The collected paper can be used in special "draft" printers, in fax machines, or for other purposes.

Measure Progress
Monitor the program's success with regularly scheduled assessments. Note whether predetermined benchmarks have been reached. Communicate successes and failures to appropriate stakeholders. Reward or recognize those responsible for successes and, if necessary, identify and address obstacles limiting the program's success.

Related Documents:

Guidelines for the Procurement, Use and End-of-Life Management of Electronic Equipment, State of California, 2003
This guidance document contains useful information on energy efficiency, materials efficiency, and toxics reduction related to imaging equipment.

Environmentally preferable electronic equipment is comparable in cost, quality, and supply to models without such features. In many instances, duplex (i.e. 2-sided) printing and ENERGY STAR power management functions come standard. Even if a cheaper model without such features is available, environmentally preferable functions pay for themselves through savings on staff time, maintenance, energy, consumables, and paper.

Cost

Environmentally preferable electronic equipment generally costs no more than models without environmental attributes. It is even possible to save money by purchasing environmentally preferable imaging equipment. For example, in its 2005 bid, the State of California reduced its costs for new copiers while incorporating many environmental criteria (SoC, 2006).

Duplex units are standard on many printers and copiers, and double-sided printing can reduce office paper needs by up to 40 percent. Washington County, Minnesota – with two printers and 70 employees – saved over 10,000 sheets of paper and $57 in paper costs the first year they implemented duplexing (MSWMCB, 2002a).

Similarly, ENERGY STAR registered equipment is up to 90 percent more efficient than models without energy management controls, thereby decreasing energy costs and prolonging the life of equipment. Remanufactured toner cartridges save purchasers 30 to 60 percent on a per-copy-basis compared to new cartridges (EPA, 2006a). King County, Washington saved $275,000 in 2007 alone, since their purchase of over 3,900 remanufactured cartridges cost approximately one half that of new cartridges (King County, 2008).

Quality

Environmentally preferable imaging equipment performs just as well as other models, although there are a few differences. Duplexing is a more complex method of printing and can take extra processing time and potentially increase the risk of paper jams. To reduce these issues, look for imaging equipment with efficient output speed and make sure equipment is adjusted correctly.

Remanufactured toner cartridges also perform just as well or better than new cartridges. In fact, they may outlast new ones in some instances. Some companies guarantee that their cartridges will not damage machines and will cover repair costs in the event a faulty cartridge damages equipment. Purchasers should be

wary of companies that restrict product warranties if users do not use the original equipment manufacturer's cartridges. Avoid this by including bid specifications prohibiting such exclusions (CA, 2006b).

Supply

Purchasers such as the State of California; King County, Washington; and the Commonwealth of Massachusetts, have procured electronic equipment meeting some or all of the environmental concerns addressed in this *Guide*. Many environmental features are widely available and easy to identify. Duplexing units, for example, are standard on high-speed printers and copiers, and many local computer and office supply stores stock remanufactured toner cartridges (CA, 2006a; CA, 2006b). ENERGY STAR-registered imaging equipment is widely available—as of June 25, 2007, there over 1,000 ENERGY STAR qualified printers, copiers, faxes, scanners, MFDs, mailing machines, and power adapters, including models from manufacturers such as Canon, Dell, HP, Ricoh, Sharp, and Xerox. There are currently products registered with EcoLogo as well.

Many responsible purchasing efforts start with policies. Policies for purchasing printers, copiers, fax machines, scanners, and MFDs typically outline the importance of buying environmentally preferable imaging equipment, identifying desired human health and environmental product attributes, and requiring the procurement of ENERGY STAR qualified products.

Model Policy

Alameda County, CA, Environmentally Preferable Purchasing Model Policy, 2006
This overarching yet succinct policy covers a full range of products including imaging equipment, with specifications for remanufactured toner cartridges (paragraph 3.1.2), producer equipment take-back (3.1.9), equipment compatibility with recycled paper and cartridges (3.2.2), and equipment energy efficiency (3.3.4).

More Sample Policies

Federal

The White House, Executive Order 13514, 2009
Federal Leadership in Environmental, Energy, and Economic Performance requires that federal agencies prioritize "employing environmentally sound practices with respect to the agency's disposition of all agency excess or surplus electronic products; ensuring the procurement of Energy Star and FEMP designated electronic equipment" (p. 5). Also requires agencies to give preference to EPEAT-registered electronic products.

State

Arizona, ENERGY STAR Policy, 2008
Requires State agencies to procure ENERGY STAR-qualified imaging equipment in contracts under $50,000. For procurements above $50,000, products must be ENERGY STAR-qualified unless a life cycle cost analysis justifies a non-ENERGY STAR product.

California Environmental Protection Agency, Green Purchasing Policy, 2004
This broad policy contains a section devoted to electronic office equipment. In addition to requiring that new equipment meets or exceeds ENERGY STAR efficiency levels, this policy gives preference to equipment with low levels of toxic materials and packaging. In addition, preference is given to equipment designed for easy recycling and reuse, and a staff awards and recognition program is created to encourage efficient imaging equipment usage.

Colorado, Environmentally Preferable Purchasing Policy, 2009
Requires ENERGY STAR as a minimum standard for all energy consuming products, when available. Policy goes beyond purchasing to state that ENERGY STAR features must be enabled upon installation, and remain enabled unless the features conflict with operations and maintenance for office electronic equipment.

Illinois, Senate Bill 2313, Electronic Recycling and Reuse Act, 2008
Requires electronic manufacturers, retailers and the Environmental Protection Agency to participate in the management of obsolete residential electronic products, such as televisions, desktop and notebook computers, computer monitors and printers—the bill also creates standards for electronic recycling and reuse facilities.

[Illinois, Executive Order 11, 2009](#)
Agencies shall take all necessary actions to reduce the consumption of office paper. They shall establish a goal to attain a 10 percent reduction in office paper consumption by July 1, 2010, when compared to paper consumption for fiscal year 2008. By July 1, 2012, agencies shall achieve a 20 percent reduction in office paper consumption from fiscal year 2008 levels. To the extent possible, agencies shall implement energy efficiency practices with respect to the operation and maintenance of all State-owned and State-leased buildings. These practices include turning off office equipment and electronics when they are not in use.

[Indiana, Executive Order 05-21, 2005](#)
This is an updated version of the original "Greening the Government" Executive Order. The original order set guidelines shall be revised for the purchase of computers, fax machines, printers, multi-use machines and other products, as available, which have the ENERGY STAR efficiency label. All ENERGY STAR features will be enabled when the product is installed. Agencies shall use life-cycle cost analysis in making decisions about their investments in all other products.

[Michigan, Executive Directive, 2005](#)
Establish policies and procedures to ensure the energy-saving feature in all ENERGY STAR compliant electronic office equipment is activated, unless enabling the feature will hinder the performance or security of the equipment. New electronic office equipment purchased by state departments or agencies shall be ENERGY STAR compliant to the extent certified equipment is available.

[New Jersey, Electronic Waste Recycling Act, A-3572/SCS, 2008](#)
The new law banned the disposal of televisions, computers, cellphones and other electronic devices from garbage cans and landfills starting January 16, 2008. Manufacturers must participate in a statewide recycling program. In addition to the disposal ban, the state requires electronic producers to pay state registration fees of upwards to $5,000.

County
[Alameda County, CA, Green Purchasing Policy, 2003](#)
This broad green purchasing policy is designed as a model policy for other jurisdictions, including sample language for vendor requirements, reference resources, and definitions. Sections pertaining to imaging equipment include requirements for ENERGY STAR registration, low toxicity, and product take-back.

City
[Berkeley, CA, Environmentally Preferable Purchasing Policy, 2004](#)
General green purchasing policy with requirements for imaging equipment, including ENERGY STAR qualified equipment, the compatibility of equipment with recycled and remanufactured products like paper and toner cartridges, and analysis of short and long-term cost implications of ENERGY STAR versus conventional equipment. Also includes requirements for packaging, end-of-life disposal, and toxic materials reduction.

[San Francisco, CA, Mayor's Directive, 2005](#)
Directive to buy Multi-Functional Devices (MFDs) to replace printers, scanners, copiers and fax machines.

Educational Institution
[University of California System, Policy on Sustainable Practices, 2009](#)
Section VII of this policy requires ENERGY STAR registration for all imaging equipment purchased. Suppliers are required to deliver items with ENERGY STAR features enabled.

Establishing a responsible imaging equipment policy demonstrates a commitment to buying better printers, copiers, scanners, fax machines, scanners, and MFDs. But with or without a policy, environmental attributes must be incorporated into procurement specifications.

State

Commonwealth of Massachusetts, Photocopiers, Printers, Facsimile/Multifunctional Equipment Supplies and Services, 2003
This detailed and comprehensive request for bids contains specifications for copiers, printers, faxes, and toner cartridges with preference for: remanufactured equipment and consumables; energy efficiency; reduced packaging; compatibility with recycled paper; end-of-life management; reduced toxics; emissions control; and environmental plans from bidders. Specs are on these pages: p. 35 for copiers, p. 78 for printers, p. 113 for fax machines, and p. 137 for toner cartridges.

State of Michigan, Master Contract for the Lease of Output Services and Limited Services, 2009
Leasing contract that covers digital copiers, faxes, scanners, printers, and multi-functional office devices (MFD) (individually and collectively, "Equipment") on a cost per image (CPI) basis for all State of Michigan departments and agencies. Contains provisions for: ENERGY STAR and EPEAT Silver or higher where applicable, compatibility with recycled paper, and end-of-life management.

State of Minnesota, Multi-Functional Devices, 2008
State, City, County, Educational Institutions and certain non-profits can purchase from this contract for only ENERGY STAR Rated Multi-Functional Devices. Multiple vendors listed, all must sign a participation agreement. Reporting required to ensure implementation of best practices.

City

New York City, Minimum Standards for Goods, 2007
Mandates that ENERGY STAR and RoHS be included in specifications for office electronics.

Seattle, WA, RFP for Multi-Functional Devices, 2009
Specification calls for Hewlett-Packard Multi-Functional Devices that meet environmental standards from EcoLogo, ENERGY STAR, and future EPEAT criteria when they become available. Documentation of proper end-of-life management practices required from vendors.

⟳ Standards

ENERGY STAR and EcoLogo are the two leading standards for responsible printers, copiers, faxes, scanners, and MFDs. EPEAT will be releasing its standard for imaging equipment and televisions in 2011, at which point it will become another leading environmental standard. GREENGUARD has certification criteria for imaging equipment but currently does not have products certified to this standard.

ENERGY STAR
ENERGY STAR, a partnership between the U.S. Environmental Protection Agency and Department of Energy, rates products based on energy use during operation. Over fifty product categories are included in ENERGY STAR, each with a unique rating methodology based on the amount of energy used for product functions. Imaging equipment covered by ENERGY STAR includes: copiers, printers, fax machines, scanners, MFDs, mailing machines, and power adapters. To date, the standards have focused on low-power and standby power modes. Revised ENERGY STAR criteria for imaging equipment were released in early 2007 and included efficiency requirements for active power modes. This standard uses two different approaches to address the energy consumption of imaging equipment. The Typical Energy Consumption method (TEC) analyzes full duty cycle for standard-sized equipment. The Operational Mode (OM) approach focuses on energy consumption in various low-power modes (i.e., sleep and standby) for products such as ink jets and large format devices. The metric for OM is the typical weekly amount of electricity a product might use in all modes.

The most up-to-date ENERGY STAR criteria for imaging equipment (version 1.1) went into effect July 1, 2009. The changes from the previous version include:

- All machine types are now required to meet a 1 Watt standby requirement
- Minor changes to energy consumption levels for the four TEC categories
- A more challenging sleep requirement for all product categories
- Different power supply efficiency requirements between products with internally and externally powered digital front-ends

Download this standard—ENERGY STAR Program Requirements for Imaging Equipment

EcoLogo
Type I Label
EcoLogo is the Government of Canada's environmental label, managed by the private for-profit company TerraChoice Environmental Marketing. The label is available for copiers, fax machines, printers, mailing machines, and multifunction devices. The comprehensive CCD-35 standard for office equipment contains life-cycle criteria, from manufacture to use and disposal. Hundreds of imaging products are currently certified under this standard. A newly revised version of this standard was released on April 1, 2008. The new Office Equipment standard incorporates ENERGY STAR standards and covers restrictions on hazardous substances, design for extended life, reuse and recycling, and energy and paper savings.

Other Standards and Programs

Electronic Product Environmental Assessment Tool (EPEAT)

EPAT is a system that helps purchasers evaluate, compare, and select electronic products based on their environmental attributes. The system currently covers desktop and laptop computers, thin clients, workstations and computer monitors. Standards for imaging equipment and televisions are being developed and EPEAT-registered products should be available in these categories in 2011.

GREENGUARD

The GREENGUARD Environmental Institute has developed a standard for imaging equipment with low impacts on indoor air quality. The standard sets maximum levels of formaldehyde, styrene, benzene, and ozone that can be released from products. A copy of this standard can be downloaded from this link. As of May 2009, no imaging equipment had been certified to this standard.

Certification by the Standardized Test Methods Committee of the International Imaging Technologies Council

There are many suppliers of remanufactured consumables, and choosing one may be difficult. We recommend that organizations buy only from suppliers that are certified by the Standardized Test Methods Committee (STMC) of the International Imaging Technologies Council (I-ITC), a remanufacturing industry organization. The certification ensures that remanufacturers have effective quality testing protocols for supplies. As part of the certification process, the vendor must demonstrate that they have the necessary test equipment, go through an on-site inspection and staff training, and submit a test report. Certified suppliers are able to affix a special logo with an individual number to their products.

Note that this is a supplier certification, not a product certification; somewhat similar in nature to the ISO 9000 standard. STMC is only beginning to work on color laser and inkjet supplies, and the certification does not currently apply to them.

US Green Building Council (USGBC)

The USGBC's Leadership in Energy and Environmental Design (LEED) program certifies buildings at the Certified, Silver, Gold, and Platinum levels, based on the number of credits earned in a variety of categories. All rating systems require at least two points be earned in the "Optimize Energy Performance" credit in the Energy and Atmosphere category. Simple ways to earn points under this credit include using ENERGY STAR rated equipment, such as imaging equipment, computers, lamps, and HVAC systems.

Climate Counts Campaign

The Climate Counts Campaign rates corporations according to 22 climate-related criteria. Climate Counts uses a scorecard to compare companies based on whether they have 1) Measured their climate "footprint", 2) Reduced their impact on global warming, 3) Supported progressive climate legislation, and 4) Publicly disclosed their climate actions. The point scale is from 0 to 100, with a higher score indicating a better climate profile. Below is the 2008 scorecard for office electronics companies, with their change in score from 2007:

ELECTRONICS		
IBM	77	+7
Canon	74	-3
Toshiba	70	+4
Sony	68	+17
Hewlett-Packard	68	+9
Motorola	66	+6
Hitachi	51	+15
Samsung	51	+18
Siemens*	51	+17
Dell	49	+8
Nokia	37	+8
Apple	11	+9

Products

RPN's online product database includes over one thousand ENERGY STAR and EcoLogo registered copiers, printers, fax machines, scanners, MFDs, mailing machines, and power adapters. Listings are updated regularly, but please check directly with certifying agencies to verify product registration status.

▸ According to the U.S. Energy Information Administration, office equipment is responsible for up to 26 percent of energy use in a typical office building (The Cadmus Group, 2007).

▸ Organizations spend up to 10 percent of their annual revenues on document production (Hawkins, 2007).

▸ Electronic waste currently comprises up to 5 percent of U.S. municipal solid waste and is expected to increase by 3-5 percent annually – nearly three times faster than the overall municipal waste stream (SVTC, 2004).

▸ 40 percent of lead and 70 percent of heavy metals found in landfills, including mercury and cadmium, originates from discarded computers and other office electronics (SVTC, 2004).

▸ According to the U.S. EPA, ENERGY STAR qualified imaging equipment uses 40 percent less electricity than average models (EPA, 2006a).

▸ Buying one machine with multiple functions can save over 150 percent in costs compared to buying several single-function machines (CA, 2006a).

▸ About four million tons of copy paper is consumed annually in the U.S., with the average office worker using about 100 pounds of copy paper per year (Metro, 1999).

▸ Double-sided copying can reduce paper use by up to 40 percent (MSWMCB, 2002a).

▸ Duplexing saved Washington County, Minnesota over 10,000 sheets of paper and $57 in costs in one year, with two printers and 70 employees (MSWMCB, 2002b).

▸ A typical toner cartridge contains: 40 percent plastic; 40 percent metal; and 20 percent rubber, paper, foam, and toner. The plastic takes at least 1,000 years to decompose (ACWMA, 2004).

▸ About 97 percent of toner cartridge components can be reused and recycled (ACWMA, 2004).

▸ Remanufactured toner cartridges save purchasers 30-60 percent on a per copy basis compared to new cartridges (King County, 2008).

▸ King County, Washington, saved $275,000 in one year by purchasing over 3,900 remanufactured cartridges that cost about half the price of new cartridges (King County, 2008).

▸ It often takes up to 30 inkjet cartridges to produce the same output as a single laser printer cartridge (Cornelius, 2007).

▸ Page coverage for color prints is typically higher than for monochrome ones, and the cost of color toner is sometimes 10 times higher than monochrome (Cornelius, 2007).

Calculators

RPN's web-based purchasing guide contains links to ENERGY STAR and EPEAT calculators that purchasers can use to quantify energy savings, waste reduction, and emissions saved.

All-in-one (AIO) cartridge	A cartridge for imaging equipment that contains the toner and drum in one unit.
Automatic duplexing	Capability of an imaging device to automatically place images on both sides of an output sheet, without manual manipulation of output as an intermediate step; for example, one-sided to two-sided copying and two-sided to two-sided copying. A product is considered to have automatic duplexing capability only if the model includes all accessories needed to satisfy the above conditions.
Brominated flame retardants	Hormone disrupting chemicals such as polybrominated diphenyl ethers (PBDEs) that are added to computers and imaging equipment to reduce the risk of fire; see also polybrominated biphenyls (PBBs) and polybrominated diphenyl ethers (PBDEs).
Cadmium	Bioaccumulative, toxic metal used in some electronic equipment.
Consumables	Materials used by imaging equipment such as toner, cartridges, and drums.
Copier	A commercially-available imaging product whose sole function is the production of hard copy duplicates from graphic hard copy originals or from electronic images sent from a network computer. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as copiers or upgradeable digital copiers (UDCs).
Cost-per-copy contract	A contract whereby an organization purchases copy services rather than copying equipment; the contractor is responsible for providing imaging equipment, consumables, maintenance, training, and more, as per contract terms.
Diphenyl ethers (PBDEs)	Persistent and bioaccumulating chemicals used as flame retardants in plastics and polymer resins, see also polybrominated biphenyls (PBBs).
EcoLogo	Multi-attribute environmental certification managed by the Government of Canada.
End-of-life management	Process by which products are disposed of after their term of useful service expires.
ENERGY STAR	Energy efficiency standard managed jointly by the U.S. Environmental Protection Agency and Department of Energy.

Environmentally preferable	Products and services that have a reduced effect on human health and the environment when compared to other products and services that serve the same purpose.
Facsimile machine (fax machine)	A commercially-available imaging product whose primary functions are scanning hard copy originals for electronic transmission to remote units and receiving similar electronic transmissions to produce hard copy output. Electronic transmission is primarily over a public telephone system, but also may be via computer network or the Internet. The product also may be capable of producing hard copy duplicates. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as fax machines.
GREENGUARD	Independent ANSI authorized standards developer focused on indoor air quality.
Hazardous substance	1. Material posing a threat to human health and/or the environment, which can be toxic, corrosive, ignitable, explosive, or chemically reactive, 2. Substance that must be reported to the EPA if released into the environment.
Imaging equipment	Printers, copiers, fax machines, scanners, multi-function devices, and other similar office equipment used for printing images and digitizing hard copy images.
Ink jet (IJ)	A marking technology where images are formed by depositing colorant in small drops directly to the print media in a matrix manner. Color IJ is distinguished from monochrome IJ in that more than one colorant is available in a product at any one time.
Lead	Metal used in some imaging equipment that can damage the nervous system and cause blood and brain disorders.
Mercury	Material used in some electronic equipment that causes short-term and chronic nervous system impairment to exposed individuals.
Mailing Machine	A device used in a letter shop to prepare mailings by inserting package components, applying addresses or address labels, applying postage, and sealing the envelopes.

Multi-function device (MFD)	A commercially-available imaging product, which is a physically-integrated device or a combination of functionally-integrated components that performs two or more of the core functions of copying, printing, scanning, or faxing. The copy functionality as addressed in this definition is considered to be distinct from single sheet convenience copying offered by fax machines. The unit must be capable of being powered from a wall outlet or from a data or network connection. This definition is intended to cover products that are marketed as MFDs or multifunction products (MFPs).
Ozone	1. Ground level pollutant that causes respiratory damage, 2. Component of upper atmosphere that prevents ultraviolet sunlight from reaching the earth's surface.
Particulates	Small particles and liquid droplets that can be inhaled and cause respiratory and heart disease.
Polybrominated biphenyls (PBBs)	A class of flame retardant chemicals added to plastics that can enter the environment but do not degrade quickly or easily, see also diphenyl ethers (PBDEs).
Power Adapter	A power supply for an electronic device. Also called an "AC adapter" or a "charger" if used to recharge a battery, it plugs into the wall and converts AC current to a single DC voltage in most cases.
Printer	A commercially-available imaging product that serves as a hard copy output device, and is capable of receiving information from single-user or networked computers, or other input devices (e.g., digital cameras). The unit must be capable of being powered from a wall outlet or from a data or network connection.
Solid ink (SI)	A marking technology where the ink is solid at room temperature and liquid when heated to the jetting temperature. Transfer to the media can be direct, but is most often made to an intermediate drum or belt and then offset printed to the media.
Take-back	Policy whereby equipment can be returned to a manufacturer, distributor, or recycler at the end of useful life
Toxic substance	A chemical or mixture that may present an unreasonable risk of injury to health or the environment.
Volatile organic compound (VOC)	Organic compound that typically vaporizes at room temperature and participates in atmospheric photochemical reactions.

🔄 Endnotes

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