



*GREEN SEAL*

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WITH SUPPORT FROM THE GLOBAL ENVIRONMENT PROJECT INSTITUTE

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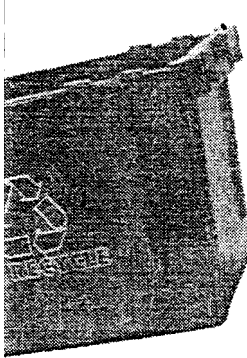
That's how much a dripping faucet can waste-it's the equivalent of filling about 180 baths.

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## HOW TO USE THIS GUIDE

This Guide is designed to assist hotels and motels in making their operations more environmentally responsible. The heart of the Guide is divided into areas where environmental efforts improve the bottom line *and* benefit the environment. The seven sections describe environmental changes facilities can make and highlight criteria for choosing environmentally preferable products. Each section identifies additional resources, and whenever possible, specific products are recommended.

**Get Started** gives a brief overview of hotel operations and their environmental impact. It also describes the key steps in developing an environmental policy or program.

**Manage Energy Consumption** describes opportunities for reducing energy consumption in four operational areas: lighting, heating, ventilation and air conditioning (HVAC), laundry and kitchen, and general operations.

**Choose Efficient Lighting** focuses on converting from inefficient incandescent lighting to energy-efficient alternatives.

**Manage Water Use** describes activities and identifies products that reduce water consumption. It includes an overview of graywater systems, with a discussion of their applications and associated costs.

**Improve Indoor Air Quality** identifies some of the main indoor pollutants found in hotels and suggests ways to eliminate them.

**Green Your Amenities and Services** focuses on simple changes facilities can make in the amenities and services they offer to reduce their environmental impact and costs.

**Publicize Your Program** recommends creative ways to publicize environmental activities, describing communications opportunities and suggesting ways to use them to a facility's advantage.



# GET STARTED

*The travel and tourism industry is the second largest employer in the U.S. after health care. It has an enormous impact on the environment, because it encompasses so many sub-industries, ranging from hotels and restaurants to car rental companies, travel agents and cruise lines.*

*Hotels and motels, a significant sector of the industry, purchase a variety of products and services that affect the environment. This section explains how to create environmental policies that let customers and vendors know how much you value products that do less environmental damage and generate less waste.*



Hotels and motels are comparable to small communities—they purchase a wide array of products, including furniture and textiles, water and lighting fixtures, paper, personal care products and cleaning supplies. In fact, the average hotel purchases more products in one week than 100 families will typically purchase in a year. Hotels and motels also buy services that affect the environment, such as advertising, waste disposal, recycling, cleaning, banking and printing.

Across the U.S., hotels and motels are increasingly incorporating environmental concerns into their purchasing and operations decisions. From non-smoking rooms and recycling to biodegradable soaps and refillable shampoo dispensers, hotels and motels are reducing their environmental impact. Some are even going beyond relatively simple steps and successfully installing motion sensors for light switches, composting their *waste* instead of sending it to landfills, and using “recycled” water. Additionally, the number of non-smoking rooms is growing, as is the number of “green” rooms, which have been adapted to reflect ecological and health concerns.

Hotels and motels will discover three key benefits of incorporating an environmental ethic into their operations.

- **Increased business.** Going green can increase occupancy rates. More than 85% of travelers interviewed in 1991 indicated that they are likely to support companies that preserve the environment, and 43 million adults nationwide reported their willingness to spend up to 8% more for eco-travel. Green rooms are seen as cleaner and healthier and, most importantly, attract repeat clientele.<sup>1</sup>
- **Lower costs.** Reducing waste and saving energy can save thousands of dollars in waste disposal and energy costs. Using less toxic products also decreases disposal costs by reducing the price of disposing of contaminated containers and unused products and treating wastewater.
- **Reduced hazards.** Using less toxic products reduces potential employee hazards, hotel liability and environmental impacts.

As an environmentally-aware hotel or motel, your facility can take a leadership role in influencing the market for environmentally preferable products. You can also create a positive domino effect by *encouraging* your vendors and suppliers to do the same.

## CREATE AN ENVIRONMENTAL POLICY

Hotels and motels have a unique opportunity to use their enormous purchasing power to clean up the environment. Developing environmental programs and purchasing policies demonstrates your facility’s commitment to the environment and influences every organization you work with.

The average hotel purchases more products in one week than 100 families will typically purchase in a year.

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<sup>1</sup> U.S. Travel Data Center. 1994.

### STEP 1: APPOINT A GREEN TEAM

The first step in organizing an environmental program is to assemble a green team to oversee the program. The team's main objective is to translate your environmental goals into implementation and purchasing strategies. It is also responsible for maintaining interest in the program and addressing the needs of buyers and operations staff.

The team should include all staff whose input is critical to making the program work. They should begin by establishing objectives, which could include the following activities: identify target areas for green buying or environmental initiatives, identify information gaps, create and confirm an action plan, and discuss individual staff responsibilities.

### STEP 2: DEVELOP YOUR MISSION AND PURCHASING TARGETS

A policy or mission statement can serve as a direction-setting mechanism to identify the broad goals that your facility will pursue. Facilities often commit to the following principles.

- Using fewer resources
- Generating less waste
- Considering the life-cycle costs of purchases
- Considering environmental criteria with other business criteria (such as cost, functionality and availability)

Your mission statement will help shape environmental policy; but turning policy into practice requires identifying specific targets. In purchasing, targets should be specific and measurable (expressed as either a percent of product purchased or a dollar amount invested).

#### **STARTING AN ENVIRONMENTAL PROGRAM**

- 1) **Appoint a Green Team.**
- 2) **Develop your mission and purchasing targets.**
- 3) **Incorporate preferences into purchasing documents.**
- 4) **Calculate the costs of buying green.**
- 5) **Purchase and test products.**
- 6) **Evaluate and modify the program as necessary.**

- Use percentage change goals instead of numerical targets.
- Identify deadlines and responsible individuals or departments.
- Set attainable standards that require some change in how you do business and how your vendors meet your needs.

### STEP 3: INCORPORATE PREFERENCES INTO PURCHASING DOCUMENTS

Structure your specifications, requests for proposals (RFPs) and other purchasing tools to give preference to environmentally preferable products, making their purchase more likely in the future. Using price preferences or set-asides ensures that buying practices change

permanently. Two other options that may be less effective are general preferences or specifying environmentally preferable products only.

If you use product specifications, review them to be sure they encourage the purchase of environmentally preferable products and don't preclude it.

- Avoid language that excludes environmentally preferable products (such as "no recycled materials").
- Enable vendors with varied capabilities to compete. Some vendors of environmentally preferable products may not be able to bid on all-or-none projects, so allow them to bid on some items or to offer a mix of products.

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#### STEP 4: CALCULATE THE COSTS OF BUYING GREEN

Some green products help you save money immediately while others cost more up-front. However, environmental purchasing should enable you to save money over the long term. By developing a comprehensive program using a mix of initiatives, you can produce a net cost difference of zero and, potentially, cost savings in the short term.

Using life-cycle cost—the cost of manufacturing, operating, maintaining and disposing of a product—enables you to compare different products by determining their real prices with a common measure. Sometimes, environmentally preferable products cost more than their alternatives, even on a life-cycle basis. This discrepancy usually occurs for one of three reasons: these are emerging technologies, products are inefficiently distributed, or environmental costs are not captured in costs of competing products.

The following bullets highlight ways to structure RFPs to ensure that they are consistent with your green buying program.

- Adopt a green purchasing policy with specific goals and targets and give a copy to all your vendors.
- Commit to purchasing on the basis of life cycle costs, not initial costs.
- Construct purchasing criteria to favor products that meet criteria established by your green team.
- Broadcast as widely as possible your requirements for environmentally preferable products. Let current and potential vendors and manufacturers know about your interest in green products.
- Insist on complete disclosure from suppliers and manufacturers regarding chemicals used to manufacture products.
- Consider designing specifications to favor companies that will take back goods that have reached the end of their useful lives.
- Specify that products be easily and cost-efficiently repaired.
- Set reasonable timelines for reaching out to new distributors for environmentally preferable products. They may need time to learn to work with you.
- Don't include RFP or contract language that inadvertently precludes green purchasing. For example, if you want re-refined oil, don't specify "must be greater than 90% Pennsylvania crude oil by origin.
- Don't include specifications that are irrelevant for the intended use. For instance, a specification of 'virgin paper only' won't ensure that paper performs and will exclude recycled paper.
- Don't let preferred vendor contracts exclude environmentally preferable product and service distributors.



Keep track of the savings that environmentally preferable products offer over their alternatives by measuring or estimating savings. In some cases, you will find that green purchasing doesn't seem to pay off. But there may be reasons to make the purchase anyway. It might significantly raise environmental consciousness in your facility or help publicize your environmental initiatives.

#### STEP 5: PURCHASE AND TEST PRODUCTS

Switching to new products requires input from product users. Working groups or limited testing can provide valuable information and boost acceptance of new products. Once you've solicited input, purchase a few of these products and evaluate them using trial runs; but don't require them to perform better than the product they're replacing.

#### STEP 6: EVALUATE AND MODIFY THE PROGRAM AS NECESSARY

The key to a successful program is a willingness to try new products, make mistakes and alter your course as necessary. Encourage feedback and take steps to make appropriate modifications in a timely manner. Make sure that any evaluation reflects the comprehensive nature of your program.

There are many reasons to start your environmental program: because an employee has requested it, because you want to lower operations costs or because you want to boost occupancy rates. Whatever the reason, get started today!

# MANAGE ENERGY CONSUMPTION

*E*lectricity use accounts for 60 to 70 percent of the utility costs of a typical hotel. Many properties have discovered that this cost is controllable, without sacrificing guest comfort, by using energy more efficiently. In addition to cutting waste and implementing energy efficient practices, a number of properties have also successfully used alternative energy sources (such as solar power) to supplement their needs. This section describes opportunities for reducing facility energy consumption, generally through implementing routine maintenance and choosing energy-efficient equipment.

## ENERGY BASICS

Hotel energy consumption depends on many factors, such as geographical location, size, class, equipment, system, occupancy and age of facility. These factors affect the cost-effectiveness of certain measures and the magnitude of savings.

Two federal programs provide background information and a good starting point for hotel energy upgrades. The U.S. Environmental Protection Agency Energy Star Buildings program—a voluntary program designed to help commercial buildings retrofit for energy efficiency—recommends key steps to energy efficiency. For more information, contact the Energy Star Buildings Program at (202) 775-6650.

The U.S. Department of Energy (DOE) also has a program designed to encourage energy conservation in the hospitality industry. Called “Hospitality Industry Forum for Energy Conservation,” the Forum provides financial and technical support for industry demonstration projects. For more information, contact the Forum at (301) 588-9387.

In general, there are four areas of hotel operation where most facilities can generate savings through energy-efficiency.

- Lighting
- Heating, ventilation and air conditioning
- Laundry and kitchen
- General operations (such as swimming pools, pumps, steam boilers)

An environmental audit form and an energy work sheet are included in the appendix to help estimate your potential energy savings.

## MANAGING ENERGY IN HOTELS

Conduct an energy audit before any major retrofit or upgrade projects are implemented, either in a specific area (such as lighting or HVAC) or hotel-wide. Beyond providing an assessment of current performance, a comprehensive energy audit helps identify appropriate measures by providing cost information and setting realistic performance goals. Experts also recommend a systematic approach, because some projects can generate secondary effects and savings (for example, switching to energy-efficient lighting can reduce cooling loads).



### KEY QUESTIONS

Use these questions to identify areas where conservation can yield the most savings.

- What are the top two areas where you use the most electricity?
- Do you have a maintenance schedule for the heating, ventilation and air conditioning (HVAC) systems on your property?
- Are HVAC systems checked and adjusted seasonally prior to heavy use periods?
- Do you take steps to minimize heat sources (e.g., incandescent lamps, sunlight) on the property during cooling season?
- Do you consider energy efficiency in your equipment purchases?

Economic analysis is an important but under-utilized tool for energy management. Analysis methods-such as calculations of return on investment, capital recovery factor or internal rate of return-can provide powerful arguments for energy efficiency projects by comparing their benefits and costs and estimating payback periods. We recommend that property energy audits be followed by a careful economic analysis that incorporates specific saving goals.

Below is a list of energy-efficient options for hotels, organized under the four general energy-saving areas identified in Energy Basics.

#### **MAKING HVAC EFFICIENT**

- **Properly maintain the system.**
- **Reduce inside heat sources.**
- **Don't cool or heat more than necessary.**
- **Purchase efficient equipment.**

**LIGHTING** Hotel lighting, especially guest room lighting, accounts for about 30 to 40 percent of hotel electricity consumption. The lighting section of this Guide addresses retrofitting with energy-efficient lamps and fixtures, and generally recommends replacing incandescent lights with compact fluorescent lamps (CFLs) and full-size fluorescents with T-8s and electronic ballasts. Recommendations for hotel-specific applications are also provided.

**HVAC** The HVAC systems are also large energy consumers for hotels, using between 25 and 40 percent of the total energy consumed. HVAC energy management involves regular maintenance, sensors and other “smart” controllers, load reduction measures and fan, motor and chiller replacement or upgrades. Added benefits of well-operated HVAC systems include increased guest comfort and better indoor air quality.

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**Properly maintain the system.** Maintaining equipment at peak operating condition and implementing regular maintenance can help sustain system efficiency. Proper maintenance also helps avoid costly downtime by identifying potential system problems.

#### ***HVAC Systems Maintenance***

- Clean permanent filters with mild detergents every one or two months, or change replaceable filters every one or two months.
- Check entire system each year for coolant and air leaks, clogs and obstructions of air intake and vents.

#### ***Room (Window) Air Conditioner Maintenance***

- Check and clean the filter once each month during heavy cooling periods.
- Have the units checked every year. Spring is the best time for evaluation, because it is normally before heavy use.
- Clean unit condensers at least every two or three years.

- Make sure the appropriate amperage and voltage are available to every unit.

**Reduce inside heat sources.** Air conditioning systems work to remove heat from indoors and transport it to the outside. Reducing indoor heat sources helps to reduce HVAC loads and energy consumption. The following activities can help reduce heat buildup.

- Cover windows, especially west- and south-facing windows, against sunlight with drapes, shades or shutters. Select efficient windows and window films, which don't transfer as much heat into rooms.
- Turn off electric lights and appliances or other heat-producing equipment that is not in use, and reduce or eliminate incandescent lighting in favor of CFLs.
- Install programmable on/off timers and sensors for lights, appliances and room HVAC.
- Position heat-producing appliances (such as TVs and lamps) away from room thermostats.

**Don't cool or heat more than necessary.** Energy is wasted when the HVAC is competing with hot or cold air titration or conditioning empty rooms and other unoccupied areas. Setting the thermostat lower (or higher) than needed to speed the system does not work. It does not cool or heat faster; it only works the HVAC system harder and wastes energy. Additionally, efficiency diminishes when a system tries to cool to a temperature greater than 20°F below outside temperature. Some other HVAC guidelines follow.

- Set the thermostat to the highest comfortable temperature in summer (>78°F) and the lowest comfortable in winter (<68°F), especially in empty rooms or places where the system cannot be turned off completely.
- Install programmable on/off timers and sensors for low occupancy areas.
- Turn the cooling unit(s) off when the weather is cooler.
- Use weather stripping to close air gaps around doors and windows.
- Close all unnecessary openings.

**Purchase efficient HVAC equipment.** Although performance and cost are usually considered when purchasing new HVAC units or replacing old ones, energy efficiency may not be a priority. Some energy-efficient units have higher initial costs, but can save money over the long run through lower operating and energy costs. Consider the following points before purchasing or replacing HVAC systems.

- Note that higher cooling capacity does not mean higher efficiency. Instead, the efficiency is measured by a high energy efficiency ratio (or seasonal energy efficiency ratio).



## DEFINITIONS

**COOLING CAPACITY** refers to the ability of an air conditioner to cool and is expressed in British thermal units per hour (Btu/hr).

**COOLING LOAD** refers to the amount of heat (generated by people, lights, equipment) an air conditioner must remove from an area.

- Estimate the cooling load needed for your building(s). Work with an experienced professional to calculate load. Once the cooling load is known, buy equipment to match it.
- It is better to undersize than oversize where cooling capacity is concerned, and a continuous flow of cold air is more efficient than cycling on and off.
- Match the air conditioning or heat pump components for higher efficiency,

Good alternatives to more expensive cooling upgrades (and more energy consumption) include “passive” measures, such as light or reflective roof and exterior coatings, or even planting shade trees on the south

side of low buildings to create shading. These measures reduce heat build-up in external walls and surfaces.

**LAUNDRY AND KITCHEN** Energy management measures can also yield savings in laundry and kitchen areas. Hotel laundry and kitchens can consume large quantities of energy and water, not to mention detergent and other chemicals. The International Hotel Environment Initiative estimates that some hotel kitchens use two or three times as much energy as private restaurants to prepare the same amount and quality of food. Savings from these areas, like savings from HVAC operations, come from large and small measures.

**Properly use and maintain equipment.** Kitchen and laundry equipment—boilers, washers, dryers, refrigerators, freezers, ovens and stoves—function more efficiently when they are properly used and maintained. Small maintenance steps, such as cleaning condenser coils and removing lint from dryers, are just as important as major upkeep, such as cleaning boiler tubes. Both approaches help maintain efficiency and reduce energy consumption, as does running equipment only with full loads.

**Team up for efficiency.** By teaming up equipment of similar or complementary functions, or separating equipment of unlike functions, efficiency can be enhanced. For example, separate stoves and ovens from refrigerators and freezers and adapt laundry operating hours to reflect actual needs. Other examples include using recovered heat from dryer exhaust or capturing water from clothes washer rinse cycles in holding tanks for use in the next wash. (For more information, see the Graywater section under Water Use.)

**Look for energy-saving measures.** Since white linens typically require higher wash and rinse water temperatures, switching to non-white or colored linens enables a property to reduce hot water and bleach use and lower the hot water heater setting. Alternately, switching to a low-temperature detergent formula enables you to lower the hot water heater temperature while continuing to use white linens.

**Investigate alternative energy sources.** Many conventional uses of energy in the kitchen and laundry areas can be adapted to unconventional energy sources. Solar hot water heating for pool and kitchen use, for example, is an excellent application of solar energy.

**MAKING LAUNDRY AND KITCHENS EFFICIENT**

- Properly use and maintain equipment.
- Team up similar appliances for efficiency.
- Look for energy-saving measures in dish and linen washing.

**GENERAL OPERATIONS** The energy-saving potential in this area varies and depends on hotel location, size, class, equipment, system, occupancy rate and age. The recommendations below are intended to serve as a starting point, and can be adapted to meet the needs of your facility.

- During periods of low occupancy, group guests in relation *to* mechanical and electrical systems. This approach translates into energy savings in unused areas.
- Operate laundry and other energy-intensive operations at night, when utility rates are lower (off-peak).
- Purchase energy-efficient office equipment. Consider purchasing controlling devices, which can turn off unused office equipment, or specify new equipment with a “sleep” feature to save energy.
- Try solar power. Use solar-powered exterior landscape lighting, or install skylights in work areas to increase available light.

## CHOOSING ENVIRONMENTALLY PREFERABLE PRODUCTS

- Choose windows and skylights meeting the following criteria.<sup>1</sup>
  - Ratio of visible light transmission coefficient over solar heat gain coefficient > 1
  - U-value <0.36 for windows and glazed exterior doors and <0.44 for skylights
  - Air leakage rate <0.10 scfm/ft<sup>2</sup> for fixed products and <0.30 scfm/lfc for operable products

<sup>1</sup> These criteria are based on Green Seal’s standards for *Windows-GS 13*.

- Frame and sash materials not formulated with lead, cadmium, arsenic, mercury or hexavalent chromium
- Packaged in materials containing 25% post-consumer recycled content and that do not contain heavy metals
- Choose window films meeting the following criteria.\*
  - Ratio of visible light transmission coefficient over solar heat gain coefficient greater than 1
  - Packaged in materials containing 25% post-consumer recycled content and that do not contain heavy metals
- Purchase window air conditioning units that meet the following criteria.
  - Do not use R11 or R12, which are compounds from the CFC family, as refrigerants (Note: Where available, HFCs are more preferable than HCFCs.)
  - Do not use ozone-depleting chemicals in the manufacturing process (products must be labelled if they are manufactured with ozone-depleting chemicals)
  - Have a sensible heat factor (SHF) of less than 0.78
  - Have the energy efficiency ratio listed below

Type	Size (Btu/hr)	Minimum EER
No Reverse Cycle/Louvered	< 6,000	9.0
	6,000 to 14,000	9.5
	14,000 to 20,000	10.0
	20,000 and above	8.5
Reverse Cycle/Louvered	All Sizes	9.5
No Reverse Cycle/ Non-louvered	<6,000	8.5
	6,000 to 14,000	9.0
	14,000 to 20,000	9.0
	20,000 and above	8.7
Reverse Cycle/ Non-louvered	All Sizes	9.0

- Choose energy-efficient lighting, such as compact fluorescents and other lamps and fixtures described in the Lighting section.
- Look for high-efficiency motors and chillers.

<sup>2</sup> These criteria are based on Green Seal's standards for *Windows Film-GS 14*.

- Look for fans with variable speed drives and variable air volume (instead of fixed).
- Choose equipment with sensors or controllers, which enable equipment to power down or turn off during periods of inactivity.
- Install a computerized energy management system for maximum efficiency.
- Choose low-temperature detergents and those meeting other criteria described in the Water Use section.

## SUCCESS STORIES<sup>3</sup>

The following DOE demonstration projects in Montana have been successful in reducing energy use. For more information, contact the DOE Hospitality Forum.

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### RADISSON NORTHERN HOTEL BILLINGS, MONTANA

Despite celebrating its golden anniversary in 1992, the Radisson Northern Hotel in Billings, Montana, is running like a youngster these days, thanks to the application of an innovative energy management system. Its new, high-tech heating system has accomplished the long-sought goal of the hotel management—saving money and still providing the best services possible for the guests.

The system overhaul relied on the following energy-efficient measures: (1) replacing energy-wasting incandescent lights with efficient fluorescent bulbs, (2) adding new equipment that captures waste heat to preheat the hotel's domestic water supply, and (3) installing a computerized energy-management system.

According to the general manager, the energy-efficient fixtures and retrofit brought three prime benefits to the hotel.

- The costs for power have stabilized and become predictable despite increased occupancy and higher energy rates.

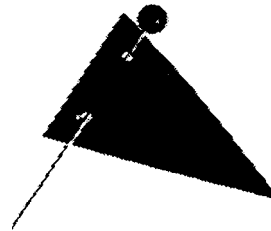


**CERTIFIED  
PRODUCTS**

To order Green Seal-certified products, contact the following companies:

- CFLs-Lights of America,  
(800) 321-8100
- CFLs-General Electric Lighting,  
(216) 266-2884
- Windows-Andersen Corporation,  
(612) 430-7362

See appendix for additional products.



<sup>3</sup> Reprinted with permission of Northwest Energy News, March/April 1992 and November/December 1993, respectively.

- The system promptly alerts hotel management to potential problems (so that they can be fixed before they are detected), and permits the front desk clerk to monitor and adjust things like temperatures in guest rooms.
- The system allows for upgrades and retrofits to yield even greater efficiencies and savings.

No wonder the Radisson Northern looks forward to another 50 years of savings!

#### THE 4BS INN

MISSOULA, MONTANA

There is little indication that the 4Bs Inn in Missoula, Montana, is an unusual place, but the two awards displayed on the walls inside the lobby set it apart. The awards, one from the Northwest Power Planning Council and the other from the Montana Power Company, honor the 4Bs for the energy efficiency of its heating and cooling systems. In fact, the motel's heating and cooling system is so innovative that it has been patented.

Cost-saving redundancies make the system unique. The pipes that carry hot water to guest rooms also are coiled in the heaters for those rooms, giving heat and hot water from the same pipes. Similarly, the cold water pipes feed the cooling system for each room and also double as the fire protection system. The result is tremendous savings in construction costs and energy consumption. Since October 1991, the 4Bs has saved management between \$700 to \$1,000 a month in energy costs during winter months.

Another motel that tried the 4Bs' system is the 62-room Great Falls Day's Inn. It averages \$700 per month in energy bills, or about two or three times less than normal for a building its size. According to a Montana Power Company executive, the Day's Inn "may be the most energy-efficient commercial building in the country."

## ADDITIONAL RESOURCES

Air-Conditioning and Refrigeration Institute (ARI)  
4301 North Fairfax Drive, Suite 425  
Arlington, VA 22203  
tel (703) 524-8800  
fax (703) 528-3816

Alliance to Save Energy  
Suite 509  
1725 K Street, NW  
Washington, DC 20006-1401  
tel (202) 857-0666  
fax (202) 331-9588

American Council for an Energy-Efficient Economy (ACEEE)  
Suite 801  
1001 Connecticut Avenue, NW  
Washington, DC 20036  
tel (202) 429-8873  
fax (202) 429-2248

American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE)  
1791 Tullie Circle, NE  
Atlanta, GA 30329-2305  
tel (404) 636-8400  
fax (404) 321-5478

Energy-Efficient Procurement Collaborative  
c/o New York State Energy Research and Development Authority  
2 Empire State Plaza, Suite 1901  
Albany, New York 12223-1253  
tel (518) 465-6251  
fax (518) 449-4989

Energy Efficiency and Renewable Energy Clearinghouse (EREC)  
PO. Box 3048  
Merrifield, VA 22116  
tel (800) DOE-EREC (363-3732)  
fax (703) 893-0400

Energy Ideas  
c/o Government Purchasing Project  
P.O. Box 19367  
Washington, DC 20036  
tel (202) 387-8030  
fax (202) 234 5176

National Institute of Standards and Technology (NIST)  
Building and Fire Research Laboratory  
Gaithersburg, MD 20899  
tel (301) 975-2000  
fax (301) 975-4032

Northwest Power Plating Council  
Suite 1100  
851 Southwest Sixth Ave.  
Portland, OR 97204  
tel (800) 222-3355 or (503) 222-5161

Rocky Mountain Institute  
1739 Snowmass Creek Road  
Snowmass, CO 81654-9199  
tel (970) 927-3851  
fax (970) 927-4178

United States Department of Energy (DOE)  
Office of Energy Efficiency and Renewable Energy  
1000 Independence Avenue, SW  
Washington, DC 20585  
tel (202) 586-6169, (800) 586-5000

U.S. DOE/Hospitality Industry Forum for Energy Conservation  
c/o D&R International Ltd.  
tel (301) 588-9387  
fax (301) 588-0854

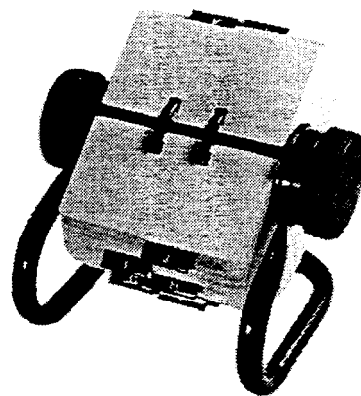
Motor Challenge and Industrial Air Compressors, Pumps, Fans and Drives  
tel (800) 862-2086

United States Environmental Protection Agency (EPA)  
401 M Street, SW  
Washington, DC 20460  
tel (202) 260-2080

Energy Star Buildings Program  
tel (202) 775-6650

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*See appendix for partial listing of consultants and suppliers.*



# CHOOSE EFFICIENT LIGHTING

*C*ommercial lighting—which includes hotels and motels—accounts for just under half of all the lighting electricity in the U.S. Hotel lighting is more than the overhead fluorescent fixtures found in many offices. Depending on the property size, lighting ranges from fluorescent fixtures in hallways to table and vanity lamps in guest rooms, as well as specialized lighting in lobbies, restaurants, shops and meeting rooms. Many of these lights and fixtures can be converted to more energy-efficient and longer-lasting alternatives. This section describes how to decrease your energy use by installing energy-efficient alternatives.

## LIGHTING BASICS

The Rocky Mountain Institute has estimated that the amount of lighting electricity consumed by the commercial sector can be directly reduced by one-third to one-half if more energy-efficient sources are used. Efficient light sources put out less heat, so an indirect benefit is cooler rooms and reduced air conditioning costs.

Most people's perception of light output focuses on bulb or system wattage. While a more powerful (higher wattage) bulb or system generally puts out more light, the true measure of usable light is the lumen; a watt is a measure of power. A more efficient light source should give you more lumens for about the same or less wattage. For example, an average 75 W incandescent bulb will give you about 1,150 lumens of light, while a compact fluorescent lamp can provide you with the same amount of light using only 20 to 22 W. Similarly, a four-foot T-8 fluorescent system with electronic ballast can give you about the same lumens as older T-12 systems with magnetic ballasts while using about 20% less energy.<sup>1</sup>

Almost any upgrading of current systems will yield better and *more efficient* light, even for systems considered state-of-the-art just a few years ago. For some fixtures—such as table, floor, wall and bathroom vanity—energy-efficient alternatives can perform as well as their incandescent counterparts. New options are also available for outdoor lights and exit signs.

Newer, more efficient lamps generally last longer than old fluorescent and incandescent lamps. Compact fluorescent lamps (CFLs) can last up to 10,000 hours, or about 10 to 12 times as long as the average 60 W incandescent bulb. Halogen light sources generally last two to three times longer than incandescents and are 10 to 50% more efficient, depending on the application. Long product life reduces the amount of solid waste generated and maintenance costs associated with changing bulbs. However, periodic cleaning may be necessary to keep them at peak rated efficiency.

A work sheet is included in the appendix to help estimate your potential energy savings from efficient lighting.

### A LAMP AND FIXTURE PRIMER

**COMPACT FLUORESCENT LAMPS** employ the same technologies as the larger fluorescent lamps and come in a variety of shapes and sizes to fit available fixtures.

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#### KEY QUESTIONS

Target your lighting projects.

- What percent of your electric bill is attributable to lighting?
- How many indoor light fixtures operate 24-hours a day? Do they all need to be operating?
- Are any of the 24-hour fixtures equipped with energyefficient compact fluorescents or electronic ballasts with full-size fluorescents?
- Do your exit signs use incandescent bulbs?
- Do your outdoor lights use incandescent bulbs?

<sup>1</sup> Many less-efficient T-12 lamps were phased out in October 1995 by the Energy Policy Act.



**LUMINAIRES** are the fixtures that house light sources. A variety of luminaire types and models are available for use in hotel applications.

**MORE EFFICIENT FULL-SIZE FLUORESCENT LIGHTS** improve the efficiency of the full-size lights traditionally used in hallways, kitchens, offices and other large areas. The three main components of these lights are described below.

An average 75 W incandescent bulb provides about 1,150 lumens of light, while a compact fluorescent lamp can provide the same amount of light using only 20 to 22 W.

**Energy-efficient lamps.** Efficient lamps radiate light more efficiently with improved color characteristics. These lamps are also slimmer (1 inch diameter instead of 1.5 inches) and generally require ballast upgrades to operate at their maximum potential.

**Energy-efficient ballasts.** Higher efficiency ballasts are now available for fluorescent lamps. These include hybrids, which contain a combination of electronic and magnetic components, and fully electronic ballasts. Electronic ballasts are more efficient and can improve lamp efficiency by 15% or more. In addition, electronic

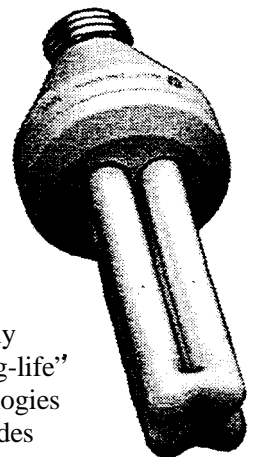
ballasts are quieter and can reduce lamp flicker, eliminating two common problems with magnetic ballasts.

**Reflectors.** Well designed reflectors can redirect light downward (when it would otherwise illuminate the ceiling), increasing a fixture's useful light output. Reflectors can be used to reduce the number of lamps per fixture while maintaining similar light output.

**HALOGEN LAMPS** improve upon the incandescent technology by encapsulating the filament in a quartz capsule filled with halogen gas. Halogen lamps can be 10 to 50% more efficient than regular incandescent lamps, although still not as efficient as fluorescents. You may prefer halogens in areas where focused light is a priority, such as lobbies, restaurants and shops.

**EXIT SIGNS** are often incandescent and operate 24 hours per day, making them an invisible but significant source of energy consumption and heat.<sup>2</sup> Available technologies not only significantly reduce energy consumption but also outlast "long-life" incandescent lamps. Several energy-efficient exit sign technologies are available, and Green Seal recommends light-emitting diodes (LEDs) because their long life reduces associated waste.<sup>3</sup>

**LEDs** use the same technology as indicator lights on home entertainment equipment. They use less than 7 W per single-sided sign or 8 W per double-sided sign, and can last between 700,000 and 5 million hours (80 to 600 years).



<sup>2</sup>Green Seal estimates that an exit sign with incandescent bulbs consumes between \$17.50 and \$35 of electricity per year per sign at ¢10 per kWh.

<sup>3</sup> Confirm local fire officials' acceptance of any exit sign retrofits.

**Self-luminous** signs use sealed phosphor tubes containing tritium gas and require no external sources of energy. Their expected life time is 131,400 hours (15 years).

**Electroluminescent** technology turns the sign into a lamp, causing light to emit from the letters. The signs use less than 1 W per side and can last for 70,000 hours (8 years).

**Tungsten light strips** (or “FlexLights”) consist of a string of tiny tungsten-halogen lamps contained within a flexible plastic tube adaptable to standard incandescent sockets. They consume about 6 W per sign and have an estimated life of 50,000 hours (5.7 years).

**CFLs** with screw-in bases are available for exit sign use and can be substituted directly for existing incandescent bulbs. CFLs use between 7 W and 9 W per sign and have an 8,000 to 12,000 hour life (1 to 1.5 years).

#### EXIT SIGN TECHNOLOGIES IN ORDER OF EXPECTED LIFE

- Light-emitting diodes (LEDs)
- Self-luminous signs
- Electroluminescent signs
- Tungsten light strips
- CFLs

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**OUTDOOR LAMPS** Incandescent or mercury vapor outdoor lights are generally inefficient and should be evaluated for conversion. Energy-efficient options include the lamp types listed below and solar-powered lamps. Of these, Green Seal recommends low-temperature CFLs because of their adaptability.

**Low-temperature fluorescent lights.** CFLs with low-temperature operating characteristics have recently been introduced. When combined with the proper electronic ballasts, these lamps will start at temperatures as low as -40°F. Some full-size fluorescent lamps will start as low as -20°F. They are an excellent choice for porch lights, lanterns, landscape lighting, sign lights and compact flood lights.

**Metal halide lamps.** These exterior-use high-intensity discharge (HID) lamps offer good color rendering and are available in sizes ranging from 70 to 150 W for small applications (e.g., pole lights, canopy down lights, and medium floodlights) up to 175 to 1,000 W for large applications (e.g., large parking lots and roadways, sports fields). These lamps are 1.5 times more efficient than mercury vapor lamps but require a 3 to 5 minute warmup period.

**High pressure sodium and low pressure sodium lamps.** These lamps use sodium vapor instead of mercury vapor and are roughly twice as efficient. High pressure sodium lamps are suitable for street and parking lot use; low pressure sodium lamps are suitable for floodlight-type applications. They last as long as mercury vapor lamps but tend to give out a yellowish light. They require a 2 to 3 minute warmup period.

## MAKING LIGHTING EFFICIENT IN HOTELS

Consider switching the lights that are lit the longest to energy-efficient alternatives. Start with the 24-hour lighting systems in lobbies, guest hallways, corridors and the busiest “back-of-house” spaces. Many of these systems use standard fluorescent lighting and can be upgraded with T-8 lamps and electronic ballasts. However, if you use incandescent bulbs in these spaces, a permanent conversion to CFLs is cost-effective, achieving 25 to 75% savings.

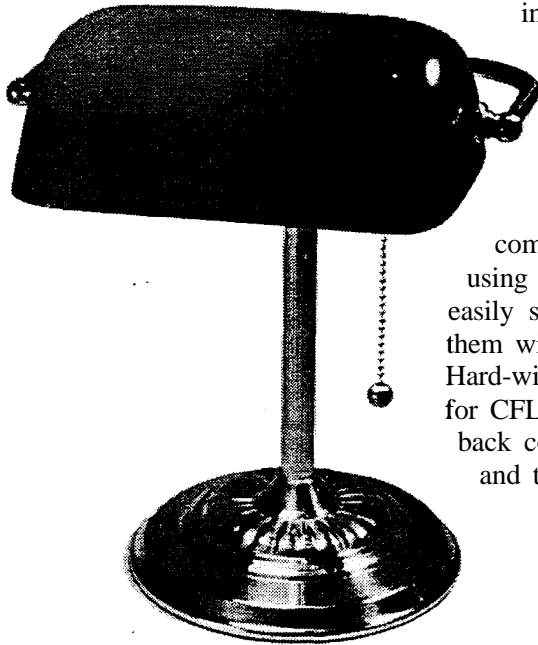
Once the longest-burning lights are converted, next focus on systems that operate for eight hours or longer, such as back-of-house work rooms (e.g., laundry rooms, kitchens, storage areas) and office areas. As with the longer-burning lights, most of these conversions involve T-8 lamps and electronic ballasts or CFLs. Installing occupancy sensors to these systems ensures that lights are turned off when not needed.

Exterior lighting systems are also part of the 8-hour-plus category. Incandescent exterior lighting can be converted to low-temperature CFLs or high-intensity discharge (HID) lamps. Outdoor lights can be controlled properly through sensors or daily schedules, and ornamental lighting should be turned off after midnight. Consider solar-powered exterior lighting as well.

For many hotels, guest rooms offer opportunities for lighting upgrades. Depending on the conversion, an energy saving rate of 50% or more is possible *when rooms are occupied*. Most guest rooms average between seven to ten sockets, usually with incandescent lamps, or five to seven fixtures; but these lights do not operate as many hours as those in other areas. Research

shows that bathroom vanity lights have the longest burning hours (possibly because they are often used as night lights), and are good conversion targets. For ordinary guest room lamps, higher output CFLs (in the 22 to 38 W range) should be considered to keep rooms bright and ensure that guest comfort is maintained.

When converting incandescent lighting systems to compact fluorescents, the easiest conversions *are* made using screw-in self-ballasted CFLs. However, these can be easily stolen, and maintenance personnel usually replace them with less costly incandescent lamps (i.e., “snap-back”). Hard-wired conversions or new fixtures specifically designed for CFLs ensure good performance without theft or snap-back concerns. Conversion kits are available for downlights and table and floor lamps.



You can also save energy with the following approaches.

**Choose lower lamp wattage.** Offices and other spaces designed in the last two decades are often overlit. One way to save energy is to switch to lower wattage lamps (for example, 34 W instead of 40 W).

**Install task lighting.** This term refers to light sources that focus needed light directly on work areas and reduce overall lighting. Although task lighting cannot replace overhead lights, it can help to save energy through reduced lighting needs.

**Install timers and sensors.** Timers turn off lights in areas not frequently occupied, such as storage areas. Sensors can control the amount of light needed in an area based on available natural light (where applicable) or occupancy levels.

These lights are good targets for energy efficiency upgrades.

- 24-hour lights in lobbies and hallways
- 8–12 hour lights in laundry rooms, kitchens and outdoor lamps
- exit signs
- vanity lights in guest rooms

## CHOOSING ENVIRONMENTALLY PREFERABLE PRODUCTS

- Choose CFLs meeting the following criteria.<sup>4</sup>
  - Color rendering index (CRI) of 80 or higher
  - Color temperature between 2,600 and 3,100°K
  - Four second start-up time at the minimum rated operating temperature
  - Average minimum rated product life span of 8,000 hours at three hours per start



CERTIFIED  
PRODUCTS

To order Green Seal-certified products, contact the following companies:

- CFLs-Lights of America,  
(800) 321-8100
- CFLs-General Electric Lighting,  
(216) 266-2884

See appendix for additional products.

<sup>4</sup>These criteria are based on Green Seal's standards for *Compact Fluorescent Lighting Products-GS-5*.

- Meeting minimum safety requirements as indicated by the Underwriters Laboratories Inc. (UL) listing or its equivalent
- Having the minimum efficacies indicated in the box

MINIMUM AVERAGE EFFICACIES	
Lamp Wattage	Lamp Efficacy (lumens/watt)
<b>CFLs</b>	
<7 watt	40
7 - 9 watt	50
>9- 13 watt	55
>13- 18 watt	60
>18 watt	62
<b>Self-Ballasted Lamps, Lamp &amp; Ballast Combinations</b>	
<10 watt	40
10-15 watt	45
>15 watt	55

- Choose luminaires meeting the following criteria.<sup>5</sup>
  - **Lenses or diffusers.** Look for lenses and diffusers constructed of glass or UV-stable optical grade plastics. Purchase shades constructed of fabric or plastic interior with white finish and fabric, metal or UV-stable plastic exterior.
  - **Chassis or body.** Look for body and chassis constructed of durable metals, UV-stable plastics or composite materials not susceptible to burning.
  - **Ballasts and lamps.** Choose properly matched ballasts and lamps to ensure lamp-life rating. Look for product life measurements based on applicable ANSI (American National Standards Institute) or IES (Illuminating Engineering Society) standards.
  - **Efficiency.** Look for luminaires that (1) can meet the efficiency required in Table A, (2) are permanently equipped to operate with the lamps listed in Table B, and (3) have magnetic, hybrid or electronic ballasts meeting system efficacy requirements in Table C. The following pages provide more detail on these tables.
  - **Starting and noise.** Look for indoor luminaires that offer flicker-free starting and Class A sound rating.
- Replace incandescents with CFLs in the lights that are lit the most, including guest rooms, bathrooms and hallways.

<sup>5</sup> These criteria are based on Green Seal's proposed standards for *Residential Luminaires-GS-30*.

- Purchase halogen lights for lobbies, restaurants and shops.
- Upgrade full-size fluorescents to T-8 lamps and electronic ballasts.
- Choose low-temperature CFLs for outdoor applications.
- Purchase LEDs for exit signs.

### CHOOSING LUMINAIRES

Tables A, B and C (on the following pages) are designed to be used together. First choose fixture types from Table A, then choose lamps to match from Table B. Finally, make sure the system provides adequate light by meeting the recommended efficacies in Table C. For example, in guest bathrooms you might choose the fluorescent and compact fluorescent bathroom vanity fixture identified in Table A, which has a minimum efficiency of 35%. From Table B, you could then choose 27 W twin tube-rapid start CFLs for that fixture. Your system would fall in the “CFL 21 to 39 W category” in Table C, meaning that it should have a minimum efficacy of 55 lumens per watt.

Your operations staff will be familiar with most of these choices and terms. But if you need additional assistance, any lighting professional can use these tables as decision making aids.

TABLE A. Expected Luminaire Efficiency by Type

The fixtures in this table should provide at least the percent of light indicated in the second column. Fixture manufacturers can provide efficiency ratings. You can also ask about limitations associated with each fixtures when used in specific applications (such as minimum efficiencies when fixtures ore designed to illuminate target areas).

<b>Luminaire Type</b>	<b>Expected Efficiency (%)</b>
CFL open and wallwash downlights	65
CFL open downlights with white reflector and optional louver	38
CFL open downlights with fresnel or prismatic lens	34
CFL open downlights with diffusers	19
CFL wallwashers	NA
Fluorescent and compact fluorescent bathroom vanity	35
Decorative or ornamental wall sconces	40
CFL outdoor decorative lanterns or wall fixtures	35
Fluorescent and compact fluorescent permanent and portable under cabinet lights	NA
Outdoor area HID lights	55
Outdoor vandal-resistant compact and full-size fluorescent lights	45
Compact and full-size fluorescent ceiling and close-to-ceiling fixtures	30
CFL outdoor porch ceiling fixtures	30
Table and floor lamps	45

TABLE B. Acceptable Lamps

The table below indicates minimum specifications to look for in each lamp type.

Lamp Type and Base	Minimum Color Rendering Index	Wattage & Variation (W)
Compact Fluorescent		
TwinTube - preheat G23/GX23	80	5, 7, 9, 13
TwinTube - rapid start 2G7/2GX7	80	5, 7, 9, 13
Twin Tube - rapid start 2G 11	80	18, 24, 27, 36, 39, 40, 50, 55
Quad Tube - preheat G23-2/GX23-2, G24d-1/2/3	80	9, 13, 18, 26
Quad Tube - rapid start GX10q	80	13, 18, 27
Quad Tube 15mm - preheat GX32d-2/3	80	18, 22, 28
Quad Tube - rapid start G24q-1/2/3	80	10, 13, 18, 26
		Flat 18, 24, 36
Triple Tube - rapid start, dimming and/or electronic GX24q-1/2/3	80	13, 18, 26, 32
2D GR 10q-4	80	10, 16, 21, 28, 38
Full Size and U-bent Fluorescent lamps		
Full Size Fluorescent T-8 265 mA medium bipin	70	straight: 17, 25, 32, 40 U-bent: 16, 24, 31, 32
Full Size Fluorescent Standard T-12 medium bipin	70	straight: 20, 25, 30, 32, 34, 40; U-bent: 34, 40
Circline GR 10q-4	70	20, 22, 30, 32, 40
HID lamps		
High Pressure Sodium	22	ED-17: 35, 50, 70, 100
Metal Halide (universal burning position, rated for open luminaires)	65	ED-17 and PAR38: 50, 70, 100

TABLE C. Minimum Required Lamp/Ballast System Efficacies

This table identifies the minimum efficacy that your lamp/fixture combination should have.

Lamp Type and Wattage	Minimum System Efficacy - Indoor (lumen/W)	Minimum System Efficacy - Outdoor (lumen/W)
CFL <14w	45	45
CFL 14 to 20 w	50	50
CFL 21 to 39 W	55	55
CFL >40W	70	70
Full Size and U-Bent Fluorescent < 30 W (measured with "energy saving" T-12)	55	55
Full Size and U-Bent Fluorescent > 30 W (measured with "energy saving" T-12)	75	75
HID lamps < 70 W	45	45
HID lamps 70-100 W	65	65

## SUCCESS STORY<sup>6</sup>

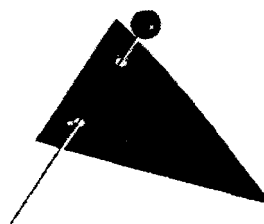
### SEATTLE WESTIN HOTEL

SEATTLE, WA

The Seattle Westin Hotel began working on its lighting system in 1993 with the assistance of its local utility, Seattle City Light. Most of the lighting in its public spaces and its south tower has now been upgraded to more energy-efficient systems.

One goal of the Seattle Westin's upgrade was to eliminate the need for frequent replacement of incandescent light bulbs. The different wattage of incandescent lamps used in each room often created confusion when the need for replacement arose. Improving energy efficiency while maintaining a warm residential "look" was also a goal for the retrofit.

The work involved lamp and ballast changes, fixture changes and mechanisms to increase control of lighting in less frequently occupied spaces. In hallways and elevator lobbies, incandescent bulbs in ceiling- and surface-mounted fixtures and table lamps were replaced with CFLs. In guest rooms, floor and table lamps were refitted with "warm" color CFLs, while bed headboards were equipped with halogen reading lights. In guest bathrooms, magnetically ballasted four-foot T-12 fluorescent lamps and fixtures were replaced by wall sconces equipped with "warm" color CFLs and electronic ballasts.



<sup>6</sup> Reprinted with permission of EPA Green Lights Update, March/April 1995.



The Seattle Westin's lighting retrofit accomplished the following objectives.

- complete conversion from incandescent lamps to CFLs
- reduced lighting energy needs in guest rooms while improving light quality and quantity
- more aesthetically pleasing lighting in guest rooms, especially guest bathrooms
- reduced lighting maintenance cost in hallways, lobbies and guest rooms
- reduced energy usage in less frequently occupied spaces

The results of the lighting changes are significant. The hotel has reduced the guest room wattage from 800 W to 270 W, a 66% reduction, while exceeding Westin Hotels' standard for guest room lighting. The hotel has also received compliments from guests regarding the increased amount of light in the rooms and improved bathroom lighting ambience. The Seattle Westin's annual savings from reduced energy use is estimated to be \$400,000.

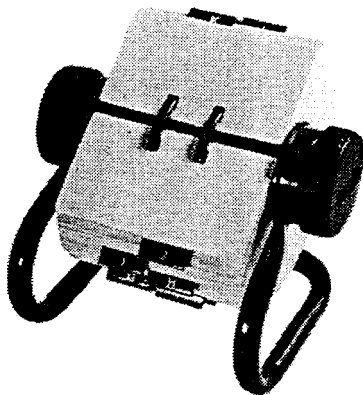
## ADDITIONAL RESOURCES

The Green Lights Program  
U.S. Environmental Protection  
Agency (EPA)  
MS 6202J  
401 M St., SW  
Washington, D.C. 20460  
tel (202) 775-6650

U.S. Department of Energy (DOE)  
CE-44  
1000 Independence Ave, SW  
Washington, D.C. 20585  
tel (800) 586-5000

The Lighting Research Center  
RPI  
Green Building, Room 115  
Troy, NY 12180  
tel (518) 276-8716  
fax (518) 276-2999

Your Local Utility



***See appendix for  
partial listing of  
consultants  
and suppliers.***

# MANAGE WATER USE

*T*ypically, hotels in the U.S. use 218 gallons of water per day per occupied room.<sup>1</sup> Assuming a 50% average occupancy rate, a 200-room hotel uses almost eight million gallons of water in a year. Two to 2.5 million gallons can be saved using water-efficient fixtures. This translates into a 25 to 30% reduction in water and sewer bills, with no loss of comfort to guests.

Water management usually involves retrofitting with water-efficient fixtures and instituting the wise water use practices described in this section. Most of these conservation measures have relatively short payback periods. More ambitious water management includes the use of graywater systems, which are discussed at the end of this section.

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<sup>1</sup> University of Florida Cooperative Extension Service, *Ecopurchasing in Hotels and Motels*, 1993.

## WATER USE BASICS

Hotel water consumption depends on many factors, such as location, size, class, occupancy and age of the facility. Guest rooms and in-house laundry operations use the most water in hotels, followed by kitchen and general operations.

Conduct a water audit before carrying out any water conservation measures. Audits generally require that you identify areas of water use, monitor to assess the area or areas of greatest use and identify opportunities for conservation. The Environmental Protection Agency has a non-regulatory water efficiency partnership-Water Alliances for Voluntary Efficiency (WAVE)-that provides water-use analysis software and other technical support.

Low-flow fixtures are typically one of the first steps in reducing water consumption. Water-efficient showerheads and aerators are engineered to mix air into the water flow, reducing the actual amount of water leaving the faucet or showerhead while maintaining or increasing the *perceived* water volume. In other words, guest comfort won't be compromised by low-flow fixtures. Low-flow toilets are also engineered to perform their tasks using less water without sacrificing performance. Other water conservation measures include wise water use practices in the kitchen and laundry and reducing water use for grounds keeping and other outdoor functions.

Every gallon of water saved means less water is drawn from natural sources and reservoirs, less wastewater is discharged and less energy is required to deliver and process water. Water conservation also helps cut down emissions from power and wastewater treatment plants. Remember that each gallon of water has been piped by electric pumps from a water reservoir to its point of use (and is sometimes heated). After it is used, energy is needed to transport the water to a central waste treatment facility; where it is circulated, filtered, treated and then transported to a discharge point. There it is usually mixed with clean water so that the cycle can begin again.

A work sheet is included in the appendix to help estimate your potential savings from water conservation measures.

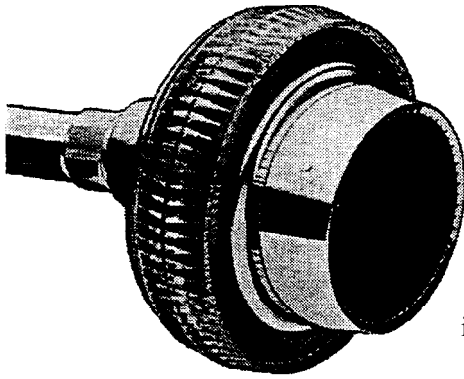
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### KEY QUESTIONS

Use these questions to identify areas where you can reduce water use.

- What is the flow rate or age of the showerheads in your guest rooms?
- What is the flow rate of the sink and bath faucets in your guest rooms?
- Do the toilets on your property use more than six gallons per flush?
- Are the guest rooms periodically checked for leaking faucets and toilets?
- If you have laundry facilities, are the machines operated with full loads?



## MANAGING WATER USE IN HOTELS

Reducing water consumption in guest rooms has relatively short returns on investment and high savings rates. Conservation measures can include the following.

- Retrofitting or replacing showerheads and bath and sink faucet aerators with low-flow alternatives
- Installing water *conservation* devices in toilets (such as toilet dams)

Also, regular inspection for leaks and immediate repair will help reduce water waste. Longer-term conservation measures include the specification of low-flow toilets and the installation of graywater systems during remodeling or new construction. Similar reduction measures can be implemented in areas such as kitchens, laundry facilities and public rest rooms.

Below are some easy steps you can take to decrease water use throughout your facility.

**Retrofit fixtures in guest rooms and public rest rooms.** Specify low-flow showerheads, bath and sink faucet aerators, and low-flow toilets.

**Maximize efficiency in kitchen and laundry facilities.**

- Install water-efficient devices (such as kitchen and laundry faucet aerators).
- Operate clothes and dish washers only with full loads, and promptly repair all leaks.
- Wash clothes and linens in the coolest water that will do the job; hot water is usually only necessary for heavily soiled loads.

**Reuse water where possible.** Consider installing a holding tank to capture the final rinse water from clothes washers to reuse as the wash water in the next wash cycle. Flush the final tank of the day to clean the system.

**Reduce water use in grounds keeping and landscaping.**

- Restrict lawn watering to evening and night to decrease water loss from evaporation and maximize effectiveness.
- Water only when needed, and avoid using sprinklers—they waste water through evaporation. If you use sprinklers, calibrate them to achieve even water distribution on your lawn.
- Use “recycled” water if possible. Graywater from drinking fountains, baths and laundry can be used for watering plants and lawns.

Use soaker hoses, which “sweat” water. Choose those made from post-consumer recycled rubber. These hoses deliver water directly to plant roots, enabling the water to be absorbed rather than running off.

- Choose native plants and flowers. They are more adapted to the local environment and require less water, pesticides and other care. Ask experts from a local nursery to advise you on trees, shrubs and plants suitable for your location. Replace non-natives with native plants where feasible, and specify native species when you re-landscape.
- Plant ground cover that requires minimum maintenance. Try using low-growing ground cover instead of a conventional lawn. Clover, Irish or Scotch moss, creeping thyme and chamomile are good examples of the many ground covers that can substitute for lawns and significantly reduce routine lawn maintenance.
- Apply mulch, which helps retain water. Sprinkle lawn surfaces with peat moss, wood chips, cocoa hulls, salt hay or pine needles to cover the ground and reduce evaporation.

**Look for other areas to reduce water use.** For example, limit pool water circulation to actual pool usage time. Excess circulation can result in higher evaporation rates. Cover pool when not in use if possible.

## CHOOSING ENVIRONMENTALLY PREFERABLE PRODUCTS

- Purchase low-flow showerheads, which have flow rates of 2.4 gpm or less (at 80 psi).<sup>2</sup>
- Purchase low-flow aerators meeting the following criteria (at 80 psi).
  - 2 gpm for lavatory and multipurpose faucets
  - 2.5 gpm for kitchen faucets
- Purchase low-flow toilets, which have a maximum flush volume of 1.6 gallons.
- Install toilet dams where possible.
- Look for soaker hoses meeting the following criteria:<sup>3</sup>
  - Discharge water to ground in low-drip process
  - Made of at least 65% recycled rubber from post-consumer motor vehicle tires
- If you must use sprinklers, choose hoses made of at least 50% post-consumer recycled rubber from used motor vehicle tires.

<sup>2</sup> The criteria for showerheads, aerators and toilets are based on Green Seal's criteria for *Showerheads-GC-06* and standards for *Water-Efficient Fixtures--GS-06*.

<sup>2</sup> The criteria for soaker hoses are based on Green Seal's criteria for *Soaker Hoses-GC-01*.



## CERTIFIED PRODUCTS

To order Green Seal-certified products, contact the following companies:

- Composting Toilets-Clivus Multrum,  
(617) 491-0051
- Low-Flow Toilets-Sanitation Equipment,  
(800) 366-7317
- Low-Flow Showerheads-Teledyne Water Pik,  
(800) 525-2774
- Soaker Hoses-Aquapore Moisture Systems,  
Inc., (602) 936-0401

See appendix for additional products.

- Laundry detergents: Purchase non-phosphate, liquid detergents or non-phosphate powders (although powders have higher levels of priority pollutant metals than liquids).
- Use the following criteria to select automatic dishwashing detergent.
  - Choose products without chlorine bleach, look for oxygen-based bleach instead.
  - Avoid products where NTA (nitrilotriacetic acid) is a builder.
  - Choose products with minimal amounts of phosphates.
  - Look for concentrates.
- Choose hand dishwashing detergent with reduced volatile organic compounds (VOCs). Although no federal standard for VOCs in dishwashing detergent exists, VOC levels should not exceed California's VOC standards for glass cleaners (VOCs < 8% by weight until January 1996, when it drops to < 6%).

4-5

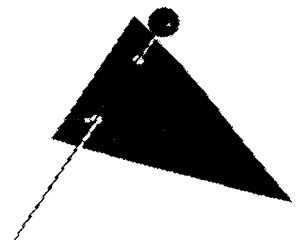
## SUCCESS STORY<sup>4</sup>

WESTIN BAYSHORE  
VANCOUVER, BC

The Westin Bayshore, a 517-room luxury hotel in Vancouver, British Columbia, recently explored ways to reduce costs, be more environmentally responsible and still maintain the standard of service that a guest paying more than \$100 per night would demand.

The hotel designated 75 of its rooms as "Environmentally Friendly" after extensive guest polling and a commissioned environmental audit. The "Environmentally Friendly" rooms are equipped with water-efficient fixtures, including low-flow showerheads and low-flush toilets, along with other energy and solid-waste conserving measures.

While the conversion of the 75 rooms did incur initial up-front costs, the hotel is beginning to see savings from these rooms. Most significantly, water use in these rooms was reduced 40%. The hotel is now planning to convert more of its rooms into these "Environmentally Friendly" rooms, as well as instituting conservation measures throughout.



<sup>4</sup> Source: *The San Francisco Examiner*, Sunday, October 12, 1994.

## GRAYWATER RECYCLING SYSTEMS

Graywater refers to used water that is collected and recycled without being sent to a central treatment facility. Graywater is typically generated by clothes washing machines, showers, bathtubs and bathroom sinks. Kitchen dishwashing water is not usually collected as graywater, because the high levels of oil, fat and grease can be difficult to filter and may cause odor problems, which are likely to attract pests.

Most of the wastewater generated by hotels and motels can easily be recovered and used for tasks that do not require potable water (such as irrigation or toilet flushing). Depending on the water fixtures, 15-40% of all graywater generated can be recycled to flush toilets, and the remaining 60-85% can be used for land irrigation.

According to recent studies, graywater accounts for an average of 65% of household wastewater, or approximately 29.4 gallons per capita per day. This suggests that as much as 65% of household wastewater can be recycled and reused. Unfortunately, similar estimates for commercial establishments are not available. Assuming the same average recycling rate for hotels and motels (since most hotel wastewater is also from bathing, dishwashing and laundry), about 140 gallons per day could be recovered per room for reuse.

4-6

### GRAYWATER BASICS

Graywater recycling systems are most commonly used for irrigation and toilet flushing. Other uses include supply water for ornamental ponds and make-up water for cooling towers in the central air-conditioning system.

On-site water recycling systems involve two kinds of water: graywater and blackwater. Blackwater is the water from kitchen dishwashing or toilet and urinal flushing. While graywater can be recycled and reused, blackwater cannot be recycled easily and must be disposed and treated accordingly.

Graywater systems for commercial establishments are now accepted by more *state* water management officials than in the past; however, as of 1992, only ten states allowed on-site graywater systems.<sup>4</sup> Some other states allow water recycling on a case-by-case basis (e.g., counties and cities have passed laws to allow the use of graywater systems).



#### KEY QUESTIONS

Use the following questions to assess whether a graywater system is appropriate for your facility.

- Is your property located in an arid state or in a water-use restriction area?
- Are graywater systems allowed by the government agency with jurisdiction over your facility?
- Do you have an on-site laundry facility?
- Is most of the water used on your property generated by guest-related activities, such as showers and baths?
- Do you require large amounts of water for outdoor irrigation?
- Are you planning any remodeling or retrofitting projects that will affect the plumbing or piping of guest rooms?

<sup>4</sup> These ten states are Arizona, California, Georgia, Hawaii, Maryland, New Mexico, South Dakota, Tennessee, Texas and Virginia.

Strict government regulations and plumbing codes are often the major barriers to implementing graywater systems. Generally, plumbing codes are in the purview of county or other local governmental agencies, so check with your local county health department or building inspector regarding the use of graywater in your area.

## SYSTEM OVERVIEW

Graywater systems typically consist of the following elements: storage tanks, piping, filters, pumps, valves and controls. When properly installed, operated and maintained, a graywater system can recycle much of the bath and wash water that otherwise would flow into a sanitary sewer or septic system for treatment. This is accomplished in three stages: collection, treatment with disinfection and distribution.

- **Collection.** Graywater systems require the use of a dual wastewater piping system—one for graywater and one for blackwater. Separate graywater piping is needed to collect wastewater from bathroom sinks, showers, bathtubs, clothes washing machines and laundry sinks and to direct it to the storage tank. The blackwater piping from toilets and kitchen sinks, on the other hand, remains plumbed to the sewer line or septic tank disposal system.
- **Treatment with disinfection.** Once collected, the graywater should be used as soon as possible and *should not be stored for more than a day*. The collected water is treated using standard water treatment methods; media filtration is the most commonly used. Your choice of treatment method will depend on the graywater source, application, recycling scheme and economics. For wastewater recycling systems (black & graywater), the standard disinfection techniques are also available.
- **Distribution.** The distribution method depends on the end-use of the graywater. In general, the distribution systems should use separate, *well-marked* piping to minimize any unintended uses. The systems should also be equipped with backflow prevention devices where connections to potable water systems are needed (such as potable water backup irrigation or flushing).



## COSTS

Graywater systems are most cost-effective in larger commercial establishments, such as hotels and motels, and when installed during building construction or remodeling. Adding a graywater unit as a retrofit to an existing building can be expensive, especially if the recovered water is used for toilet flushing or land irrigation.

Citing an average cost for a graywater system is difficult, because costs vary dramatically based on the system, climate, type of building and need. Graywater systems can produce water savings as high as 75-90% in commercial buildings. Payback, however, varies among units, climates and buildings. Roughly, payback for a commercial building is about five years. As with any building system, three types of costs are involved.

- **Initial costs.** The major cost of on-site wastewater treatment and recycling systems is the initial system cost. It typically ranges from \$300 for a basic residential system to \$30,000 or more for a fully automated commercial system for a large office building.
- **Operating costs.** Operating costs are related to use. One manufacturer estimated the annual energy consumption of a hotel or motel graywater system to be 13,000 kilowatt hours (kWh).<sup>5</sup> This represents the amount of energy required for a 100-room establishment to recycle *all of its generated wastewater*. At \$0.10/kWh, that translates into \$1,300.
- **Maintenance costs.** Maintenance costs include costs of replacement parts, replacement labor, filter cleaning labor, equipment repair and cost of maintaining control systems. For small commercial applications, the annual maintenance cost is about \$50 to \$100. For large commercial and industrial applications, the annual maintenance cost is about 2% of the initial equipment cost.

Many types of graywater systems are available from a variety of manufacturers. For more information, contact the National Association of Plumbing-Heating-Cooling Contractors at (800) 533-7694 and request a copy of *Assessment of On-Site Graywater and Combined Wastewater Treatment and Recycling Systems*.

### A SYSTEM SNAPSHOT

Graywater recycling systems require dual piping: one for graywater and one for blackwater.

1. The graywater pipe collects wastewater from showers, sinks and washers.
2. This water is treated in the on-site graywater treatment unit.
3. The graywater is recycled (i.e., sent through another piping to flush down toilets or to use for irrigation).
4. Once flushed down the toilet, the graywater becomes blackwater.
5. This blackwater is sent through designated piping to be disinfected and treated at the central treatment plant.

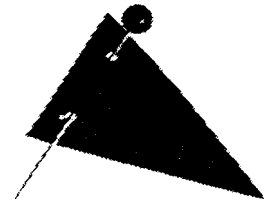
<sup>5</sup> John Irwin. Thetford Systems, Inc., (800) 521-3032.

## SUCCESS STORIES

### APPLE FARM INN & RESTAURANT <sup>7</sup>

SAN LUIS OBISPO, CA

The Apple Farm Inn & Restaurant, a seven-room luxury hotel in San Luis Obispo, California, installed a graywater system in 1992. The owners have saved about \$5,000 per year in their water and sewer bills, and the unit paid for itself in less than two years. Savings come from recycling the 4,200 gallons of water discharged daily from two commercial washers. The wastewater from the washers is quite clear, and instead of sending it directly to a waste treatment plant, it is recycled and used to flush toilets. So far, management has received positive feedback about the system and no complaints.



### GRAYWATER AT DISNEY WORLD <sup>8</sup>

ORLANDO, FL

At Disney World, violet-colored piping runs along roadways, curves above ground and plunges into the ground to emerge again elsewhere. Adding color to the resort, these violet pipes are part of Disney World's graywater aqueduct system.

The resort reclaims four million gallons of wastewater a day to use for horticultural purposes. Used water is captured, treated and used to irrigate hundreds of thousands of plants, five golf courses and hundreds of acres of lawns.

According to a Disney environmental specialist, using municipally treated water for irrigating the resort grounds would be prohibitively expensive, not to mention environmentally irresponsible, given Florida's threatened ground water resources. He added that the system benefits Disney World and can be beneficial to lodging facilities of all sizes.

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<sup>7</sup> Bob Davis, Apple Farm Inn, (805) 541-1614

<sup>8</sup> Reprinted with permission from Lodging, March 1994.

## ADDITIONAL RESOURCES

California Department of Water  
Resources  
PO. Box 942836  
Sacramento, CA 94236-0001  
tel (916) 327-1620

Maryland Department of Energy  
2500 Broening Highway  
Baltimore, MD 21224  
tel (410) 631-3652  
fax (410) 631-4894

National Association of Plumbing-  
Heating-Cooling Contractors  
(NAPHCC)  
180 S. Washington Street  
P.O. Box 6808  
Falls Church, VA 22046  
tel (800) 533-7694  
fax (703) 237-7442

National Sanitation Foundation  
(NSF)  
3475 Plymouth Road  
P.O. Box 130140  
Ann Arbor, MI 48113-0140  
tel (800) NSF-MARK  
or (313) 769-8010  
fax (313) 769-0109

National Small Flows  
Clearinghouse (NSFC)  
West Virginia University  
P.O. Box 6064  
Morgantown, WV 26506-6064  
tel (800) 624-8301  
or (304) 293-4191  
fax (304) 293-3161

Rocky Mountain Institute  
1739 Snowmass Creek Road  
Snowmass, CO 81654-9199  
tel (970) 927-3807  
fax (970) 927-4178

United States Environmental  
Protection Agency (EPA)  
401 M Street, SW  
Washington, DC 20460  
tel (202) 260-2080

Water and Waste Management  
tel (202) 260-5776

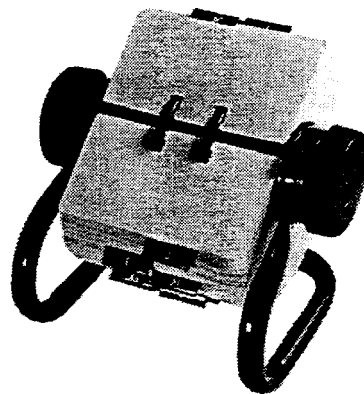
Water Alliance for Voluntary  
Efficiency (WAVE)  
tel (800) 993-WAVE

Virginia Department of Health  
Division of On-Site Sewage and Water  
Services  
P.O. Box 2448  
Richmond, VA 23218-2448  
tel (804) 786-1750  
fax (804) 225-4003

Water Environment Federation (WEF)  
601 Wythe Street  
Alexandria, VA 22314-1994  
tel (800) 666-0206  
fax (703) 684-2492

4-10

*See appendix for  
partial listing of  
consultants  
and suppliers.*



# IMPROVE INDOOR AIR QUALITY

*We spend over 90% of our time indoors, according to studies conducted by the Environmental Protection Agency (EPA). The EPA has also found that indoor air can be more polluted than outdoor air. Because of the amount of time spent indoors, any potential health risks associated with indoor air are increased.*

*Indoor air quality (IAQ) is an important factor in the hotel and motel industry's goal of client comfort. This section is geared towards keeping your guests satisfied by identifying common pollutants found in hotels and describing steps to eliminate those pollutants from your facility.*

## INDOOR AIR QUALITY BASICS

IAQ problems and concerns have increased tremendously in the last decade. The following combination of factors has contributed to their increase.

- Changes in building construction and heating, ventilation and air conditioning (HVAC) practices have created tighter buildings with fewer operable windows.
- In many buildings, occupants depend totally on the building WAC system to provide adequate ventilation.
- The use of synthetic materials and fabrics in building construction and furnishing has become commonplace.
- Personal care products, cleaners and pesticides are increasingly made with new and sophisticated chemical formulations, often packaged in aerosol cans or spray bottles to facilitate their delivery.

These factors contribute to two basic effects:  
(1) an increase in the number and types of contaminants released in the indoor environment and  
(2) a decrease in the amount of introduced fresh outdoor air, which dilutes contaminants and serves health and comfort needs.

A wide array of contaminants can be introduced into hotel and motel environments from diverse sources. The most common hotel pollutants and their sources are listed below.

**Asbestos** can be present in deteriorating or damaged building insulation and materials.

**Biological contaminants** can be released by poorly maintained HVAC systems, water-damaged walls, ceilings and carpets.

**Carbon monoxide and nitrogen dioxide** can be present in car exhaust, smoke, gas stoves, heaters and fireplaces. Elevated levels of nitrogen dioxide are highly irritating, and elevated levels of carbon monoxide can be fatal.

**Environmental tobacco smoke** is released from cigarette, pipe and cigar smoking.

**Formaldehyde** is contained in pressed wood products, durable press drapes, other textiles and glues.

5-2



### KEY QUESTIONS

Find out what you can do to promote good indoor air quality.

- Does your cleaning staff use products that are labeled as toxic? Delivered by aerosol spray cans?
- Are your guest rooms dependent on your heating, ventilation and air conditioning (HVAC) systems for the majority of fresh air delivery, or are room windows operable?
- Are the smoking rooms in your property isolated and separately ventilated?
- How often are the ventilation and air duct systems checked?
- Are there localized ventilation systems for kitchens, rest rooms, parking lots, elevators, offices and storage rooms?
- Are new rugs and furniture evaluated for off-gassing potential?

Two basic effects contribute to increased indoor air pollution.

- increased number and types of contaminants released in indoor environments
- decreased amounts of introduced fresh outdoor air

**Lead** is present in lead-based paint and can become airborne during renovations or when paint flakes off walls.

**Other volatile organic compounds (VOCs)** are released by building materials, carpets, office furnishings, cleaning products, air fresheners, paints, adhesives, pesticides and office equipment.

**Outdoor pollution** is generated by pollen, dust, car exhaust, combustion by-products and industrial air pollutants, and can be drawn inside buildings through HVAC systems.

**Ozone** is generated by laser printers, copiers, certain fax machines and air cleaning equipment (e.g., filters and ionizers). Ozone is also a product of car exhaust and sunlight, so that areas of high traffic can be a source of indoor ozone (when the pollution is drawn inside through building HVAC systems).

**Radon** is present in building materials and in earth and rock beneath building foundations.

Each of these pollutants can cause various human health effects. For example, radon, asbestos and formaldehyde are all classified by the EPA as either known or probable human carcinogens. Two contaminants—lead and VOCs—merit further discussion because they can be found throughout hotel and motel facilities, potentially in areas where guests spend long periods.

**LEAD** The major source of lead in indoor air is lead-based paint. Although residential use of lead-based paint was legally banned in 1978, these paints are still used for commercial and professional purposes. Furniture and walls in older buildings may be coated with leaded paint. Ingestion is the most common route of exposure to lead, and in small children, can result in delayed physical or mental development, lower IQ levels and increased behavioral problems.

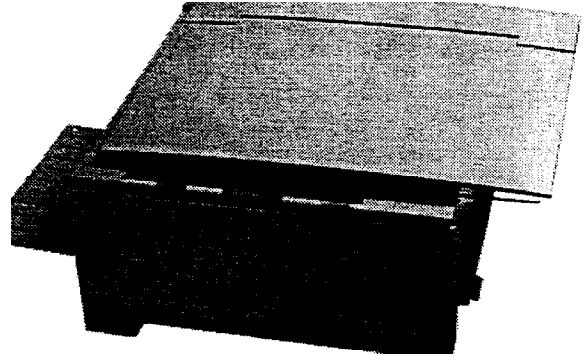
**VOCs** The health effects associated with VOCs vary widely, from headaches and eye, nose and throat irritation to loss of coordination and liver, kidney and nervous system damage. A set of EPA studies<sup>1</sup> found levels of common organic pollutants to be two to five times higher in some inside environments than the levels outdoors, regardless of location. Additional studies of IAQ in public buildings indicated that concentrations of VOCs are elevated due to emissions from sources such as surface coatings, wall and floor coverings, building materials, consumer products, and processes such as cleaning and smoking.<sup>2</sup> At least 500 VOCs have been identified by the EPA, and 100 to 200 of them have levels several times higher than outdoor concentrations.

<sup>1</sup>TEAM, or Total Exposure Assessment Methodology, 1979-1985.

<sup>2</sup>Indoor Air Quality in Public Buildings, September 1988.

The following categories of products commonly emit VOCs.

- Building materials and furnishings made of pressed wood products
- Paints and sealants
- Office equipment, such as copiers and printers, correction fluids, carbonless copy paper, glues and adhesives
- Cleaning products, such as rug and oven cleaners, air fresheners, cleansers and disinfectants
- Professionally dry-cleaned clothes
- Personal items, such as perfume and hair sprays



While not much can be done regarding the building materials used to construct existing buildings, we recommend a thorough facility inspection for indoor air pollutants (such as asbestos, formaldehyde, radon gas and other VOCs). Areas that deserve close examination include the building site, building materials, HVAC systems, basements, crawl spaces, building interiors and garbage handling.

5-4

## CONTROLLING INDOOR AIR QUALITY IN HOTELS

There are three basic strategies for controlling indoor air quality. By far, the most efficient method is **source control**- the prevention, reduction and removal of potential pollutants before they are introduced in a closed environment. An example of source control is substituting potentially toxic materials with less toxic alternatives.

The second method for improving air quality is **ventilation**. A good mechanical ventilation system and equipment-good design, operation and maintenance-are essential to the indoor air quality of a building. Therefore, fixing or replacing poorly operating HVAC systems leads to better IAQ. In closed or tight spaces- such as kitchens, garbage rooms, bathrooms, elevators and laundry and storage rooms-a good ventilation system will be needed to remove environmental tobacco smoke and other pollutants as well as provide adequate circulation of fresh air. Parking spaces, especially those that are located underground, also require good ventilation due to the large amounts of carbon monoxide and other unhealthy combustion-related pollutants released by automobile exhaust.

Large facilities may face greater IAQ problems, because there may be

### WAYS TO IMPROVE IAQ

#### SOURCE CONTROL

- Use non-toxic cleaning solutions

#### VENTILATION

- Introduce adequate fresh air into facility

#### AIR CLEANING

- Install air filters in offices

hundreds of sources (such as smoking rooms) in those facilities. Hence, larger hotels generally require more source control or better equipped ventilation mechanisms,

The third method of controlling IAQ is **air cleaning** (using air filtration equipment), but the EPA and other sources caution that this method should only complement, not replace, the previous two methods.

## METHODS OF CONTROLLING IAQ

### **Eliminate Sources**

- Eliminate sources of environmental tobacco smoke (i.e., prohibit cigarette smoking in all public areas and limit smoking to specific, separately-ventilated areas).
- Control humidity and surface temperatures to ensure the thermal comfort of occupants and prevent growth of mold and mildew due to moisture.
- Use products made from sustainably-harvested wood for indoor furniture and cabinets. When using pressed wood products, look for those containing phenol resin, which releases less formaldehyde than urea resin.
- Replace combustion appliances (such as kerosene heaters) with electric appliances.
- Use non-toxic and low-VOC materials wherever possible.
- Select environmentally preferable cleaning chemicals and solvents.
- Avoid lead-based paints.
- When choosing furnishings, choose lower emitting products. Choose carpets that display the CRI (Carpet and Rug Institute) IAQ Testing Program label (meaning the product type meets the criteria for low emissions) and follow the installation guidelines suggested on the next page.
- Remove sources of microbiological contamination, such as water-damaged carpets, furnishings or building materials (e.g., ceiling tiles, wallboards).

### **Adequately Ventilate**

- If parking is underground, provide adequate local exhaust ventilation.
- Open, adjust or repair air distribution systems to ensure proper air distribution indoors.
- Check, adjust, upgrade or improve operation and maintenance of all HVAC systems to meet appropriate IAQ standards<sup>3</sup> See Recommended Ventilation Levels table below.

<sup>3</sup> Defined in ASHRAE 62-1989.



- Inspect, clean and replace any leaks, corroding parts and filters in an HVAC system to remove debris and other biological contaminants.
- Implement local ventilation in kitchens, rest rooms, parking lots, elevators, offices and storage rooms.

### **Clean in Conjunction with Other Measures**

- Buy air cleaning equipment (e.g., filters and ionizers) only as complementary measures (with other steps). These devices do not completely eliminate bad indoor air, especially in the presence of strong sources.

5-6

### **INSTALLING AND MAINTAINING CARPET**

Carpets emit volatile organic compounds (VOCs) because they are made from synthetic compounds, and the adhesives and glues used to install carpets also contain VOCs. To address this issue, the Carpet and Rug Institute (CRI) of Dalton, Georgia, has established an Indoor Air Quality Testing Program in coordination with the EPA and the Consumer Product Safety Commission. Follow these common sense guidelines (established by CRI) when renovating your facility.

#### **Carpet Installation Guidelines**

- Vacuum old carpet before removal and clean floor afterwards.
- Ventilate with fresh air during all phases of installation for at least 72 hours.
- Use only low VOC emitting adhesives or pads.

#### **Carpet Maintenance Guidelines**

- Clean spills promptly.
- Vacuum high traffic areas (such as entrances and exits) daily, or at least twice weekly.
- Use vacuum cleaners with strong suction, adjustable brushes or beater bars, good filtration (one micron) and an enclosed filter bag.
- Completely extract moisture and chemicals during professional cleaning.
- Professionally clean carpet every 12 to 18 months and ventilate during and after the process, using portable fans if necessary.

## RECOMMENDED VENTILATION LEVELS <sup>4</sup>

The following table lists the minimum levels of ventilation recommended by ASHRAE (the American Society of Heating, Refrigerating, and Air-Conditioning Engineers) to ensure good indoor air quality.

Application	Occupancy (person/1000 ft <sup>2</sup> )	Ventilation level	
		cfm/person	cfm/ft <sup>2</sup>
<b>Hotels, Motels, Resorts &amp; Dorms</b>			
Bedrooms, Living Rooms			30/room
lobbies	30	15	
Conference Rooms	50	20	
Assembly Rooms	120	15	
<b>Food and Beverage Service</b>			
Dining Rooms	70	20	
Cafeteria	100	20	
Bars, Cocktail Lounges	100	30	
Kitchen	20	15	
<b>Offices</b>			
Office Space	7	20	
Reception Areas	60	15	
Conference Rooms	50	20	
<b>Public Spaces</b>			
Smoking Lounges	70	60	
Elevators	variable		1.00/ft <sup>2</sup>
<b>Sports and Amusement</b>			
Spectator Areas	150	15	
Game Rooms	70	25	
Playing Floors	30	20	
Ballrooms and Discos	100	25	

## CHOOSING ENVIRONMENTALLY PREFERABLE PRODUCTS

- Purchase low-VOC products (including paints, furnishings, office supplies and cleaning products) whenever possible. Choose paints with the following VOC concentrations (weight in grams/liter of product minus water).<sup>5</sup>

<sup>4</sup> CFM = cubic foot per minute. Source: ASHRAE Standard 62-1989, *Ventilation for Acceptable Air Quality*.

<sup>5</sup> Criteria for paints are based on Green Seal's standards for *Paints-GS-11*.

*Interior coatings*

- Non-flat - 150 g/L
- Flat - 50 g/L

*Exterior coatings*

- Non-flat - 200 g/L
- Flat - 100 g/L

- Other criteria to consider in paints include the following.

**Performance**

*Interior topcoats*

- Scrubbability at least 100 cycles (200 separate strokes) before failure
- Hiding power at a minimum of 0.95 contrast ratio at 400 ft<sup>2</sup>/gallon
- Washability of five minimum rating for flat paints and seven minimum rating for non-flat paints

*Exterior topcoats*

- Hiding power at a minimum of 0.95 contrast ratio at 400 ft<sup>2</sup>/gallon

**Chemical Component Restrictions**

- Limit the amount of aromatic compounds used in the product to no more than 1% by weight.
- Use paints that do not contain the following chemicals<sup>6</sup>

methylene chloride  
 1,1,1-trichloroethane  
 benzene  
 toluene  
 ethylbenzene  
 vinyl chloride  
 naphthalene  
 1,2-dichlorobenzene  
 di(2-ethylhexyl) phthalate  
 butyl benzyl phthalate  
 di-n-butyl phthalate  
 di-n-octyl phthalate  
 diethyl phthalate  
 dimethyl phthalate  
 isophorene  
 antimony  
 cadmium  
 hexavalent chromium

lead  
 mercury  
 formaldehyde  
 methyl ethyl ketone  
 methyl isobutyl ketone  
 acrolein  
 acrylonitrile



<sup>6</sup>You may need to request material safety data sheets to verify that these chemicals are not present in paints you are using.



## CERTIFIED PRODUCTS

To order Green Seal-certified products, contact the following companies:

- Paints-Con-Lx Coatings, Inc.,  
(908) 287-4000
- Paint & Primer-Krylon Products Group,  
(216) 498-2327
- Cleaners-BCD International,  
(800) 422-9290

See appendix for Additional products.

- Request that paint cans and their components are not fabricated with lead solder.
- Choose sealants and caulking compounds meeting the following criteria.<sup>7</sup>
  - Not labeled as toxic or highly toxic (as required by the Consumer Product Safety Commission (CPSC) regulations in 16 CFR Part 1500)
  - Not formulated with aromatic solvents, fibrous talc or asbestos, formaldehyde, mercury, lead, cadmium, hexavalent chromium or any halogenated solvents
  - Not formulated with emittable VOCs in excess of 20 g/L
- Use the following criteria to select cleaning products<sup>8</sup>
  - Choose non-toxic products-Look for products that are not formulated with carcinogens or reproductive toxins (as identified by the

National Toxicology Program's Annual Report and the California Safe Drinking Water Act of 1986, respectively). One exception to this list is ethanol; the relatively small amounts used in cleaners probably do not pose a reproductive hazard.

- Avoid products with high human toxicity, which are identified by a CPSC toxicity label, and high aquatic toxicity. Look for products where butoxy ethanol is replaced with less toxic alternatives, such as propylene glycol ether or ethanol.
- Choose biodegradable products-Look for products where each organic ingredient exhibits ready ultimate biodegradability, since some products which appear to be biodegradable may contain persistent ingredients or by-products. Avoid products with EDTA, a common builder that exhibits poor ready biodegradability.
- Buy concentrated products (containing less than 20% water by weight).
- Choose phosphate-free (less than 0.5% by weight) and heavy metal-free products.
- Purchase cleaners with less than 10% volatile organic compounds (VOCs) by weight.
- Choose pump-style sprays instead of aerosols-they generally emit fewer VOCs.

<sup>7</sup> These criteria are based on Green Seal's proposed standards for *Sealants and Caulking Compounds-GS-17*.

<sup>8</sup> These criteria are based on Green Seal's standards for *Household Cleaners-GS-8*.

- Look for packaging that is recyclable or made with recycled materials.
- Look for refillable containers.
- Avoid secondary packaging (except for concentrates) and aerosol cans. Aerosols often have high VOC content in their propellants, are flammable and contribute to global warming.
- Choose electric appliances instead of combustion appliances.
- Choose lower-emitting carpets displaying the EPA/CRI label.
- Purchase air cleaners (e.g., filters) to supplement your source control and ventilation activities.

## ADDITIONAL RESOURCES

American Society of Heating,  
Refrigerating, and Air-Conditioning  
Engineers (ASHRAE)  
1791 Tullie Circle, NE  
Atlanta, GA 30329  
tel (404) 636-8400

Carpet and Rug Institute (CRI)  
P.O. Box 2048  
Dalton, GA 30720  
tel (706) 278-3176

Indoor Air Quality Information  
Clearinghouse (IAQ INFO)  
U.S. EPA  
P.O. Box 37133  
Washington, DC 20013-7133  
tel (800) 438-4318 or (202) 484-1307  
fax (202) 484-1510

### U.S. EPA Publications

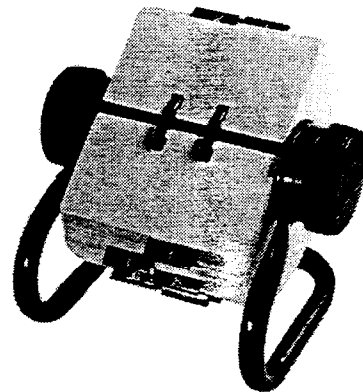
- *Introduction to Indoor Air Quality: A Self-Paced Learning Module*
- *The Inside Story: A Guide to Indoor Air Quality*
- *Indoor Air Pollution: An Introduction to Health Professionals*
- *Building Air Quality: A Guide for Building Owners and Facility Managers*

U.S. Consumer Product Safety  
Commission's Hotline  
tel (800) 638-CPSC  
National Lead Information Center  
Hotline  
tel (800) LEAD-FYI

U.S. Department of Energy (DOE)  
Office of Conservation and Renewable  
Energy  
1000 Independence Ave.. SW  
Washington, DC 20585  
tel (202) 586-6169  
or (800) 586-5000

U.S. Public Health Service  
Division of Federal Occupational Health  
Office of Environmental Hygiene, Region  
III, Room 1310  
3535 Market St.  
Philadelphia, PA 19104  
tel (215) 596-1888  
fax (215) 596-5024

**See appendix for  
partial listing of  
consultants  
and suppliers.**



# GREEN YOUR AMENITIES AND SERVICES

*Amenities and services are an important part of marketing your property. The ones you choose convey a certain image to your guests and are one of the “extras” that make a guest feel pampered and special. The services you provide—turn-down service at night, an in-room coffee maker or a portable computer—set you apart from your competitors. For this reason, decisions about environmentally preferable amenities and services require careful consideration of guest preferences, availability and costs. This section describes cost-effective ways for you to reduce the environmental impact of your amenities.*

## AMENITIES BASICS

Conservation and recycling programs do not necessarily mean giving up on luxury and comfort. In fact, if properly presented, the changes you make can enhance your guests' feelings of comfort. And while you boost sales and take care of your guests, you are also taking care of the environment beyond the hotel walls.

Changing the amenities and services your hotel offers may be met with opposition internally, because staff may be concerned that changes appear to be motivated by cost-cutting; however, using the right presentation, these changes can be supported by your staff and welcomed by your guests. (See the Publicity section for tips on informing staff and guests.)

Once you decide to change your amenities and services, review what you currently offer. Identify what makes a guest feel special and then decide whether there is another, environmentally preferable way to give them the same feeling. Ask your purchasing department to research and seek out suppliers of products that are less harmful to the environment than the products you currently use.

The activities described in this section have been tried by others in the lodging industry and have been received favorably by employees and guests.

6-2

### IDENTIFYING AMENITIES OPTIONS FOR HOTELS

Start with minor, low cost changes to your amenity programs. As these changes begin saving money, reinvest the savings into programs that may require larger initial capital investments before the savings are recaptured.

#### PERSONAL CARE PRODUCTS

**Choose recycled products.** Purchase toilet tissue, facial tissues and paper towels made from recycled paper tiers and you will be supporting and encouraging recycled product development.

**Review your choice of amenities in terms of size and associated wastes.** Can you purchase smaller bars of soap, so that less is wasted? Can you choose a product with less packaging? Do guests use the amenities you provide? If you find they rarely use a



#### KEY QUESTIONS

- What does your property do with "leftover" amenities?
- Do amenities and their packaging comprise a significant percentage of your solid waste?
- Have you conducted an audit of your purchases to identify items that are over-packaged (such as single-serving condiments)?
- Have you considered donating excess or worn-out linen to local shelters or other charity groups?
- Are guests using the amenities you provide, or is there excess waste when they depart?
- Are guests informed of your property's efforts to reduce environmental impacts?

product, such as a shower cap, consider having it available upon request.

**Purchase refillable soap, hair rinse and hand lotion dispensers** for guest rooms and eliminate bottle and soap waste altogether. Several hotels have converted to this relatively new approach, and report great success. For example, the Boston Park Plaza Hotel in Boston, Massachusetts notes that the money it saves has gone into purchasing a better quality product to go into the dispensers. Guests may resist this departure from a standard amenity, but an explanation of the environmental benefits will ease their concerns. In other words, guests want to know that the dispensers benefit them and the environment, and are not just cost-cutting measures.

**Donate partially-used products**, and extend their useful life. Currently, millions of little, partially-used shampoo and lotion bottles enter our landfills each year. Rather than discarding bottles with valuable contents, many hotels leave the bottles in a central location for employees to take home. Others donate the extras to local shelters. Your donations will be welcomed by the Salvation Army or other charities that you may choose.

## LINENS

**Purchase sheets with a higher thread count** for longer wear.

**Purchase towels and robes made from 100% natural cotton**, containing no chemicals, dyes or bleaches.

**Re-dye stained towels and wash cloths** for reuse as pool towels or cleaning rags. Some hotels have begun cutting stained towels and using them to make aprons for kitchen staff, baby bibs, crib liners and laundry bags for guest rooms. These projects can be implemented by staff during slow periods, so they won't increase labor costs.

**Donate used linens** to local shelters, the Salvation Army or other charities in your area.

## LAUNDRY AND DRY-CLEANING DEPARTMENTS

**Reduce your use of plastic** by returning laundry in reusable baskets and returning dry cleaning in plastic only if guests request it.

**Recycle hangers whenever possible.** Banff Springs Hotel in Alberta, Canada collects 1,000 to 1,500 coat hangers from guest rooms and staff accommodations every month and returns them to the laundry. Consider replacing plastic or wire hangers with ones made from sustainably harvested wood.



For guests staying several days, **reduce the frequency of changing and washing linens.** Guests who want fresh towels can leave the used ones on the floor, while guests who are willing to use their towels another day re-hang them. By placing instructions on towel racks and night stands explaining your program, you let guests choose for themselves the frequency of towel and sheet changes. The hotels who have tried this approach report an overwhelmingly positive guest reaction, noting that clear explanations prevent misinterpretation and enhance guest satisfaction. These programs also result in significant savings of water, detergent and costs. (See the sample cards in the appendix.)

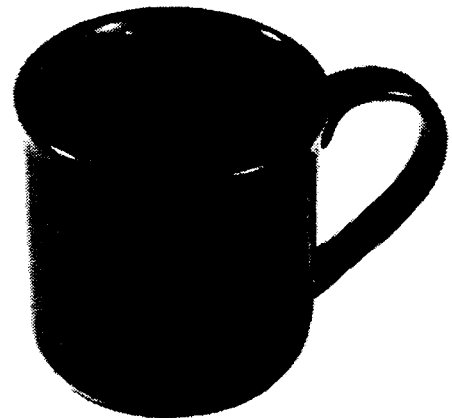
#### ROOM SERVICE

**Avoid individual packages** of butter, salt, pepper, jams and ketchup. Instead, consider providing reusable salt and pepper shakers or supplying jam and butter on a dish. Make the same considerations for in-room coffee service. If individual packages are used and guests leave some products unopened, consider ways to reuse or donate, rather than discard, the unopened products.

**Avoid using paper, plastic and polystyrene utensils and dishes.**

Instead, replace these items with reusable china, glasses and silverware. They generate less waste, and guests will appreciate the added luxury. Note that although you will be reducing waste, washing and drying reusable dishes consumes energy.

6-4



#### RESTAURANT AND CATERING DEPARTMENTS

**Donate leftover, untouched food** to local shelters or food banks. Appoint someone from your green committee to contact the charities in your area for programs that are already in operation. They may be able to pick up contributions or have a system to make your efforts less time consuming.

## CHOOSING ENVIRONMENTALLY PREFERABLE PRODUCTS

Purchase bath and facial tissue and paper towels and napkins meeting the following criteria.<sup>1</sup>

- Bath tissue should contain 100% recovered materials including 20% post-consumer material (pcm).
- Facial tissue should contain 100% recovered materials including at least 10% pcm.

<sup>1</sup> These criteria are based on Green Seal's standards for *Tissue Paper-GS-1*.

- Paper towels and napkins should contain 100% recovered material including at least 40% pcm.



To order Green Seal-certified products, contact the following companies:

- Coffee Filters and Baking Paper-A.V. Olsson Trading Co., (203) 531-5155
- Recycled Printing and Writing Paper-Mohawk Paper Mills, (518) 237-1740

See appendix for additional products.

- All products should be unbleached products or not bleached with chlorine or its derivatives.
- Products should not contain added dyes, inks or fragrances.

Choose recycled paper for stationery, message pads, placards, tables tents and in-room information packages. Look for paper meeting the following criteria.<sup>2</sup>

- All paper except coated should contain a minimum of 20% post-consumer recycled content.
- Coated paper should contain a minimum of 10% post-consumer recycled content.
- Choose papers that are not bleached or deinked using chlorine and its derivatives. Look for totally chlorine free (TCF) products over elemental chlorine free (ECF) products.

- Cadmium, hexavalent chromium, lead and mercury should not be used as ingredients in coated printing paper, and coating should not be formulated with free formaldehyde.

Purchase coffee filters that are either (1) unbleached or (2) not bleached with chlorine or its derivatives.<sup>3</sup>

Choose refillable dispensers for soap, shampoo, conditioning rinse and lotion.

Purchase sheets with higher thread count.

Look for reusable baskets for laundry services.

Purchase recycling bins for guest rooms or floors.

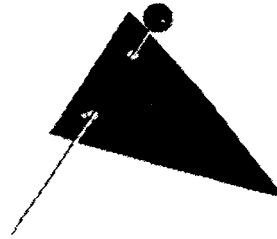
<sup>2</sup> These criteria are based on Green Seal's standards for *Printing and Writing Paper-GS-7*.

<sup>3</sup> Recommendation based on Green Seal's criteria for *Paper Products Used in the Preparation of Food-GC-08*.

## SUCCESS STORY <sup>4</sup>

COLONNADE HOTEL  
BOSTON, MA

The Colonnade Hotel in Boston, Massachusetts has a recycling program that encourages reuse as much as possible. For example, the hotel turns worn sheets and towels into baby bibs, crib bumper pads and bar covers. The Colonnade reports that they've "literally received hundreds of comments regarding the increased amenities we provide which advertising dollars couldn't begin to match!"



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<sup>4</sup> *Recycling and Source Reduction for the Lodging Industry, AH&MA*

# PUBLICIZE YOUR PROGRAM

*E*xtend the results of your environmental efforts even further Encourage others to support you by publicizing your efforts within the facility and throughout the local community. This section describes quick and easy ways to let people know how and why you are making changes to benefit the environment. It covers who you should inform and suggests ways to do so.

## WHO NEEDS TO KNOW?

Hotel guests who care about the environment will choose your property over others if they know about your environmental efforts. Keeping guests informed and satisfied with your programs is essential, because guest recommendations are the best publicity.

Informing your employees and supporters is also important, because they often implement or oversee the programs. Hotels with successful environmental programs overwhelmingly agree that employee participation and understanding of the programs are key to their success. Employees experience first-hand whether the programs are effective, and often will suggest improvements. Their daily contact with your guests puts them in the best position to educate your guests as well.

Educating the community at-large will make it easier for you to accomplish your environmental goals. This group includes local businesses, trade associations, other members of the lodging industry, your stockholders and board members, and the general public. It also includes the local and national media, who can be great allies. For instance, Stanley Selengut, President of the Maho Bay Resort in the U.S. Virgin Islands, reports that media interest in his resort's environmental programs has made a publicity budget unnecessary for the past ten years.

7-2

## HOW TO TELL THEM

You can publicize your environmental efforts to various audiences using the approaches described below. We recommend trying these as soon as your program is initiated; however, a particularly good time to seek press coverage for environmental efforts is around Earth Day-April 22.

### GUESTS

**Use placards to inform guests of environmental efforts in their rooms.** For example, if you're making daily towel and sheet changes optional, place a card imprinted with an environmental message on towel racks. The card instructs guests to place a towel on the floor if they want it washed, and back on the rack if they choose to use it again. A similar card is placed on nightstands for sheet changes. The cards can convey the amount of water or detergent saved if guests choose to reuse their linens. This approach has received positive reactions from guests. And best of all, you team up with those guests who wish to participate without alienating those who do not. (See sample cards in the appendix.)

**Use table tents in restaurants and lobbies.** Let guests know how much energy is being saved by using energy-efficient lights or how much waste is kept from landfills by finding new uses for old towels and linens.

**Send an environmental message with reservation confirmations.**

Include a small slip that touts your environmental accomplishments in terms that guests can understand (e.g., trees saved, cars removed from the road).

**Inform guests of your environmental efforts at check-in.** For example, let guests know you have non-smoking or “green” rooms available. Tell them where they *can* recycle aluminum cans or how to reuse towels and sheets.

**Incorporate an environmental message into in-room packages.**

Include your environmental mission statement in guest information packages, near light and water fixtures, or present it at check-in.

**Place recycling bins in guest rooms or hallways,** and provide

instructions nearby. Bins can be unobtrusive to blend in with

your decor, yet can be functional and inform guests of the efforts you are making. Many hotels are encouraging recycling in this way. For example, every hotel in the Canadian Pacific Hotels chain has placed recycling bins in guest rooms. The City of Toronto’s Public Works and Environment Department even provided Canadian-Pacific’s Skydome Hotel with a number of boxes free of charge. Although recycling bins require an initial capital investment, their costs should quickly be recovered by savings in disposal charges.



**Give guests the option at check-out to contribute an extra dollar to an environmental or wildlife group** of your

choosing. The Boston Park Plaza Hotel does this by adding a line to the guest folio which may be crossed out by the guest if he or she does not wish to make the contribution. Consider matching funds and be sure to let your guests know if you do so. In another example, two hotels in the Loews Hotel chain-Loews Annapolis and Loews L'Enfant Plaza-have instituted a *Very Important Pets* program, as part of the chain’s Good Neighbor Policy. The hotel donates 5% of the room rate generated by guests with pets to the local Society for the Protection and Care of Animals.

## EMPLOYEES AND SUPPORTERS

**Announce your environmental efforts around the facility** and throughout other branches if you are part of a chain. Encourage others to follow your lead by writing articles about environmental benefits and cost savings in employee or stockholder newsletters and annual reports. Repeat the green message at staff events, such as staff picnics or annual board meetings.

**Designate coordinators of environmental activities (e.g., recycling coordinator).** Their responsibilities should include educating other staff about the program.

**Convey your environmental message on gifts to employees.** The environmental committee of the Canadian Pacific Skydome Hotel in Toronto, Canada presents all new employees with a reusable mug for use in the staff cafeteria as a welcome gift.

**Start an incentive program for new ideas or demonstrated dedication to the environment.** Reward individuals and recognize the best “green” departments. For example, some hotels offer badges or plaques to employees who identify opportunities to decrease the facility’s environmental impact.

7-4

## COMMUNITY

**Participate in environmental activities** in your **community**. Projects such as beach, street, and bay clean-ups and recycling drives are great, low-cost opportunities for hotel personnel to interact with the community and feel good about the work the hotel is sponsoring. Such projects also build leadership and team-work skills-and they’re fun.

**Participate in community events that attract media attention, and highlight your environmental activities.** These activities often stimulate positive press, especially when a major employer in the community participates.

- Participate in community organizations, such as Rotary or Kiwanis, and describe your environmental contributions to the community at meetings. Consider presentations to the Chamber of Commerce as well.
- Trumpet your environmental efforts on a float in a local parade.
- Provide beverages for a community event and highlight your environmental activities on reusable cups that you distribute. Provide recycling bins for such events as well.
- Consider participating in ride-sharing programs and donating food, clothing and linens to shelters.

**Participate in award programs sponsored by your trade association.**

Some associations give awards for forward-thinking or environmentally progressive members. For example, the Willard Inter-Continental Hotel in Washington, DC won the 1995 American Hotel and Motel Association's Stars of the Industry Award for Environmental Achievement. The award led to media interest from such publications as *The New York Times* and *Conde Nast Traveler*.

**Include local education institutions in your activities.** Invite schools to participate in activities or go to schools and promote public awareness. The Loews New York Hotel participated in the chain's Good Neighbor policy by bringing elementary school children to the hotel for a morning of supervised cooking. Afterwards, the students hand-delivered their leftovers to a nearby soup kitchen.

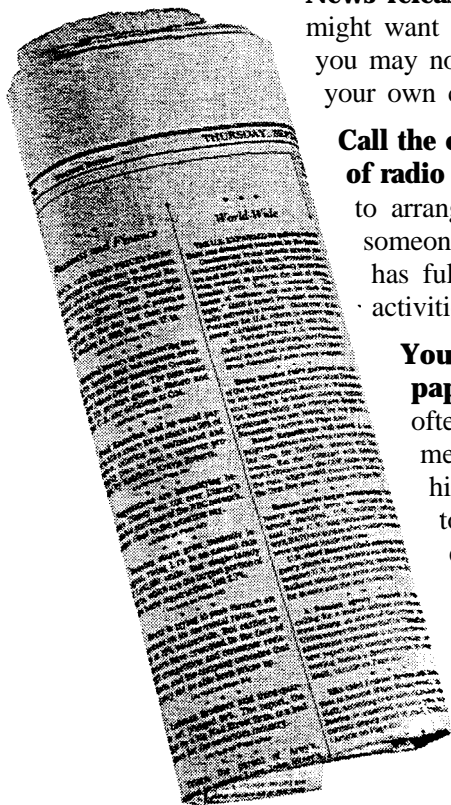
**Submit news releases to your local press so the** community will know of your environmental efforts. Mention specific activities or changes you are making and when possible, quantify the results. For example, let the public know how many trees you are saving as a result of switching to recycled paper in your offices. Figures like these go a long way to impress upon the community that you are serious about protecting the environment.

**News releases also work well with the travel press,** although you might want to follow the release with a phone call to the editor since you may not be as well-known by trade publications as you are in your own community.

**Call the editor of your local newspaper, or speak with producers of radio talk shows and cable television public affairs programs** to arrange a meeting or interview with your company president or someone from your green team. Make sure your spokesperson has full knowledge of environmental improvements, both the activities and the results.

**You can also write a letter to the editor of your local newspaper.** Call first to find out length requirements (these are often short), and address the larger picture of the environmental impact of the lodging industry in general. You can highlight your own facility as an example, but editors tend to stay away from promotional-style letters, so think 'broad educational message' on these.

By publicizing your environmental efforts, your facility becomes established as an environmental leader. You can build good will in your community while you protect our natural resources.

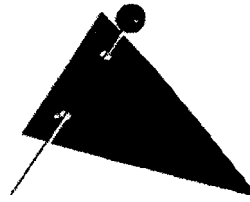




## SUCCESS STORY

MANDARIN ORIENTAL

SAN FRANCISCO, CA



The Mandarin Oriental, a five-star luxury hotel in San Francisco, has instituted a comprehensive environmental program that balances guest requirements with environmental concerns. As part of the program, the hotel hangs a poster in the employee lounge and in each department describing the hotel's environmental commitment. The same statement is reprinted in the guest directories. Following is the preamble:

*Mandarin Oriental Hotel Group is committed to actively participate in the continuous improvement and protection of the environment for our guests, our colleagues and the community. We continuously strive to minimize adverse effects on the environment within the context of our business requirements and without compromising our high standards and the comfort of guests. We will endeavor to anticipate any changes in environmental priorities and take positive action.*

# APPENDIX

# ENVIRONMENTAL AUDIT FORM FOR HOTEL AND MOTELS

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PAGE 1

OPERATIONAL AREA	PROJECT AREA	PROJECT DESCRIPTION	DONE	COMPLETION DATE	ESTIMATED COST	EST. SAVINGS	RESPONSIBLE PERSON
Guest Rooms	Energy	<ul style="list-style-type: none"> <li>■ Replace incandescent light bulbs with compact, fluorescents of equal or better brightness.</li> <li>■ Replace incandescent light fixtures (such as wall sconces, bathroom vanity, table and floor lamps) with dedicated (hard-wired) energy-efficient light sources, such as compact fluorescent or halogens.</li> <li>■ Install timers or motion sensors to turn off unused lights and HVAC..</li> </ul>					
	Water	<ul style="list-style-type: none"> <li>■ Replace conventional showerheads with low-flow ones (2.4 gpm).</li> <li>■ Install low-flow faucet aerators (2.5 to 2.0 gpm).</li> <li>■ Replace conventional toilets with low-flow toilets (1.6 gpf).</li> </ul>					
	IAQ	<ul style="list-style-type: none"> <li>■ Eliminate environmental tobacco smoke (ETS) sources by maintaining smoke-free rooms or isolated, separately-ventilated smoking rooms.</li> <li>■ Substitute materials that cause irritation and allergies (such as pesticides, room freshener sprays, furniture polish, glues) with those that do not.</li> <li>■ Clean rooms with environmentally preferable cleaning chemicals and solvents, including those that are low in VOCs.</li> </ul>					
	Waste/ Recycling	<ul style="list-style-type: none"> <li>■ Replace soap and shampoo packages with refillable dispensers.</li> <li>■ Provide recycling bins for cans, bottles and newspapers in every room.</li> </ul>					
	Communica-tions	<ul style="list-style-type: none"> <li>■ Inform guests of your efforts through in-room placards and other means.</li> </ul>					

**ENVIRONMENTAL AUDIT FORM FOR HOTEL AND MOTELS**

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PAGE 2

OPERATIONAL AREA	PROJECT AREA	PROJECT DESCRIPTION	DONE	COMPLETION DATE	ESTIMATED COST	EST. SAVINGS	RESPONSIBLE PERSON
Hallways Lobbies and Public Areas	Energy	<ul style="list-style-type: none"> <li>■ Replace incandescent hall, bathroom and lobby lights and fixtures with energy-efficient light sources or fixtures, such as compact fluorescents, HIDs or halogens.</li> <li>■ Replace incandescent exit lights with compact fluorescent, LED, or other energy-efficient and long-lasting light sources.</li> <li>■ Use compact fluorescent bulbs for table and floor lamps in lobbies.</li> <li>■ Delamp hall vending machines.</li> </ul>					
	Water	<ul style="list-style-type: none"> <li>■ Install low-flow aerators (2.5 to 2.0 gpm) in faucets in public bathrooms.</li> <li>■ Replace conventional toilets in public bathrooms with low-flow (1.6 gpf) toilets.</li> </ul>					
	IAQ	<ul style="list-style-type: none"> <li>■ Check, adjust, improve or upgrade HVAC system operations and maintenance to meet appropriate IAQ standards, as recommended by ASHRAE 62-1989.</li> <li>■ Detect and remove sources of microbiological contamination, such as water damaged carpets, furnishing or building materials.</li> <li>■ Use vacuum cleaners that have strong suction, good filtration and a filter bag.</li> <li>■ Clean spills from food and beverages promptly.</li> </ul>					
	Waste/ Recycling	<ul style="list-style-type: none"> <li>■ Place recycling receptacles on each floor as an alternative to in-room recycling bins.</li> </ul>					
	Communi- cations	<ul style="list-style-type: none"> <li>■ Involve and educate the staff on conservation efforts.</li> <li>■ Inform guests of your efforts through placards and other means.</li> </ul>					

**ENVIRONMENTAL AUDIT FORM FOR HOTEL AND MOTELS**

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PAGE 3

OPERATIONAL AREA	PROJECT AREA	PROJECT DESCRIPTION	DONE	COMPLETION DATE	ESTIMATED COST	EST. SAVINGS	RESPONSIBLE PERSON
Offices	Energy	<ul style="list-style-type: none"> <li>■ Upgrade office lighting fixtures to energy-efficient T8 lamps with electronic ballasts.</li> <li>■ Consider energy-efficient task lights.</li> <li>■ Purchase controlling devices for computers, printers and copiers.</li> <li>■ If possible, purchase new energy-efficient equipment.</li> </ul>					
	IAQ	<ul style="list-style-type: none"> <li>■ Use local ventilation.</li> <li>■ Open, adjust or repair the air distribution system to ensure proper air distribution.</li> <li>■ Educate the staff to use air-cleaning equipment (especially air ionizers) only as complementary devices.</li> </ul>					
	Waste/ Recycling	<ul style="list-style-type: none"> <li>■ Implement office paper recycling.</li> <li>■ Consider the purchase of recycled and other environmentally preferable products (e.g., remanufactured toner cartridges, copier and writing paper with recycled contents).</li> </ul>					
	Communications	<ul style="list-style-type: none"> <li>■ Educate and involve the office staff on conservation efforts.</li> </ul>					
Kitchen/ Laundry	Energy/ Water	<ul style="list-style-type: none"> <li>■ Reduce the hot water settings for kitchen and laundry where practical.</li> <li>■ Operate dish and clothes washers only with full loads.</li> <li>■ Establish a maintenance schedule for dish and clothes washers, dryers and flushing of hot water tanks.</li> <li>■ Install timers and sensors for lights and HVAC.</li> </ul>					

**ENVIRONMENTAL AUDIT FORM FOR HOTEL AND MOTELS**

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OPERATIONAL AREA	PROJECT AREA	PROJECT DESCRIPTION	DONE	COMPLETION DATE	ESTIMATED COST	EST. SAVINGS	RESPONSIBLE PERSON
Kitchen/ Laundry, <i>cont.</i>	IAQ	<ul style="list-style-type: none"> <li>■ Use local ventilation.</li> <li>■ Select environmentally preferable cleaning chemicals and solvents, including those that are low in VOCs.</li> </ul>					
	Waste/ Recycling	<ul style="list-style-type: none"> <li>■ Purchase supplies in bulk.</li> <li>■ Eliminate excess packaging.</li> <li>■ Recycle and reuse containers where practical.</li> </ul>					
	Communi- cations	<ul style="list-style-type: none"> <li>■ Involve and inform the kitchen and laundry staff about conservation efforts.</li> </ul>					
Grounds and General Opera- tions	Energy	<ul style="list-style-type: none"> <li>■ Maintain room air conditioners according to manufacturers' recommendations (i.e., clean or replace about once a month, clean condensers every two or three years).</li> <li>■ Equip windows with glazing or films that allow light but not heat to pass through.</li> <li>■ Install timers and sensors for lights.</li> <li>■ Encourage employees to turn lights and other equipment off where possible.</li> </ul>					
	Water	<ul style="list-style-type: none"> <li>■ Consider xeriscaping—cultivating native plants and flowers to reduce water and pesticide needs—where possible.</li> <li>■ Water plants and shrubs only when necessary and at night.</li> <li>■ Use soaker hoses to deliver water.</li> <li>■ Consider a graywater recovery system for gardening and other needs.</li> </ul>					

**ENVIRONMENTAL AUDIT FORM FOR HOTEL AND MOTELS**

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PAGE 5

OPERATIONAL AREA	PROJECT AREA	PROJECT DESCRIPTION	DONE	COMPLETION DATE	ESTIMATED COST	EST. SAVINGS	RESPONSIBLE PERSON
Grounds Operations <i>cont.</i>	IAQ	<ul style="list-style-type: none"> <li>■ Use sustainably harvested wood for indoor furniture.</li> <li>■ Upgrade combustion appliances for efficiency and improved IAQ where possible.</li> <li>■ Establish strict maintenance schedules.</li> <li>■ Inspect and clean the HVAC system to remove debris and other biological contaminants.</li> <li>■ Repair all leaks, and replace corroding parts and filters.</li> </ul>					
	Waste/ Recycling	<ul style="list-style-type: none"> <li>■ Develop and implement a property-wide recycling policy.</li> <li>■ Establish a toxics reduction program to identify toxic and hazardous chemicals and safer substitutes.</li> <li>■ Offer employees mugs and reusable cups instead of disposable ones.</li> </ul>					
	Communi- cations	<ul style="list-style-type: none"> <li>■ Involve and inform employees in all departments of conservation efforts.</li> <li>■ Establish a conservation suggestion box, and offer prizes for good conservation ideas.</li> </ul>					

Notes:

- IAQ - Indoor Air Quality
- HID - High Intensity Discharge lamps
- HVAC - Heating, Ventilation and Air Conditioning
- LED - Light Emitting Diodes
- VOCs - Volatile Organic Compounds

# ENERGY WORKSHEET

Property: \_\_\_\_\_ Date: \_\_\_\_\_

Average monthly utilities: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average monthly electric: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average monthly gas: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average monthly oil: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_

## A. Energy Audit

1. Date of last audit: \_\_\_\_\_ By: \_\_\_\_\_
2. Any action taken? Yes No
3. Savings realized: \_\_\_\_\_ \$/month
4. Any cost/benefit studies provided? Yes No

## B. HVAC Operations and Maintenance

5. Have you instituted a regular maintenance schedule for all HVAC systems? Yes No
6. If you have a regular maintenance schedule, does it include the following:
  - Cleaning of permanent filters with mild detergents every one or two months, or change replaceable filters every one or two months?
  - Checking entire systems once a year for coolant and air leaks, clogs and obstructions of air intake and vents?
  - For room (window) air conditioner maintenance, does the maintenance schedule include the following:
    - Checking and cleaning the filters once every month during heavy cooling?
    - Checking the units every year?
    - Cleaning unit condensers at least every two or three years?
    - Checking to see if the right amperage and voltage are available to every unit?
7. During high cooling seasons, do you implement steps to reduce inside heat sources? Do they include the following:
  - Covering windows, especially west- and south-facing windows, against sunlight with drapes, shades or shutters?
  - Selecting windows and window films with high visible light transmission coefficients and low heat gain coefficients?
  - Turning off electric lights and appliances or other heat-producing equipment that is not in use, and reducing or eliminating incandescent lighting?
  - Installing programmable on/off timers and sensors for lights, appliances and room HVAC?
  - Positioning heat-producing appliances (such as TVs and lamps) away from room thermostats?



### **C. Laundry and Kitchen**

8. Have you implemented use and maintenance program for appliances?
  
9. Are the equipment positioned for optimal performance (for example, separating stoves and ovens from refrigerators and freezers)?
  
10. Is your staff encouraged to look for products and activities that can help save energy (for example, switching to non-white or colored linens)?

### **D. General Operations**

11. Are there opportunities to reduce energy consumption and cost in general operations? For example, running laundry and other energy-intensive operations at night, when utility rates are lower, can save energy and lower your bills.
  
12. Has your property considered more energy-efficient office equipment (for example, purchasing “controlling devices” that can turn off unused office equipment to save energy)?

# LIGHTING WORKSHEET

Property \_\_\_\_\_ Date: \_\_\_\_\_

Average monthly utilities \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average monthly electric \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average lighting %: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_

## A. Energy Audit

1. Date of last audit: \_\_\_\_\_ By: \_\_\_\_\_

2. Any action taken? Yes No

3. Savings realized: \_\_\_\_\_ \$/month

4. Any cost/benefit studies provided? Yes No

## B. General Operations and Grounds

5. Have you instituted energy-efficient lighting practices in all common areas, including the following:

- converting incandescent fixtures that stay on for 24 hours a day to more energy-efficient alternatives such as CFLs?
- converting full-size fluorescent fixtures to energy-efficient T-8 lamps and electronic ballasts?
- evaluating the use of task lighting in offices and reception areas and the use of energy-efficient and hardwired fixtures in lobby and other areas?
- installing timers or other control for outdoor lighting so that they do not stay on beyond needed periods?

6. Have you investigated alternatives to incandescent exit sign lighting with more energy efficient alternatives, such as LED or CFL?

7. Have you investigated alternatives for incandescent outdoor lighting with other energy-efficient sources, including solar energy operated outdoor lights?

## C. Guest Rooms

8. Have you replaced incandescent light bulbs in guest room table, floor, wall or vanity fixtures with more energy-efficient alternatives of the types listed below?

- Table, floor or wall fixtures with compact florescent (22 W or above)?
- Bath and sink vanity with fluorescent lamps and electronic ballasts?

9. Have you considered the replacement of incandescent table, floor, wall or vanity fixtures in guest room with more energy-efficient and hard-wired alternatives?

**D. Sample Calculations**

For a typical guest room

	Table Lamp	Floor Lamp	Vanity
A. Current Lamp Wattage			
B. Suggested Replacement	25	27	2 x 20
C. Estimated Use Hours/Day			
D. Estimated Occupancy Rate			
E. Electric Rates (¢/kWh)			
Savings Per Year: (A-B) x C x 365 x D x (E/1000)			

# WATER WORKSHEET

Property: \_\_\_\_\_ Date: \_\_\_\_\_

Average monthly water: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average monthly sewer: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_

For hotwater heating:  
Average monthly gas: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_  
Average monthly oil: \_\_\_\_\_ High: \_\_\_\_\_ Low: \_\_\_\_\_

## A. Audit

1. Date of last audit: \_\_\_\_\_ By: \_\_\_\_\_

2. Any action taken? Yes No

3. Savings realized: \_\_\_\_\_ \$/month

4. Any cost/benefit studies provided? Yes No

5. Are all leaks repaired immediately?

## B. Guest Rooms

6. Have you replaced guest room showerheads, bath and sink faucet aerators and toilets with more water-efficient alternatives of the types listed below?

- Showerheads with flow rates of 2.4 gallons per minute (GPM) or less at 80 psi?
- Bath and sink faucet aerators with flow rates of 2.0 GPM (at 80 PSI)?
- Low-flow toilets with flush volume of 1.6 gallons or less per flush?

## C. Kitchen and Laundry

7. Have you instituted water efficient practices in the kitchen and laundry areas, including installing water-efficient devices of the types listed below or practices listed below?

- Kitchen and laundry faucet aerators with flow rates limited to to 2.5 GPM (at 80 PSI)?
- Operate clothes and dish washers only with full loads?
- Considered installing a holding tank to capture the final rinse water from clothes washers to reuse as the wash water in the next wash cycle?

## D. General Operations and Grounds

8. Have you identified areas of unnecessary water use and instituted reduction and alternate measures, including the measures listed below?

- Replace non-native plants with natives where feasible and specify native species when you re-landscape?
- Use soaker hoses, which “sweat” water and are made from post-consumer recycled rubber?
- Restrict lawn watering to evening and night time to maximize effectiveness and water only when needed?
- Limit pool circulation to actual pool usage time and cover pool when not in use?

## E. Sample Calculations

### Guest Room Water Use

	Toilet Usage (GPF)	Lavatory Faucet Flow Rate (GPM)	Showerhead Flow Rate (GPM)
A. Measured or Actual			
B. Ideal Conservation	1.6	2.0	2.4
% Savings per use $[(A-B)/B] \times 100$			

Note: The US EPA WAVE program provides more detailed forms and software of this type to all program participants.

SAMPLE LINEN CARDS

**SAVE OUR PLANET!**

Dear Guest:

Every day tons of detergent and millions of gallons of water are used to wash towels that have only been used once.

**PLEASE DECIDE FOR YOURSELF**

A towel on the rack means "I'll use it several times"



A towel on the floor means "please exchange"



10% of Profits Donated to The Sierra Club.  
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P.O. Box 430212, Houston, TX 77242-0212  
713/769-8889, Fax 713/769-9786

**SAVE MOTHER EARTH!**



Bed sheets washed daily in thousands of hotels in this world uses millions of gallons of water and tons of detergent.

Sheets are customarily changed daily, but if you feel that this is unnecessary, leave this card on your pillow in the morning, and your sheets will not be changed that day.

**PLEASE DECIDE FOR YOURSELF.**



10% of Profits Donated to The Sierra Club.  
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P.O. Box 430212, Houston, TX 77242-0212  
713/769-8889, Fax 713/769-9786

## PARTIAL LISTING OF HOTEL CONSULTANTS

Cape and Islands Self Reliance Corporation  
24 Collins Road  
PO Box 3203  
Waquoit, MA 02536  
tel (508) 457-7679  
fax (508) 457-9171  
Matt Patrick, Executive Director

Eco-Logical Solutions, Inc.  
6 St. James Avenue  
Boston, MA 02116  
tel (617) 426-2010  
fax (617) 426-2060  
Tedd Saunders, President

HVS Eco Services  
372 Willis Ave.  
Mineola, NY 11501  
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fax (516) 742-3059  
Cindy R. Rushmore, President

Minnesota Environmental Initiative  
2420 Rand Tower  
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Marina Swedberg, Energy Program Manager

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Alexandria, VA 22314  
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James Golden, Administrator

River City Resource Group, Inc.  
4233 S.W. Corbett  
Suite 1  
Portland, OR 97201  
tel (503) 248-4550  
fax (503) 295-2053  
Wendy Frizzell, Associate

Servidyne Systems, Inc.  
2120 Marietta Blvd. NW  
Atlanta, GA 30377  
tel (404) 352-2050  
fax (404) 352-2827  
E. Milton Bevington, President

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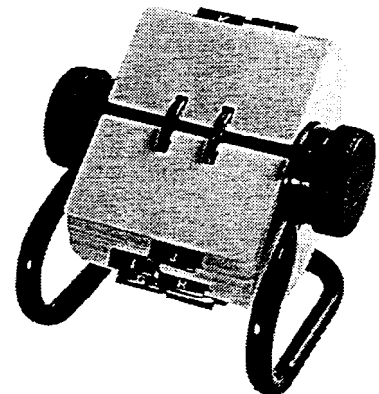
## PARTIAL LISTING OF SUPPLIERS

Customized Environmental Systems, Inc.  
3422 William Penn Highway  
Suite 202  
Pittsburgh, PA 15235  
tel (412) 823-1147  
fax (412) 823-1055  
Derrick Williams, President

Green Suites International  
1901 Avenue of the Stars  
Suite 1050  
Los Angeles, CA 90067  
tel (310) 772-2892  
fax (310) 553-0851  
Ray Berger, Vice President Sales and Marketing

Hartford Air & Water  
432 Landmark Dr.  
Wilmington, NC 28412  
tel (910) 799-7955  
fax (910) 799-1925  
Bill Thibideau, VP

PureChoice, Inc.  
4445 W. 77th St.  
Suite 100  
Edina, MN 55435  
tel (800) 845-5544  
fax (612) 835-2226  
Bryan Reichel, President



## CERTIFIED AND RECOMMENDED PRODUCTS

Below are four kinds of products that make environmental claims.

- Green Seal-certified products.
- Products certified by the Environmental Choice Program (ECP), Canada's environmental labeling program. These products are available in the U.S. unless otherwise noted.
- Products recommended in the University of Florida's *EcoPurchasing in Hotels and Motels* (1993), noted as "FL product list."
- Products recommended In Green Seal's *Choose Green Report*.

Green Seal has neither tested nor verified any environmental or performance claims unless indicated by the phrase "Green Seal-certified."

### KEY

- 100/50 means 100% recovered material and 50% post-consumer material.
- PC refers to levels of post-consumer material.
- 100% recycled means 100% recovered materials and no post-consumer materials.
- Class A certification for a CFL means that a product meets Green Seal's power quality designation.
- Class A certification for a paint means that it is formulated without volatile organic compounds (VOCs).
- TCF means totally chlorine free, and ECF means elemental chlorine free.

Product Name	Manufacturer	Environmental Claims
<b><i>Bicycle Racks</i></b>		
Bicycle Racks	Enviro-Cycle, Inc., 404-840-7010	FL product list. Made from 100% recovered plastic, sawdust and wood.
<b><i>Brooms, Industrial</i></b>		
Brooms	Emsco, Inc., 814-774-3137, 800-458-0839	FL product list. 50% PC recycled plastic
Snow Brooms	Recycled Plastic Products Corp., Gary Plastic Packag- ing Corp., 203-629-1480	FL product list. 100% recovered plastic.
<b><i>Building Materials</i></b>		
AMOFOAM-RCY Insulation and AMOFOAM-RCX Insulation	Amoco Foam Products Company, 404-587-0535, 800-241-4402.	FL product list. Both types made without CFCs and with 50% blend of PC and industrial waste polystyrene. RCX Insulation is film-laminated for strength.
Ceiling Tile, Acoustic	Apache Products Company, 601-693-0254	FL product list. 18% PC newsprint, 45% recovered mineral wool.
Plastic Lumber	ARW Polywood, Inc., 419-224-2283	FL product list. Made from recycled plastic.
Ceiling Tile, Acoustic	The Celotex Corporation, 813-873-4027	FL product list. 4-21% PC newsprint, 3-90% recovered steel mill slag.



Product Name	Manufacturer	Environmental Claims
Plastic Lumber	Futurewood Products, National Waste Technologies, 516-RECYCLE	FL product list. Made from recycled plastic.
Plastic Lumber	Hammer's Plastic Recycling Corp., 515-648-5073	FL product list. Made from recycled plastic.
Ceiling Finish, Spray-On	International Cellulose Corp., 713-433-6701	FL product list. 100% recovered paper.
Plastic Lumber	Jeanell Sales Corp., 901-456-2681	FL product list. Made from recycled plastic.
Bricks	Phoenix Scientific Industries, 614-267-0100	FL product Est. 50% PC brick, 50% recovered fly ash.
Asphalt Products	Rouse Rubber Industries, Inc., 601-636-7141	FL product list. Made from ground 100% PC tires.
Tiles, Floor	Stoneware Tile Co., 317-935-4760	FL product list. Made from PC recycled glass.
Insulation	Suncoast Insulation Manufacturing, 813-238-0486.800-666-4824	FL product list. Made from 100% recycled newspapers: no asbestos, fiberglass, or mineral wool.
Plastic Lumber	Superwood of Alabama, Inc., 334-874-3781	FL product list. Made from recycled plastic.

## ***Carpeting***

Carpet Backing	DURA Undercushions, 514-737-6561	FL product list.
Carpet	Image Carpets, Inc., 706-235-7547	FL product list. All carpet contains PC recycled plastic, some with 100% PC content.
Enviroilon™ Carpeting	Talisman Mills, Inc., 800-482-5466	FL product list. Contains 100% recycled plastic, most of it PC plastic.

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## ***Cleaning Products***

✓ BCD Ultra Concentrated Cleaner	BCD International, 800-422-9290	Green Seal-certified. Meets Green Seal environmental standards governing ingredients, biodegradability, packaging and other characteristics.
Bio-T All Purpose Cleaner/Degreaser	Biochem Systems, 800-442-4686	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
BR-Solvent	Blue Ribbon Paint Company, 304-233-1670	FL product list. Made from 100% recovered spent waste solvent mixture.
Trewax Clean Multi-Purpose Cleaner/Degreaser	Chemifax, 310-908-0405	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
Citra-Solv	Chempoint Products Inc., 203-778-0881	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
Ecover All-Purpose Cleaner	Ecover, 800-449-4925	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
ECO 2000	KC Products Inc., 503-287-4608	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
Planet All-Purpose Cleaner	Planet Inc., 604-656-9436	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
DfE™3, Enviro Care All-Purpose Cleaner	Rochester Midland Corp., 716-336-2200	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable.

<b>Product Name</b>	<b>Manufacturer</b>	<b>Environmental Claims</b>
Dispensers, Solutions Center	S.C. Johnson & Son, Inc., 414-631-2000. 800-962-5326	FL product list. Dispenses concentrated cleaning solutions into reusable trigger spray bottles with back-flow preventer that protects the potable water supply.
Toilet Bowl Cleaner	S.C. Johnson & Son, Inc., 414-631-2000 800-962-5326	FL product list. Neutral pH, water-soluble.
Enviro-Solns #70 General Purpose Cleaner, #75 Heavy Duty Degreaser	Seventh Generation, 802-655-6777	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
Simple Green	Sunshine Makers Inc., 800-228-0709	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.
Ultra Shield Ultra Clean and Cleaner Concentrate	Ultra Shield Prod. Intl., 800-483-4083	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. Biodegradable, non-toxic.

## ***Containers***

Trash Containers	Hammer's Plastic Recycling Corp., 515-648-5073	FL product list. Made from recycled plastic.
HuskeyLite 95 and 65-gallon Universal Carts, Stacking Bins, Recycling Bins	Rehrif Pacific Co., 404-339-9888. 800-241-9693	FL product list. Up to 25% PC plastic.
Trash Containers	Routed Signs, 904-622-7066	FL product list. Made from recycled plastic/wood combination.
Recycling and Refuse Containers. Ash/Trash Receptacles, Indoor/Outdoor Waste Containers	Rubbermaid Commercial Products, 800-347-9800. 713-667-8700	FL product list. 20%-100% PC resin, can be imprinted; 15% PC soft receptacles with imprint.
Recycling Bin (18-gallon, 'Enviro-Green')	Utility Plastic Recycling, 718-497-4000	FL product list. Made from 100% PC bottles.
Plastic Containers	Vital Visions Corporation, 904-835-2121	FL product list. PC content.
Clusters™ Trash, Recycling and Litter Cans	Windsor Barrel Works, 215-756-4344	FL product list. Made from recycled plastic.

## ***Dust Pans***

Dust Pans	Wiltec, Inc., 508-537-1497	FL product list. 30-100% PC plastic.
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## ***Envelopes***

Envelopes	ATAPCO Canada Ltd., 905-564-9909 x 22	ECP-certified. Available in Canada only.
Envelopes-	Dominion Blueline Inc., 514-346-6901	ECP-certified. Available in Canada only.
Customized Envelopes	Envelope Montreal Inc., 514-331-7110	ECP-certified. Available in Canada only.
Envelopes	Fraser Envelopes Ltd., 604-521-8666	ECP-certified.
Envelopes	Innova Envelope Inc., 514-738-3305	ECP-certified.
Envelopes	National Paper Goods (Division of Envocorp. Inc.), 905-527-3641	ECP-certified.
Envelopes	Pioneer Envelopes Ltd., 604-273-0761	ECP-certified.
Envelopes	PNG Globe Envelopes, 416-675-9370	ECP-certified. Can source in the U.S.

Product Name	Manufacturer	Environmental Claims
Customized Envelopes	Regional Envelope. 905-513-8511	ECP-certified. Available in Canada only
Envelopes	Royal Envelope Ltd., 905-879-0000	ECP-certified.
Customized Envelopes	Supremex Inc., 514-251-7355	ECP-certified.

### ***Fax Machines***

Faxphone B540, Faxphone B550	Canon, 516-488-6700	Recommended in Green Seal Choose Green Report. Not Green Seal-certified.
Fax-700 C3530, Fax-700 C3781	Hewlett-Packard. 800-752-0900	See above.

### ***Fleet Vehicles***

✓ Pollution Reducing Taxicab Fleet	Clean Air Cab Company Inc., Washington, DC, 202-667-7000	Green Seal-certified. Reduced air pollution vehicle.
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### ***Food Service Products***

✓ Beyond Gourmet Unbleached Coffee Filters	A.V. Olsson Trading Co., 203-531-5155	Green Seal-certified. Meets Green Seal environmental criteria for unbleached paper products used in the preparation of food.
✓ Beyond Gourmet Unbleached Baking Cups	A.V. Olsson Trading Co., 203-531-5155	See above.
✓ Beyond Go&et Unbleached Parchment Trays and Plates	A.V. Olsson Trading Co., 203-531-5155	See above.
Food Service Coasters and Mugs	Packaging Corporation of America, 708-492-5780	FL product list. Made from PC paper.
	Signature Marketing. 203-658-7172. Distributor	FL product list. Recycled content.

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### ***Lighting Products-CFLs***

✓ GE 20 watt Electronic Triple Biax-Class A certification	General Electric, 216-266-6675	Green Seal-certified. Power Factor > 0.9 and THD < 33%.
✓ 2020TP - Class A certification	Lights of America, 800-321-8100	Green Seal-certified. Power Factor > 0.9 and THD < 33%.
✓ 2022TP - Class A certification	Lights of America, 800-321-8100	See above.
✓ 2030TP - Class A certification	Lights of America, 800-321-8100	See above.

### ***Newsprint***

✓ 100% Recycled Newsprint	Atlantic Newsprint. 905-686-5940	Green Seal-certified. ECP-certified. Certified 100% recovered material, minimum 60% PC.
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### ***Packaging***

✓ Bubble Wrap and Planks	Astro Valcour Inc., 407-855-7297, 800-848-4770	FL product list. Made from 66% recovered plastic.
Protective Packaging	International Plastics, 803-297-8000	FL product list. Made from 100% PC plastic and 100% recycled cardboard.

### ***Paints***

✓ Enviro-Plex Series Acrylic Latex Eggshell - Class A certification	Con-Lux 908-287-4000 Ask for Mark Biedron.	Green Seal-certified. Meets Green Seal environmental standards for volatile organic compounds (VOCs) and does not contain specified toxic chemicals.
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Product Name	Manufacturer	Environmental Claims
✓ Enviro-Plex Series Acrylic Latex Flat - Class A certification	Con-Lux, 908-287-4000 Ask for Mark Biedron.	See above.
✓ Enviro-Plex Series Acrylic Latex Gloss - Class A certification	Con-Lux, 908-287-4000 Ask for Mark Biedron.	See above.
✓ Enviro-Plex Series Acrylic Latex Semi-gloss - Class A certification	Con-Lux, 908-287-4000 Ask for Mark Biedron.	See above.
✓ Enviro-Plex Series Latex Primer - Class A certification	Con-Lux, 908-287-4000 Ask for Mark Biedron.	See above.
✓ Enviro-Plex Series Latex Block Filler - Class A certification	Con-Lux, 908-287-4000 Ask for Mark Biedron.	See above.
✓ Krylon® Rust Tough® Latex for Metal	Krylon Products Group. 216-498-2327	Green Seal-certified. Meets Green Seal environmental criteria for anti-corrosive paints. Does not exceed 250 g/L VOCs and does not contain specified toxic chemicals.
Beaver	Beaver Lumber Co. Ltd., 905-670-3999	ECP-certified. Available in Canada only.
Impervex, Ironclad, Moore's (latex and solvent), Moorcraft, Moorgard, MoorClo, MoorGrip, Moortone, Moot-wood, Motocraft, Pro-Am, Regal, Vol-Pro, Wal-Grip, Dulaemel, Impervo	Benjamin Moore & Co. Ltd. 416-766-1173, 800-826-2623 for U.S. dealers	ECP-certified.
Béto-Rock, Bétonel, Climat	Bétonel Limitée, 514-273-8855	ECP-certified. Can ship to the U.S.
Cloverdale	Cloverdale Paint Inc., 604-596-6261	ECP-certified. Limited availability in U.S. (OR and WA only).
Bloc Mate, Blokker, Color Your World (latex and solvent), Designer's Touch Latex, Painter's Choice, The Outsider, Velvet Pastels Latex	Color Your World Inc., 416-259-3251	ECP-certified. Available in Canada only.
Decologik, Decor, Den-Pro, Denalt, Week-End	Denalt Paints Ltd., 514-328-2727	ECP-certified. Available in Canada only.
Dura Pro, Durakote Ultra, Durakote Ultra Plus, Promo, Promo Plus, Protector Plus, Durakote Professionals Choice, DURALUX	Dural (Division of Multibond Inc.), 514-636-6230	ECP-certified.
Breeze, Envirogard, General Paint, Procraft Latex	General Paint Ltd., 604-253-3131	ECP-certified. Can ship to the U.S.
Beau&Tone, Creation, Home Latex, Home Painter, Painters Paint, Rona, Super Beauti-Tone, Wood Shield	Home Hardware Stores Ltd., 519-449-2441	ECP-certified. Available in Canada only.
Homecare (latex and solvent)	Homecare Building Centres Ltd., 905-671-2424	ECP-certified. Can ship to the U.S.
CIL, CIL Contract, CIL Dulux (latex and solvent), CIL Dulux Professional, CIL Professional, Dulux, Dulux Contractor, Dulux Dimensions, Glidden, Glidden Commercial, Glidden Endurance, Glidden Spred 2000, Glidden Spred, Glidden Spred Silk, Glidden Ultra (latex and solvent), Glidden Ultra Hide, ICI Paints, ICI Professional (latex and solvent), Fast and Easy, Insul-Aid, Lifemaster 2000, Spred, Spred House, Spred Latex, Spred Lo-Lustre, Spred Satin Latex, Spred Wall, Ultra-Hide	ICI Paints (Canada) Inc., 905-669-1020/3442, 800-221-4100 for U.S. dealers	ECP-certified.

Product Name	Manufacturer	Environmental Claims
Irly Bird Premium	Irly Distributors Ltd., 604-596-1551, 360-945-3116 for U.S. dealers	ECP-certified.
LePage's, LePage's Rez	LePage's Ltd., 905-459-1140	ECP-certified. Available in Canada only.
Iso-Stain Latex, Latex Plus, Portico Latex, Proline Latex, Vogue Latex	MF Paints, 514-628-3831	ECP-certified. Available in Canada only.
MICCA Acrylic, MICCA Moda, MICCA Texture	MICCA Paint Inc., 514-333-8500	ECP-certified. Available in Canada only.
Niagara Paint	Niagara Paint Inc., 905-522-4604	ECP-certified. Available in Canada only.
Colorlox Premium, Colorlox Premium Tmp, Norco, Timberlox	Northern Paint Canada Inc., 204-958-5400	ECP-certified. Can ship to the U.S.
P.S. Atlantic	P.S. Atlantic Ltd., 709-747-5432	ECP-certified. Available in Canada only.
Para (latex and solvent)	Para Inc., 905-792-0940	ECP-certified. Available in Canada only.
Lucite® Coatings, Olympic, Pittsburgh Paints (latex and solvent), Pittsburgh Paints Manor Hall, Pittsburgh Paints Homeguard, Pittsburgh Paints Speedcraft (latex and solvent), Pittsburgh Paints Speedhide (latex and solvent), Pittsburgh Paints Speedpro, Pittsburgh Paints Suncare, Pittsburgh Paints Sun-Proof (Latex and solvent), Pittsburgh Paints Wallcare (latex and solvent), Pittsburgh Paints Wallfresh, Pittsburgh Paints Wallhide, Pittsburgh Paints Weatherfresh, Pittsburgh Paints Brilliant Reflections	PPG Architectural Finishes, Inc., 412-274-3416	ECP-certified.
Accolade, Aqua Satin, Cellu-tone, Effecto, Permalize, Pratt & Lambert, Pro-Hide Plus (latex and solvent), Skylight Latex, Stainshield, Supreme (latex and solvent), Vapex, Vitra-Shield, Vitralite, WithSTAND	Pratt & Lambert Inc., 716-873-6000	ECP-certified. Available in Canada and the U.S.
Revelstoke	Revelstoke Home Centres Ltd., 604-888-4111	ECP-certified. Available in Canada only.
4 Way, Decorator 1 Coat, Easy Living, Easy Living Designer, Easy Living E/R, Easy Living Plus, Smooth & Easy, Stormmaster, Weatherbeater, Weatherbeater Plus, Weatherbeater Six, Water Sealer	Sears Canada Inc., 416-941-3982	ECP-certified.
Celvit, Château, Contractor, Crown Diamond, Crown Diamond China White, Crown Diamond Perfection, Crown Pro, Crown Promotional, Decor, Decor Master, Dureco, Durisco, Flame-Check, Image, Maître Decor, Perlatex, Platinum Finish, Selection Plus, Sico, Sicoglo, Sicogloss, Sicomix, Sicoprim, Sico-Satin, Sico Super Urethane, Sico Suprasatln, Sico-Tex, Sicovet, Suprasatin	Sico Inc., 514-527-5111	ECP-certified. Available In Canada only.

Product Name	Manufacturer	Environmental Claims
Co-op Atlantique, Co-op Atlantique Deco-Tone Series, Fedecor. Fedecor Deco-Tone, Laurentide. Laurentide Deco-Tone, National, National Deco-Tone Series	Société Laurentide Inc., 819-537-6636	ECP-certified. Available in Canada only.
Builder's Pride, Do-It Brand, Harimco, Howden, Howden Interior 20L, Novice, Peinture Mat Expert, Pro Brand Paint, Unitotal	Sodisco Group Inc., 519-686-2200	ECP-certified. Can ship to the U.S.
Clairtone, Decor Accent, Luxury Supreme, Luxury Velvette, Pearltone, Premium. Royal. St. Clair, St. Clair Plus Line, Step One Primers, Ultimate. Weather Supreme	St. Clair Paint and Wall-paper, 905-738-0080	ECP-certified. Available in Canada only.
Tibbetts, AQUA-T	Tibbetts Paints Ltd., 902-752-8301	ECP-certified. Can ship to the U.S.
UCP Latex	UCP Paints Inc., 514-381-9217	ECP-certified.

## ***Pallets***

Pallets	Hammer's Plastic Recycling Corp., 800-338-1438	FL Product list. 97% PC plastic.
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## ***Papers***

### ***Copy Paper***

Aspen	Boise Cascade Corp., 800-550-2750	ECP-certified.
Multipurpose Colors Recycled	Champion. 203-358-2748	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. ECF, 50/20.
Guardian	E.B. Eddy Forest Products, 613-725-6709	ECP-certified.
Geo-Cycle	Georgia-Pacific. 410-584-8377	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. ECF, 20% PC.
Resolve	Island Paper Mills Co., 800-597-5111	ECP-certified.
Eureka! 100, Eureka Premium Recycled Copy	James River Paper Co. Inc., 800-932-4888	ECP-certified and recommended in <i>Green Seal</i> Choose Green Report. Not Green Seal-certified. Available in Canada and the thirteen western states in the U.S. TCF, 100/70 or 35% PC.
New Life	Rolland Inc., in U.S. 203-878-5895, in Canada 514-569-3909	ECP-certified.
Rockland Multipurpose Bond. Rolland Opaque Hi-Tech	Rolland Inc., in U.S. 203-878-5895, in Canada 514-569-3909	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. ECF 20% PC.

### ***Fine Paper***

✓ Mohawk Vellum Recycled Paper	Mohawk Paper Mills, 518-237-1740	Green Seal-certified. ECP-certified. Certified minimum 25% PC.
✓ Mohawk Vellum PC 100 Recycled Paper	Mohawk Paper Mills. 518-237-1740	Green Seal-certified. ECP-certified. Certified 100% PC.
✓ Tomohawk Recycled Paper	Mohawk Paper Mills. 518-237-1740	Green Seal-certified. ECP-certified. Certified minimum 25% PC.
✓ Irish Linen Recycled Paper	Mohawk Paper Mills. 518-237-1740	See above.
✓ Mohawk Satin Recycled Paper	Mohawk Paper Mills. 518-237-1740	See above.

Product Name	Manufacturer	Environmental Claims
NVF Post-Consumer Papers	C.P.M. Inc., 603-542-2592	ECP-certified.
Bellbrook Laid, Genesis. Halopaque, Medallion. Normandie Writing, Sycamore 100	Cross Pointe Paper Corp., 212-213-1536	ECP-certified.
Aquarius	Cross Pointe Paper Corp., 212-213-1536	Recommended in Green Seal Choose Green Report. Not Green Seal-certified. TCF, 20% PC.
Byronic Recycled, Comet Copy, Concerto Recycled, Deluxe, Encore, Mayfair Recycled. Natural Cover 100 Recycled, Pressboard. Plainfield Recycled, Sandpiper, Viva Exercise 100	Domtar Inc., 514-848-6602	ECP-certified.
Century Premium Opaque. Eagle, Guardian. Golden Kraft Envelope R10PC. Natural Kraft Envelope R10PC, Register Paper W.P.. Vista Opaque 50/10, Work Order Tag 50/ 10, Wove Envelope R15PC	E.B. Eddy Forest Products, 613-725-6709	ECP-certified.
50% Sulfite, Capital, Circa '83® Recycled, Circa Select® Recycled, Confetti®, Crushed Leaf™, Early American®, Fox River® Recycled, Howard. Linen	Fox River Paper Co., 800-558-8327	ECP-certified.
Protterra™	Georgia-Pacific, 410-584-8377	ECP-certified.
Resolve 1	Island Paper Mills Co., 800-597-5111	ECP-certified.
Eureka!	James River Paper Co. Inc., 800-932-4888	ECP-certified and recommended in Green Seal Choose Green Report. Not Green Seal-certified. Available in Canada and the thirteen western states in the U.S. TCF, 100/70 or 35% PC.
Revue Premium Recycled	Monadnock Paper Mills, Inc., 603-588-3311	ECP-certified.
CLASSIC® Columns. CLASSIC CREST® Recycled, CLASSIC® Laid Laser Recycled. CLASSIC® Laid Recycled, CLASSIC® Linen Recycled, ENVIRONMENT®, NEENAH® Bond Recycled. NEENAH® Laser Recycled	Neenah Paper. 414-721-3511	ECP-certified.
New Life, Rolland Evolution 50. Rolland Evolution 100	Rolland Inc., in U.S. 203-878-5895, in Canada 514-569-3909	ECP-certified.

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### *Other Office Papers*

NCR Paper, Recover™ Recycled Carbonless Paper, Recover™ Integra Self-Contained, Recover™ Premium Self-Contained	Appleton Papers Inc., 414-749-8179	ECP-certified.
Shipping Tags	Avery Dennison Canada Inc., 905-623-6311	ECP-certified. Available in Canada only.
Aspen Security Tags	Boise Cascade Corp., 800-550-2750	ECP-certified.
Customized Business Forms	Crain-Drummond Inc., 514-449-7171	ECP-certified. Available through a U.S. subsidiary.
File Folders, Loose Sheets	Dalshowa Inc., 514-335-3003	ECP-certified.
Customized Business Forms and Papers	Data Business Forms, 905-677-1490	ECP-certified.

Product Name	Manufacturer	Environmental Claims
Customized Business Forms and Papers	Data Focus, 514-769-4476	ECP-certified. Available in Canada only.
Bound Materials	Esselte Canada Inc., 905-670-2222	ECP-certified. Available in Canada only.
Customized Business Papers	Lancaster Datamark Business Forms, 905-475-9750	ECP-certified. Can ship to the U.S.
Customized Business Forms and Papers	Moore Business Forms and Systems, 905-602-1736 x 219	ECP-certified.
Customized Business Forms	Pro Forms Ltd., 403-236-0135	ECP-certified.
Customized Business Forms and Papers	Sheraton Business Forms, 403-287-0414	ECP-certified.
Customized Business Papers	Tenex Data Corp., 416-291-7151	ECP-certified. Available in Canada only.
Loose Sheets	Xerox Canada Ltd., 716-423-5205	ECP-certified.
Post-It™ Notes	3M Canada Inc., 800-395-1223	ECP-certified.

### ***Re-refined Engine Oil***

✓ America's Pride - 5W30, 10W30, 10W40, 15W40	Safety-Kleen, 800-525-5739	Green Seal-certified. Meets Green Seal environmental standards for selected contaminants and certified 100% re-refined stock.
✓ America's Choice - 5W30, 10W30, 10W40, 15W40	Safety-Kleen, 800-525-5739	See above.
✓ America's Future - 5W30, 10W30, 10W40, 15W40	Safety-Kleen, 800-525-5739	See above.
✓ Safety Kleen - 5W30, 10W30, 10W40, 15W40, 20W50, SAE10, SAE20, SAE30, SAE40, SAE50	Safety-Kleen, 800-525-5739	Green Seal-certified. Meets Green Seal environmental standards for selected contaminants and certified at the following levels of re-refined stock: SAE50 - minimum 40%. SAE40 - minimum 60%. SAE30 and 20W50 - minimum 75%. all others - 100% re-refined stock.
Canada Safeway Motor Oil	Canada Safeway Ltd., 604-322-2500	ECP-certified. Available in Canada only.
CTC Motomaster ECO Environmentally Considerate Motor Oil	Canadian Tire Corp. Ltd., 416-480-8202	ECP-certified. Available in Canada only.
Chevron Re-Refined Motor Oil	Chevron Canada Ltd., 604-668-5300	ECP-certified. Available in Canada only.
Unival Enviro Plus Engine Oil	Home Hardware Stores Ltd., 519-664-2252	ECP-certified. Available in Canada only.
Lubie Lube Premium Motor Oil	Hub Oil Co. Ltd., 403-248-1900	ECP-certified. Available in Canada only.
Esso Entech Re-Refined Motor Oil, Entech Premium Heavy Duty Engine Oil	Imperial Oil, 416-968-4775	ECP-certified. Available in Canada only.
Canadian Pride Hydraulic Oil, Canadian Pride Re-Refined Motor Oil	Mohawk Oil Co. Ltd., 604-929-1282	ECP-certified. Available in Canada only.
Canada's Choice Motor Oil, National Motor Oil. Premium 1 Motor Oil	Oil Recovery (Division of Safety-Kleen Canada Inc.), 519-648-2291	ECP-certified. Available in Canada only.
Petro-Canada Re-Refined Motor Oil	Petro-Canada, 905-403-6840	ECP-certified. Available in Canada only.



Product Name	Manufacturer	Environmental Claims
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### ***Retread Tires***

Retread Truck Tires	Casselberry Tire Company, 407-831-0544	FL product list. 70% PC tires.
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### ***Reusable Bags***

✓ Safety Sacs Bags	A. Rifkin Co., 800-458-7300	Green Seal-certified. Meets Green Seal standards for being a reusable utility bag certified for at least 300 uses.
✓ Courier Sacs Bags	A. Rifkin Co., 800-458-7300	See above.
✓ Trans Sacs Bags	A. Rifkin Co., 800-458-7300	See above.
Reusable Shopping Bags: Unbleached Cotton Bag	DFR Environmental Products Ltd.. 905-707-8812	ECP-certified. Available in Canada only.
Reusable Shopping Bags: 210 Denier Nylon Bag, Unbleached Cotton Canvas Bag	Meridian Promotional Products Inc.. 604-732-9021	ECP-certified. Available in Canada only.
Reusable Shopping Bags: Unbleached Cotton Bag	Progress Packaging Ltd.. 416-638-1221	ECP-certified. Available in Canada only.
Reusable Shopping Bags: Unbleached Cotton Bag	Soni Enterprise Inc., 514-382-3555	ECP-certified. Available in Canada only.

### ***Tissue Products, Institutional***

Paper Towels, Napkins, Bath and Facial Tissue	Atlantic Recycled Paper Co., 410-747-7314. 800-323-2211	FL product list. 40-60% PC paper towels, napkins and toilet paper; 5% PC facial tissue.
Envision™ Unbleached Towels and Tissue	Fort Howard, 414-435-8821	FL product list. Recommended in Choose Green Report. Not Green Seal-certified. 90-95% PC, no dyes or fragrances. core of bathroom tissue contains 30% PC, unbleached.
Recycled Paper Products	G.E. Robertson&Co., 603-336-5981	FL product list. PC recycled paper products.
Cormatic™ Dispenser Systems	Georgia Pacific Environmen- tal Products, 800-477-2737, 800-243-2547	FL product list. Recycled paper products in reduced sizes; lightweighted corrugated packaging.
Recycled Paper Products	Marcal Paper Mills, Inc., 800-631-8451	FL product list.
Recycled Paper Products	Paper Service, Ltd., 603-239-6344	FL product list.
Recycled Paper Products and Paper/Soap Dispensers	Scott Paper Company, 215-522-5000	FL product list.
Recycled Paper Products	Tagsons Paper, 800-824-7667	FL product list.
Second Nature Unbleached Towels and Tissue	Wisconsin Tissue, 800-451-3595	Recommended in Choose Green Report. Not Green Seal-certified. 100% PC, unbleached.

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### ***Toner Cartridges***

Remanufactured Toner Cartridges	Florida Ribbon Company, 813-723-2265, 800-966-0546	FL product list.
Remanufactured Toner Cartridges	Kraynack Office Machine, 305-764-2900, 800-800-2735	FL product list.
Remanufactured Toner Cartridges	Laser Products, Inc., 305-235-9544	FL product list.
Recycled HP/Canon Compatible Laser Toner Cartridges	Multi Laser, 613-382-1115	ECP-certified.

Product Name	Manufacturer	Environmental Claims
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Remanufactured Toner Cartridges	Orlando Laser, Etc., 407-282-6070	FL product list.
Remanufactured Toner Cartridges	Quality Charge of Ocala, 904-843-1698	FL product list.

### ***Trash Bags***

Trash Bags	Amer A Can Consultants & Suppliers. 407-894-5110	FL product list. 20% PC plastic.
Trash Bags	DYCO, International. Inc., 717-823-3001	FL product list. 70% recovered plastic.
Trash Bags	International Plastics, 803-297-8000	FL product list. PC plastic.
Trash Bags	Whitehall Plastics, 813-247-2500	FL product list. 10-30% PC plastic.

### ***Water-Efficient Fixtures***

✓ Clivus Multrum Composting Toilet	Clivus Multrum, 617-491-0051	Green Seal-certified. Meets Green Seal environmental standards for water efficiency.
✓ Flush-o-Matic	Sanitation Equipment, 905-738-0055	Green Seal-certified. Meets Green Seal environmental standards for water efficiency.
✓ Ultra-Flush	Sanitation Equipment. 905-738-0055	See above.
✓ Shower Massage: SM-42W, SM-42WCL, SM-45W	Teledyne Water Pik, 303-221-8738	Green Seal-certified. Meets Green Seal environmental standards for water efficiency.
✓ Super Saver: SS-1, SS-3BL	Teledyne Water Pik, 303-221-8738	See above.

### ***Watering Hoses***

✓ Moisture Master Soaker Hose Watering System 5/8"	Aquapore Moisture Systems, Inc., 800-635-8379	Green Seal-certified. Contains a minimum of 65% PC rubber.
✓ Moisture Master Soaker Hose 1/2"	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Moisture Master Soaker Hose 5/8"	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Moisture Master Sprinkler Hose	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Grow & Tell Children's Gardening Kit	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Better Homes & Gardens Soaker Hose Watering System 5/8"	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Better Homes & Gardens Sprinkler Hose	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Better Homes & Gardens Soaker Hose 5/8"	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Rain Master Soaker Hose 5/8"	Aquapore Moisture Systems, Inc., 800-635-8379	See above.
✓ Frank's Soaker Hose 5/8"	Aquapore Moisture Systems, Inc., 800-635-8379	See above.

### ***Windows***

✓ PS Casement	Andersen Corporation, 612-430-7362	Green Seal-certified. Meets Green Seal environmental standards governing thermal transfer, solar heat gain, visible light transmission, air leakage, and frame and sash materials.
✓ PS Awning	Andersen Corporation, 612-430-7362	See above.

Product Name	Manufacturer	Environmental Claims
✓ PS Casement/Awning Picture Window	Andersen Corporation. 612-430-7362	See above.
✓ Casement Circle-Top	Andersen Corporation. 612-430-7362	See above.
✓ PS Narroline	Andersen Corporation, 612-430-7362	See above.
✓ PS Narroline Picture Window	Andersen Corporation, 612-430-7362	See above.
✓ Narroline Circle-Top	Andersen Corporation, 612-430-7362	See above.
✓ D.C. Window	Andersen Corporation, 612-430-7362	See above.
✓ Double Hung Transom	Andersen Corporation, 612-430-7362	See above.
✓ Springline	Andersen Corporation, 612-430-7362	See above.
✓ Flexiframe	Andersen Corporation. 612-430-7362	See above.
✓ Arch Unit	Andersen Corporation. 612-430-7362	See above.
✓ Frenchwood Gliding Door Double Door	Andersen Corporation, 612-430-7362	See above.
✓ Frenchwood Gliding Door Single	Andersen Corporation, 612-430-7362	See above.
✓ Frenchwood Hinged Door Double Door	Andersen Corporation, 612-430-7362	See above.
✓ Frenchwood Hinged Door Single	Andersen Corporation, 612-430-7362	See above.
✓ Circle/Oval Window	Andersen Corporation, 612-430-7362	See above.
✓ PS Gliding Window	Andersen Corporation. 612-430-7362	See above.
✓ Elliptical	Andersen Corporation. 612-430-7362	See above.
✓ PS Gliding Patio Double Door	Andersen Corporation. 612-430-7362	See above.
✓ PS Gliding Patio Single	Andersen Corporation, 612-430-7362	See above.