

CHAPTER 12 LODGING



Pollution Prevention (P2) opportunities for hotels¹ exist for a broad range of hotel operations, including housekeeping, restaurants, grounds maintenance, pools and hot tubs, offices, and facility maintenance. Hotels use an estimated 180 billion gallons of water per year,² generate 62,000³ tons of solid waste annually, and are the fourth most intensive electricity user in the commercial sector.⁴ Besides purely environmental incentives, customer desires and expectations are driving hotels to consider the environmental aspects of hotel operations. For example:

“A study by the Travel Agency Association American found that 80 percent of travelers are more likely to patronize travel companies that help preserve the environment. The Saunders Hotel Group surveyed 1,000 travelers and found that 94 percent of them prefer to stay in environmentally sound properties. In fact, more letters of guest praise are received on this subject than any other. Saunders estimates that [their] Lenox [Hotel] brought in more than \$350,000 in new group business entirely attributable to their green program.”⁵

Many programs focus on the environmental aspects of hotels, three of which are the Coalition for Environmentally Responsible Economies’ (CERES) Green Hotel Initiative, The Green Partnership Guide, and The ECOTEL® Collection. These programs provide good benchmarks for evaluating the environmental performance of hotels. This chapter focuses on such programs and on specific P2 opportunities uniquely related to hotel operations, such as waste reduction strategies for guest rooms, laundry operations, and pools and hot tubs. Office-related waste and equipment, and purchasing environmentally preferable cleaning supplies, lighting, restaurants, and landscaping are discussed in other chapters of this handbook. Section 12.5 provides a P2 score sheet for hotels, and Section 12.6 provides P2 resource information for hotels.

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¹ Accommodations at ski areas range from motels to condominiums. In this chapter, all such facilities are referred to as hotels.

² D. Hemmila. “Hotels Turn Over New Leaf with Eco Friendly Practices.” *Silicon Valley/San Jose Business Journal*. April 1998.

³ North Carolina Division of Pollution Prevention and Environmental Assistance. “Hotel/Motel Waste Reduction.” DPPEA-98-16. July 1998.

⁴ U.S. Environmental Protection Agency (EPA), Energy Star BuildingsSM Partnership. “Energy Efficiency in the Hospitality Industry.” On-line address: [www.yosemite1.epa.gov/ESTAR/business.nsf/attachments/hospitalitypresskit.pdf/\\$File/hospitalitypresskit.pdf?OpenElement](http://www.yosemite1.epa.gov/ESTAR/business.nsf/attachments/hospitalitypresskit.pdf/$File/hospitalitypresskit.pdf?OpenElement).

⁵ P. Borda. “No Vacancy - Hotel Chains, both large and small, are proving that green initiatives can help the capture the billions of guest rooms booked each year.” *GREEN@WORK*. September 1, 2001. pp. 34.

12.1 HOTEL PROGRAMS

Part of the challenge of improving a hotel's environmental performance is finding out what opportunities are available. Involvement in environmental programs is a good way for a hotel to learn more about environmental opportunities. The CERES Green Hotel Initiative created a best environmental practice survey that hotels can use to determine their basic environmental performance. The Green Partnership Guide is a step-by-step guide for incorporating environmental principles into the work place. The "Green" Hotels Association® offers information and environmentally preferable products to hotels. The ECOTEL® Collection, certifies hotels based on their environmental performance. GREEN GLOBE 21 is a sustainable travel and tourism program. Green Seal is an independent, non-profit organization that strives to achieve a healthier and cleaner environment. It prepared a best environmental practices guide for the lodging industry called "Greening Your Property." Each of these programs is discussed below along with American Automotive Association (AAA) and Mobil hotel certification programs. Besides the programs discussed in this chapter, other programs that are useful to lodging operations include EPA's Energy Star, Water Alliances for Voluntary Efficiency (WAVE), and Waste Wise programs. Hotel and hotel guests use energy (fourth most intensive energy user in the commercial sector)⁶ that can be easily reduced, saving the hotel a good deal of money. A good starting point for any energy reduction program is EPA's Energy Star Program (www.energystar.gov). This program is also discussed in greater detail in Chapter 10, Buildings. EPA's WAVE and Waste Wise are discussed in Chapters 3 and 10, respectively.

12.1.1 Green Hotel Initiative



CERES, a coalition of environmental, investor, and advocacy groups working toward sustainability, began a program called the Green Hotel Initiative (GHI) in October 2000. The purpose of this initiative is to catalyze the demand for and supply of environmentally responsible and sustainable hotel services. In May 2001, CERES released the GHI Best Practice Survey, an easy to use list of criteria that assesses a hotel's environmental performance. The Best Practice Survey is not only a tool for meeting planners and travel buyers to select environmentally committed hotels but it also is a communication vehicle to alert the hotel industry that its patrons consider environmental issues when making purchasing decisions. The survey is available on the Internet (see www.ceres.org/about/Programs/ghoverview.html), and hotels can use it to rate their environmental performance. The survey covers the following areas:

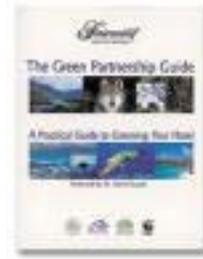
- Commitment and awareness
- Energy efficiency
- Solid waste minimization
- Air and water quality
- Water conservation
- Environmental purchasing

Each area has specific criteria that are scored from 0 to 5. The criteria in this survey are significantly less extensive than those used for ECOTEL® Certification discussed in Section 12.1.4.

⁶ U.S. Environmental Protection Agency (EPA), Energy Star BuildingsSM Partnership. "Energy Efficiency in the Hospitality Industry." On-line address: [www.yosemite1.epa.gov/ESTAR/business.nsf/attachments/hospitalitypresskit.pdf/\\$File/hospitalitypresskit.pdf?OpenElement](http://www.yosemite1.epa.gov/ESTAR/business.nsf/attachments/hospitalitypresskit.pdf/$File/hospitalitypresskit.pdf?OpenElement).

12.1.2 The Green Partnership Guide

In 2001, National Geographic Traveler recognized Fairmont's Green Partnership program, originally launched in 1990, as the most comprehensive environmental program in the North American hotel industry. In April 2001, Fairmont Hotels and Resorts released the second edition of The Green Partnership Guide. The guide is a comprehensive how-to guide for companies looking to "green" their operations. The "Second Edition" details everything needed to start, maintain and expand an environmental program, including information on reducing operating costs, keeping employees motivated, and tracking savings. The Green Partnership Guide, can be ordered by contacting Fairmont's office of environmental affairs by phone at (416) 874-2600 or by e-mail at environment@fairmont.com.



12.1.3 "Green" Hotels Association®

The "Green" Hotels Association® encourages, promotes, and supports the "greening" of hotels. Membership fees for the association vary depending on the type and size of a hotel. The basic fee for a hotel is \$1 per guest room per year (\$50 minimum and \$500 maximum). One benefit of membership is receiving a copy of "Membership Conservation Guidelines and Ideas," a list of waste reduction ideas for all areas of hotel operation, including guest rooms, public areas, pest control, restaurants, laundry, solid waste, swimming pools, offices, marketing, and more. Other membership benefits include receiving a bimonthly newsletter, designation as a "Green" Hotel on the association's web site, and receiving "Green" Hotel flags.

12.1.4 The ECOTEL® Collection



The ECOTEL® Collection (the Collection) is a group of hotels (5 in the United States and 36 worldwide as of 2000) that focuses on standards of environmental excellence for hotels. Since 1994, the Collection has developed and updated an environmental certification program for hotels called ECOTEL® Certification (Certification). The criteria involved in Certification are well researched, are regularly updated, and reflect the most progressive environmental standards for the hotels. Thus, Certification is difficult to obtain, but is a prestigious designation. The Certification is based on five environmental areas, each of which is designated by a globe (the top environmental rating in this program is a five-globe rating). The five globes are:



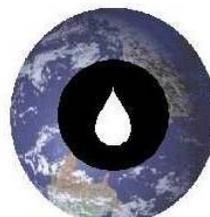
Environmental
Commitment



Solid Waste
Management



Energy
Efficiency



Water
Conservation



Employee Environmental
Education and Community
Involvement

To become certified, a hotel must achieve at least the Environmental Commitment and one other globe. Certification involves the following process:

1. **Primary Criteria.** The hotel is given a description of the primary criteria for each globe. For Certification, the hotel must have incorporated all the primary criteria for the Environmental Commitment globe and one other globe in all areas of hotel operation. Hotels may receive Certification status ranging from two to five globes. An example primary criterion is that the hotel must be able to demonstrate that it has a formalized commitment to preserving and protecting the environment.
2. **Secondary Criteria.** The hotel is given a scoresheet with all the secondary criteria for each globe. The hotel can use the scoresheet to score itself. Once a hotel believes that it scores well enough for Certification, an ECOTEL® inspector scores the hotel. For Certification, the hotel must meet all primary criteria for at least two globes and must score at least 75 percent of the available and applicable points under the secondary criteria for the same two globes. Each criterion is assigned a different point value based on its relative environmental impact. An example secondary criterion is that recycling bins must be of adequate size and properly distributed (100 possible points).
3. **Tertiary Criteria.** If a hotel scores between 50 and 74 percent for the secondary criteria, tertiary criteria are considered. Tertiary criteria are not provided before the ECOTEL® inspection. They consist of environmental efforts that the inspector considers to go beyond primary and secondary criteria. An example tertiary criterion is composting leftover foods from hotel restaurant waste.

Upon indicating its intent to attempt Certification, a hotel is provided with the primary and secondary criteria. The criteria are detailed and extensive, providing the hotel with specific information about how to become more environmentally responsible. Other benefits of enrollment include increased exposure in the marketplace, higher employee morale (because employee involvement is requisite to Certification and employee involvement in decision-making improves morale), and in some cases, decreased operating costs. See Section 12.6 for ECOTEL® contact information.

12.1.5 GREEN GLOBE 21

GREEN GLOBE 21 is a sustainable travel and tourism program established by the World Travel and Tourism Council (www.wttc.org) in 1992. The program is designed to support companies, communities, and consumers seeking sustainable tourism. Hotels can join GREEN GLOBE 21 at three different levels, with benefits and level of commitment increasing with each level. The three levels are briefly described below:



1. **Affiliates.** Members taking the first step toward improved environmental and business performance. Membership starts at \$100.
2. **Benchmarking.** Members committed to measuring key indicators based on recognized sustainability standards. Membership starts at \$200.
3. **Certified:** Members that have an environmental management system, assessed and verified by an independent accredited organization. Membership starts at \$525.

GREEN GLOBE 21 offers full membership fee reimbursement to Benchmarking and Certification members if they do not exceed costs in savings in the first year in the program. For more information, visit www.greenglobe.org.

12.1.6 Green Seal



Green Seal is a nonprofit organization dedicated to protecting the environment by promoting the manufacture and sale of environmentally responsible consumer products and promoting products and services that generate less toxic pollution and waste, conserve resources and habitats, and minimize global warming and ozone depletion. Green Seal prepared a best environmental practices guide for the lodging industry called “Greening Your Property” available at www.p2pays.org/ref/04/03267.pdf. This document contains a detailed discussion of managing energy consumption, choosing efficient lighting, managing water use, improving indoor air quality, and providing “green” amenities and services, as well as worksheets for baselining energy, lighting, and water use and a lengthy resource list. More information about Green Seal can be found at www.greenseal.org.

12.1.7 Certification Programs



Certification programs such as AAA’s and Mobil’s diamond and star rating programs are not currently focused on giving points to hotels that have incorporated environmental programs and projects into their operations. However, these certification programs are based on patrons’ expectations. To the extent that environmental issues become of greater concern to patrons, such issues will be reflected in the certification programs. According to a spokesperson for AAA’s diamond rating program, a hotel will not be penalized for pursuing environmental projects as long as the projects do not decrease the quality of service that the hotel provides. For example, if a five-diamond hotel were to offer recycling to its patrons and wanted to place recycling bins in each room, using large, bulky, plastic, awkwardly placed recycling bins might result in a penalty in points, but using attractive, well-maintained, and well-placed bins would not incur a penalty.

12.2 GUEST ROOMS

A typical guest room generates between 1 and 2 pounds of waste on a non-checkout day and twice that amount on a checkout day⁷ and uses about 200 gallons of water per day per occupied room⁸. In-room solid waste recycling can be challenging because it depends on guest participation and appropriate separation of waste. Other opportunities for waste reduction in guest rooms, such as use



of recycled-content “personal” paper products (toilet paper, tissue, and so on), water use reduction, use of environmentally preferable cleaning products, and energy efficient lighting, can be accomplished without relying on guest participation. Some hotels are reluctant to pursue environmental projects because they are concerned about how the projects will be accepted by their guests. As discussed on page 12-1, many hotel guests prefer hotels that are more environmentally friendly.

Further, according to the “Green” Hotels Association®, 70 to 90 percent of hotel guests participate in linen and towel programs (keep sheets and towels for more than one day when stay is longer than one night), which could be considered another indication of environmental programs approval.

⁷ North Carolina Division of Pollution Prevention and Environmental Assistance. “Hotel/Motel Waste Reduction.” DPPEA-98-16. July 1998.

⁸ University of Florida Cooperative Extension Service. “Ecopurchasing in Hotels and Motels.” 1993.

12.2.1 Solid Waste Recycling

Hotels generate about 62,000 tons of waste annually.⁹ About 80 percent of the waste generated by hotel guests (such as paper, newspaper, magazines, cans, glass, and plastic) is recyclable.¹⁰ Hotels nationwide have successfully implemented solid waste recycling programs that include guest recycling. Guest room recycling can be effectively accomplished by providing recycling bins in each room and at common locations throughout the hotel.



Plastic recycling bins

Although providing recycling bins in each guest room is capital-intensive, it is more effective (in terms of percentage of diverted waste) than offering recycling bins only in common areas of the hotel. An alternative to putting recycling bins in rooms is placing a tent card instructing guests to leave recyclables (listed on the card) in designated areas of the room such as a tabletop or bathroom counter. Housekeeping can then collect and sort the items. Some managers have found this system works well and they do not have to clutter guest rooms with additional receptacles. At a minimum, a hotel recycling program should include newspaper, glass, and aluminum. Other common recycling options include paper, magazines, cardboard, paperboard, and plastic.



Wicker recycling baskets

CASE STUDY: SOLID WASTE RECYCLING AT CHICAGO HILTON AND CANADIAN PACIFIC HOTELS

In 1990, the Chicago Hilton, a 1,543-room, 2-million-square foot convention hotel, began an aggressive recycling program that includes collecting 50,000 pounds of corrugated cardboard, paper, glass, and aluminum each month. The hotel currently collects 14,000 pounds of cardboard each month and has collected more than 42 tons over the past 6 months. All cardboard from restaurants, guest rooms, exhibit floors, banquet halls, and offices is collected by the housekeeping and facility department, separated, and loaded into a baler that crushes the cardboard in preparation for off-site recycling.

In 1990, Canadian Pacific Hotels (CP) began developing environmental standards and goals for all of its Canadian hotels. One goal was to reduce the amount of waste sent to landfills from each hotel by 50 percent through guest room recycling and redesigning purchasing policies to achieve source reduction. The first CP hotel to begin the guest room recycling program collected 12,120 bottles and 57,600 cans from 70 rooms in 1 year. The success of this program in this hotel led to CP placing recycling bins in every guest room of every Canadian CP hotel.



Baled cardboard

12.2.2 Recycled Content Paper Products

Since 1998 EPA guidelines (see Executive Order 13101 and the “Comprehensive Procurement Guidelines”) have required that federal facilities purchase products with recycled-content material.

⁹ New York City Department of Sanitation, Waste Prevention Program. “Hotels, New York City’s Garbage and the Partnership for Waste Prevention.” December 1995.

¹⁰ North Carolina Division of Pollution Prevention and Environmental Assistance. “Hotel/Motel Waste Reduction.” DPPEA-98-16. July 1998.

The federal government (and many state and local agencies) is required to purchase recycled-content paper products. Increased demand for recycled-content paper has driven down its cost to the point that it is often the same price as or less expensive than virgin material paper.

Paper products regularly found in guest rooms and at other locations in hotels include bathroom tissue, paper towels, paper napkins, and facial tissue. (Refer to Chapter 6, “Purchasing,” for a more complete discussion of purchasing recycled-content paper products such as office paper.) EPA’s “Comprehensive Procurement Guidelines” set recommended recovered-material content ranges for these paper products (for more information, visit www.epa.gov/cpg). Hotels should purchase paper products that fall within EPA’s recommended ranges, which are shown in Table 12.1.

TABLE 12.1 EPA-RECOMMENDED RECOVERED-FIBER CONTENT RANGES FOR COMMERCIAL/INDUSTRIAL SANITARY TISSUE PRODUCTS

Paper Product	Postconsumer Fiber Percentage ^{a, b}	Preconsumer Fiber Percentage ^{b, c}
Bathroom tissue	20 to 60	20 to 100
Paper towels	40 to 60	40 to 100
Paper napkins	30 to 60	30 to 100
Facial tissue	10 to 15	10 to 100

Notes:

^aPostconsumer fiber or postconsumer content refers to a material or product that has served its intended use and has been discarded for disposal or recovery.

^bThe content ranges in the table refer to percent preconsumer fiber, including percent postconsumer fiber, and not percent preconsumer fiber plus percent postconsumer fiber.

^cPreconsumer fiber is a material that has been recycled but that did not serve its intended use (for example, scraps at a paper mill).

Source: www.epa.gov/cpg/products/tissue.htm

Paper product suppliers have information about the recycled content of the products they carry. Some recycled-content paper vendors are listed in Section 12.6.

12.2.3 Water Use Reduction

Water for toilets, sinks, and showers used by guests and by housekeeping staff for cleaning can account for nearly half of a hotel’s water use.¹¹ Cornell University’s School of Hotel Administration conducted a study that determined that the average hotel room uses 52,500 gallons of water per year (144 gallons per day).¹² Hotels can reduce guest room water use by using low-flow showerheads and sink aerators. Water-efficient showerheads and sink aerators work by mixing air with the water flow, thereby decreasing the amount of water used, but maintaining the same pressure and perception of water flow. Reducing hot water use also saves energy by reducing the amount of water that is heated. Because most of the hot water used in hotel rooms is from showers, showerhead



Faucet aerator

¹¹ EPA and Purdue University. “Environmental Enrichment for the Lodging Industry: A Toolkit.” February 1997. On-Line Address: abe.www.ecn.purdue.edu/~epados/hotel/src/title.html

¹² see www.hotelschool.cornell.edu

replacement should be the highest guest room water use reduction priority. Toilet water use may also be reduced using one of three technologies:

1. Place a diverter in each toilet that diverts 50 percent of the flush-cycle refilling water into the tank instead of the bowl. The water in the bowl is reduced, but the flush-cycle is not affected.
2. Place tank bags or jugs (typically filled with water or sand) in each toilet tank to reduce the amount of water used to refill the tank with each flush. Be careful not to let these items interfere with the flushing mechanism.
3. Install low-flow toilets to limit the amount of water flushed from the bowl.

Table 12.2 shows typical water use in guest rooms, potential water reduction devices, and costs for the devices. Vendor information for these products is included in Section 12.6. In Chapter 10, Section 10.6 describes WABE, an EPA technical assistance program for water conservation.

TABLE 12.2 TYPICAL GUEST ROOM WATER USE AND REDUCTION DEVICES

Water User	Typical Flow Range	Water Reduction Device	Typical Flow Range	Cost Range
Showerhead	5 to 7 gpm	Low-flow showerhead	1.6 to 3 gpm (2.2 gpm is recommended minimum)	\$5 to \$10
Sink faucet	3 to 5 gpm	Faucet aerator	0.5 to 2.75 gpm	<\$1
Toilet	3.5 to 10 gpf	Diverter	Will reduce flow by 0.75 gpf	<\$1
		Tank bag or jug	0.75 to 1 gpf	<\$5
		Low-flow toilet	1.5 to 1.6 gpf	

Notes:

gpm = Gallons per minute
 gpf = Gallons per flush



CASE STUDY: WATER CONSERVATION BY SAUNDERS HOTEL GROUP

In the 1990s, the Saunders Hotel Group began a project focused on reducing water consumption at three hotels in Boston: the 977-room Boston Park Plaza Hotel and Towers, the 152-room Copley Square Hotel, and the 222-room Lenox Hotel.

The Saunders Hotel Group’s basic philosophy is that its hotels should save resources without impacting the guest experience. At its hotels, the Saunders Hotel Group installed showerheads that reduce water flow from 5 to 2.5 gpm. It also installed faucet aerators in bathrooms that reduce flow in sinks from 3 to about 1.6 gpm. In addition, it retrofitted most of its guest room toilets. The old toilet tanks used between 6 and 7 gpf while the new ones use 1.5 gpf. The company found a unique use for the discarded toilets. A Boston-area gravel company agreed to take the toilets and pulverize them. The crushed pieces were used as road bedding for new roads. Before the toilets were sent to the gravel company, the metal components were removed and recycled. Water cost savings from this project were used to buy tools for the maintenance department.

To further reduce water consumption, the Saunders Hotel Group eliminated water-cooled air conditioning equipment, installed water and energy efficient laundry systems, and switched from

water-cooled ice machines to air-cooled ice machines. The switch from water-cooled to air-cooled ice machines alone saves 1.5 million gallons of water annually.

12.2.4 Environmentally Preferable Cleaning Products

Housekeeping personnel use cleaning supplies to clean guest rooms, including tub and tile cleaner, glass cleaner, carpet cleaner, spot remover, and disinfectant. Many of these products contain chemicals that are harmful to human health and the environment. Use of such products poses a concern for both the guests and cleaning staff. Vendors offer environmentally preferable cleaning supplies with equal or better cleaning performance at equal or less cost. See Chapter 6, “Purchasing,” and Chapter 10, “Buildings,” for discussions of purchasing and implementing environmentally preferable cleaning supplies and for relevant case studies for ski areas.

12.2.5 Energy Efficient Lighting

The Rocky Mountain Institute estimated that the amount of lighting electricity consumed by the commercial sector can be reduced by one-third to one-half if energy efficient lighting is used.¹³ The energy savings come from energy efficient lighting sources that not only reduce energy use but also generate less heat, reducing air conditioning costs. See Chapter 6, “Purchasing,” and Chapter, 10 “Buildings,” for discussions of purchasing and implementing energy efficient light bulbs.

CASE STUDY: ENERGY EFFICIENT LIGHTING AT MARRIOTT HOTEL



In July 1991, the San Francisco Marriott began a lighting retrofit program that saves 2.5 million kilowatts of electricity annually and 4 million pounds of carbon dioxide emissions.

Retrofits included replacing 3,000 incandescent desk lamps and entry lights in the guest rooms with compact fluorescent bulbs in electronic ballasts and replacing 90-watt incandescent lamps in 300 wall sconces with 7-watt, hard-wired ballasts. The greatest energy-savings resulted from changing 90-watt down lights and chandeliers to fixtures with 13-watt compact fluorescent bulbs and built-in reflectors.

The total cost of the retrofit program was about \$280,000, and it saves about \$200,000 annually in energy bills. The hotel received a \$140,000 rebate from the local electric utility and had a payback period of just over 6 months.

12.3 LAUNDRY

P2 opportunities in laundry operations include reductions in water, detergent, and energy use. Laundry operations include sheets and towels washed by housekeeping staff and self service guest machines.

12.3.1 Optional Linen and Towel Washing Program

According to the National Association of Institutional Linen Management, average laundry costs range from \$3 to \$4 per guest room per day.¹⁴ The “Green” Hotels Association® estimates that hotels can save at least \$1.50 per guest room per day by offering guests an optional linen and towel

“People have written in with lots of positive comments [about the optional sheet and towel washing program], saying they appreciate us trying to make a difference.”

*Ron Berger,
Sheraton Hotel General Manager*

¹³ M. Ton. “Greening Your Property.” July 1996. See www.p2pays.org/ref/04/03267.pdf.

¹⁴ See www.nailm.com.

washing program. This program not only reduces water use, but it also (1) reduces energy use for operating laundry machines and heating water, (2) decreases labor time involved in changing sheets, (3) decreases laundry detergent and fabric softener use, (4) increases the life of linens and towels, and (5) extends the life of laundry equipment. Greg Parsons, a general manager for a Radisson hotel, estimates that 70 percent of people staying in the hotel for more than one night participate in the optional linen and towel washing program. The “Green” Hotels Association® offers towel rack and tabletop cards printed on recycled-content paper explaining the hotel’s program (\$45 for 100 laminated towel rack hangers and \$35 for 100 laminated tabletop cards).

CASE STUDY: RADISSON HOTEL’S OPTIONAL LINEN AND TOWEL WASHING PROGRAM



Since 1995, the Radisson Hotel in Asheville, North Carolina, has allowed guests to choose whether to reuse linens or towels for stays of more than one night. The hotel found that laundering costs dropped 30 percent in terms of reduced housekeeping staff time, detergent use, and water heating. The hotel also noted decreased wear on linens, towels, washers, and dryers. Managers at the hotel learned that housekeeping staff training is critical to the success of the program. Radisson provides program-related instructions in the primary languages of the housekeeping personnel and sets up rooms in various scenarios to check whether the proper instructions are followed.

“I went in this with the belief that if one customer said they didn’t like it I would stop [the optional linen and towel washing program], because we’re very sensitive about perceptions of cleanliness. I haven’t had one complaint in [the first] 4 months.”

*Greg Parsons,
Radisson Hotel General Manager*

12.3.2 Guest-Operated Laundry Machines

Hotels that offer laundry machines for guest use should consider installing energy- and water-efficient washers and dryers. Relevant vendors are listed in Section 12.6. Energy- and water-efficient, front-loading washing machines are more efficient because unlike top-loading machines, front-loaders rotate clothes through two-thirds less water, saving both water and heating energy. The front-loaders also require less detergent use. Furthermore, the front-loaders spin clothes much faster than top-loaders, reducing drying time, and saving energy. Further clothes last longer because spin agitation is easier on them than the typical center agitator.

Energy efficient washing machines cost \$200 to \$500 more than conventional washing machines. Maytag calculates the payback period for replacing conventional washers is about 1 year. Including water, electricity or gas, and sewer costs. Maytag estimates that an annual savings of up to \$250 can be realized for each conventional washer replaced by an energy efficient washer.



Dryers work by heating and aerating clothes. The efficiency of a clothes dryer (energy factor) is measured in terms of pounds of clothing dried per kilowatt-hour (lb/kWh) of electricity consumed. The minimum rating for a standard-capacity electric dryer is 3.01 lb/kWh. For gas dryers, the minimum energy factor is 2.67 lb/kWh. (The rating for gas dryers is provided in kilowatt-hours even though this primary source of energy is natural gas.)

Following is a list of features to consider when selecting an energy efficient dryer:¹⁵

- A moisture sensor automatically shuts off the machine when clothes are dry. This feature saves energy and reduces wear and tear on clothes from over drying.
- Moisture sensors in the drum save about 15 percent in average drying time. More common but less efficient temperature sensors infer dryness by sensing the temperature of the exhaust air, saving about 10 percent in average drying time.
- Dryers with a cool down period, sometimes called a "perma-press" cycle, blow cool air rather than heated air through clothes to complete the drying process. Such dryers save energy required to heat the air.
- Gas dryers are less expensive to operate than electric dryers. The cost of drying a typical load of laundry in an electric dryer is 30 to 40 cents compared to 15 to 20 cents in a gas dryer.

Energy efficient dryers may cost more than conventional dryers (by \$200 to \$500) but the extra cost is typically recovered within a few years by energy savings.

CASE STUDY: ENERGY EFFICIENT GUEST-OPERATED LAUNDRY MACHINES



In 1999, one of Aspen Skiing Company (ASC) employee housing units, the Heatherbed Lodge, was faced with replacing aging washing machines. ASC decided to replace its old washing machines with two energy efficient, front-loading washing machines made by Maytag.

Conservatively assuming the Heatherbed Lodge's 30 residents washed one load of laundry per week each or 1,560 loads per year, ASC believed that the lodge's laundry room offered a good opportunity for both cost savings and reducing environmental impacts. ASC estimates that the machines paid for themselves after one year of use and save about \$250 per year each in water, sewer, and energy costs alone.

12.4 POOLS AND HOT TUBS

Pools and hot tubs are heavy users of energy and chemicals for heating and disinfection. Selection of the appropriate heating and disinfection system is highly dependent on the specific pool or hot tub involved. Therefore, a hotel should work closely with vendors to select the best alternatives.

12.4.1 Heating

There are three basic types of pool heating systems: solar, electric, and gas. The best type of heater for a pool depends on heating needs, the budget, and the physical layout of the pool and nearby buildings. This section discusses aspects of each of the heating alternatives, advantages and disadvantages of the alternatives, and costs. Additional information resources are listed in Section 12.6.

¹⁵ See www.eren.doe.gov/buildings/consumer_information/dryers/.

Solar Heating. Solar heating works by circulating water through a large heat exchange surface that absorbs energy from the sun. Solar heating is best applied to recreational pools and for swimmers who desire pool temperatures from 80 to 85 °F. In a southern climate, solar panels can heat a pool year round, and they can extend the use of a pool in a northern climate.



Electric heat pump

Electric Heat Pumps. Electric heat pumps work like an air conditioner in reverse — that is, they take heat from air and transfer it to water. They can maintain a pool’s temperature 80 to 90 °F as long as outside temperature is above 45 to 55°F.

Gas Heaters. A gas heater heats water with an open flame as the water circulates through the unit. Initially, a gas heater is 70 to 75 percent efficient, but its efficiency decreases over time as water deposits build up on the heat exchanger. Because they are expensive to operate, gas heaters are best used when heat is needed only for short periods of time.



Gas Heater

However, they can heat water under all weather conditions.

Table 12.3 summarizes the advantages and disadvantages of each of the heating options.

TABLE 12.3 HEATING OPTION SUMMARY

Advantages	Disadvantages
Solar Heat	
<ul style="list-style-type: none"> 👍 No operating cost (can pay for itself in 2 to 3 years) 👍 Solar energy is renewable and nonpolluting 👍 Long life (10 to 20 years) 	<ul style="list-style-type: none"> 👎 Ability to provide heat depends on weather 👎 High capital investment (\$7.50 to \$17 per square foot of solar panel surface area)
Electric Heat Pump	
<ul style="list-style-type: none"> 👍 Less expensive to operate than gas heat and operates under more varied weather conditions than solar panels 	<ul style="list-style-type: none"> 👎 Effectiveness dramatically reduced when outside air temperature drops below 55 °F 👎 Effectiveness reduced with decreased humidity
Gas Heat	
<ul style="list-style-type: none"> 👍 Provides year-round heating independent of weather conditions 	<ul style="list-style-type: none"> 👎 Uses nonrenewable resource (natural gas or propane) for heating 👎 Natural gas is not available at many locations, and propane can be prohibitively expensive 👎 Heating efficiency decreases over life of heater because of water deposits on heat exchanger 👎 Expensive to operate year round

Table 12.4 summarizes costs associated with the pool and hot tub heating options.

TABLE 12.4 COSTS OF POOL AND HOT TUB HEATING OPTIONS

Heating Option	Capital and Installation Cost Range	Operation Cost Range
Solar	\$1,250 to \$4,900	\$30 to \$75 per year to operate pump
Electric	\$2,150 to \$4,750	\$3,000 to \$6,000 per year
Gas	\$1,150 to \$2,350	\$1,000 to \$1,500 per year for propane \$500 to \$750 per year for natural gas

QUICK FIX

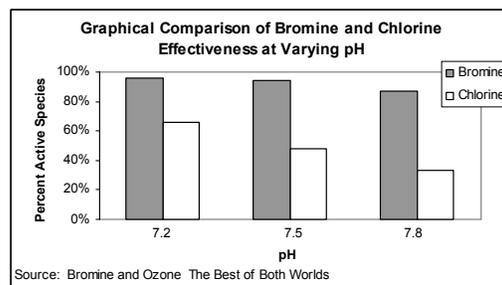
About 70 percent of all heat loss from a swimming pool is evaporative and convective. Therefore, placing a pool cover on the pool can save 65 to 70 percent in heating costs (the percentages and savings and savings are even more for hot tubs). For small pools, covers cost from \$50 to \$120. Rollers, which facilitate removing and replacing covers, start at \$180.

Some higher end hotels have hot tubs in the guest rooms. The heating systems in these hot tubs may be less substantial than those discussed above. In these types of hot tubs, the most important consideration for efficient heating is that they be well insulated. In addition, lodging facilities should leave signs asking guests to always cover the hot tub and turn down the heat slightly when the tub will not be used for extended periods of time (8 or more hours for example).

12.4.2 Disinfection

Some form of disinfectant must be used to control pathogens and other microorganisms for the health of swimming pool and hot tub users. In the United States, most pool and hot tub water is disinfected with chlorine. Chlorine is commonly used because it effectively and inexpensively disinfects and oxidizes water. However, chlorine is odorous; may cause irritation to bathers' eyes, mucus membranes, and skin; and produces toxic by-products in wastewater. Numerous other disinfection options exist that may be used in place of chlorine, including bromine, ultraviolet disinfection, and ozone. Some of these options may be used in combination to achieve the desired disinfection. Whatever is used for disinfection, it should meet the following criteria:

- Provides effective, rapid disinfection (control of pathogenic microorganisms, including viruses, bacteria, and protozoa)
- Provides ongoing oxidation (reduces organic matter and limits nutrients in order to prevent growth of bacterial colonies)
- Offers a wide margin between the concentration required for effective disinfection and the concentration at which people will experience adverse health effects
- Allows easy determination of the residual disinfectant concentration in the water
- Allows the disinfectant's concentration to be measured electronically in order to allow automatic control of dosing and continuous measurement and recording



Chlorine. Chlorine is commonly used because it readily disinfects water; has the capacity to oxidize water; has a measurable residual concentration; is easily maintained; is inexpensive; and is easy to produce, store, transport, and use. When chlorine reacts with swimmer wastes (sweat, body oils, urine, and so on), it produces a by-product (chloramine) that is odorous, causes skin and eye irritation, and reduces sanitation effectiveness.

Bromine. Bromine is a common hot tub disinfectant.¹⁶ Bromine can control microbial and algal growth just as well as chlorine without the negative issues (odor, health concerns, and by-products) associated with chlorine. Bromine works in essentially the same manner as chlorine. However,

¹⁶ P.K. Mitchell. "Bromination: An Alternative in Pool and Spa Sanitation." *Swimming Pool and Spa Dealer News*. February 1989.

bromine kills algae whereas chlorine only inhibits algal growth.¹⁷ The tablet form of bromine is the most commonly used form for pool disinfection, but elemental bromine and sodium bromine are also sometimes used. Bromine is eight times less soluble than chlorine and therefore requires a special delivery system sized according to (1) pool volume for outdoor pools and (2) daily average number of users for indoor pools. The by-product produced by bromine (bromamine) is an excellent disinfectant, is a more effective oxidant than chloramines at pH values of seven or greater, does not produce an irritating odor, and is less irritating to eyes than chlorine. Periodically, bromine-disinfected systems require shocking with chlorine or oxygen-based shock. In the presence of sunlight, bromine breaks down rapidly compared to chlorine. Disinfection operators need to compensate for the consumption of bromine based on pool or hot tub volume and average number of users.

Other Options. Hotels can also disinfect pools and hot tubs using ultraviolet radiation, ozone, or combination systems such as an ozone-bromine system, but these methods of disinfection are relatively uncommon.

The advantages and disadvantages of the different types of disinfectants are summarized in Table 12.5.

TABLE 12.5 DISINFECTION OPTION SUMMARY

Advantages	Disadvantages
Chlorine	
<ul style="list-style-type: none"> 👍 Inexpensive 👍 Easy to determine residual concentration 👍 Disinfects and oxidizes 	<ul style="list-style-type: none"> 👎 Odorous 👎 May cause irritation to eyes, mucus membranes, and skin 👎 Produces toxic by-products (chloramines) in wastewater down stream that are poor sanitizers 👎 pH control is critical to effectiveness (pH should be maintained between 6.5 and 7.6)
Bromine	
<ul style="list-style-type: none"> 👍 Easy to dose 👍 Does not require pH correction 👍 No odor 👍 By-product (bromamines) is excellent for disinfection 👍 Bromamines are more effective oxidizers than chloramines at a pH of 7 or greater 👍 Bromamines do not produce an odor and are less irritating to eyes than chloramines 	<ul style="list-style-type: none"> 👎 Difficult to determine residual concentration (must be done in a laboratory) 👎 Requires periodic superoxidation with chlorine or oxygen-based shock 👎 Eight times less soluble than chlorine
Ultraviolet Radiation	
<ul style="list-style-type: none"> 👍 Good disinfection capabilities 👍 Produces no toxic by-products 	<ul style="list-style-type: none"> 👎 Water must be pretreated to remove turbidity 👎 Cannot be used for residual disinfectant 👎 Cannot be used as an oxidizer
Ozone	
<ul style="list-style-type: none"> 👍 Most powerful oxidizing and disinfecting agent for pools 	<ul style="list-style-type: none"> 👎 Cannot be used for residual disinfectant 👎 Must be generated on site 👎 Production generates odorous, toxic gas

¹⁷ P.K. Mitchell. "Bromination: An Alternative in Pool and Spa Sanitation." *Swimming Pool and Spa Dealer News*. February 1989.

For more information about pool and hot tub disinfection alternatives, visit the following web site:

- Guidelines for Safe Recreational Water Environments , Volume 2
www.who.int/water_sanitation_health/Recreational_water/eosdraft9814.htm
 Chapter 5 – Managing Water and Air Quality

12.5 HOTEL P2 SCORE SHEET

The number of P2 opportunities for hotels is extensive, so it is not feasible to cover all the opportunities in detail in this handbook. This section contains score sheet that hotels can use to rate their own environmental performance. Use the following scoring criteria to rate the environmental performance of your hotel:

- 5 = Well-established practice/equipment installed throughout hotel
- 3 = Some practice/equipment in place but not in all areas
- 1 = Budgeted initiative planned for implementation within 1 year
- 0 = No activity in this area

A hotel's score depends in part on how many of the items on the score sheet are applicable to the facility. Calculate the total number of possible points (the number of applicable items times 5 possible points per item), fill in the score sheet, and use the following as a guide:

- **Less than 25 percent of the possible points – Poor.** Many P2 opportunities are available that are easy to implement and can result in immediate cost savings and reduced environmental impacts.
- **25 to 49 percent of the possible points – Fair.** Although it may take a bit of work, many P2 opportunities exist that can result in cost savings and reduced environmental impacts.
- **50 to 74 percent of the possible points – Good.** But there is still room for improvement.
- **More than 74 percent of the possible points – Excellent!** Keep up the good work, and continue to look for opportunities to reduce waste.

P2 OPPORTUNITY	SCORE
INSTITUTIONAL	
Create a Green Team of employees who are interested in and dedicated to environmental issues	
Develop an environmental policy and environmental purchasing program	
Measure energy, lighting, hazardous chemical, and water use	
Develop specific environmental goals with timelines	
Continually evaluate and update the environmental program	
Carefully evaluate hotel operations to determine pollution prevention opportunities	
Obtain ECOTEL® certification	
Join the “Green” Hotels Association®	
Use renewable energy alternatives such as wind and solar power	
Institutional Subtotal	

P2 OPPORTUNITY	SCORE
GUEST ROOMS	
Place environmental awareness information in all guest rooms, including information about what the hotel is doing to decrease its environmental impacts. (Topics addressed could include water saving techniques, room recycling tips, a sheet and towel reuse program, energy efficiency reminders, and compact fluorescent light bulbs.)	
<i>Energy Efficiency</i>	
Do not place furniture in front of heaters or vents	
Select light interior colors to decrease light adsorption, reducing the need for artificial light indoors	
Select draperies with thermal reflective liners	
Install an automated climate control system with thermometers linked to a computer system so that as guests check out, the temperature in the vacated rooms automatically returns to a set level	
Supply rooms with extra blankets so guests can use the blankets instead of turning up the heat if they prefer	
Install ceiling fans	
Install sheer curtains to provide filtered sunlight while maintaining privacy, reducing the need for artificial lighting	
Put radiant barriers on roofs to minimize heat in summer and retain heat in winter	
Maintain light-colored, reflective surfaces on roofs	
Install low-emissivity or thermal pane glass windows	
Plant vines in plant trellises and on brickwork to reduce the energy used for air conditioners and heaters	
Set unoccupied room's temperatures as high as feasible in warm weather and as low as feasible in cold weather	
During periods of low occupancy, fill rooms (1) on the ground floor first and on the top floor last, (2) with south- and west-facing windows last, and (3) nearer to the boiler room first	
During major renovations, replace baseboard heaters with air-to-air heat pumps in all the guest rooms	
Straighten any bent fins in heat exchangers	
Check and clean air conditioner filters once each month during periods of heavy use	
Clean air conditioning unit condensers at least once every year	
Cover the outside of air conditioning units during the winter	
<i>Resource Efficiency</i>	
Give unused soap to local charities	
Purchase furnishings made from sustainably harvested wood (see Forest Stewardship Council: www.fscoax.org or Smart Wood: www.smartwood.org)	
Use amenity packages (shampoo, soap, etc.) that generate less waste. Ideally, switch to amenity dispensers in all guest rooms.	
Make some amenities such as shower caps, shoeshine kits, and newspapers available only upon request	
Use 100 percent natural, biodegradable, vegetable oil-base, dye-free, natural-scent or scent-free amenities	
Use undyed, unbleached, 100 percent organic cotton linens	
Provide reusable water glasses with no wrapping or covers	

P2 OPPORTUNITY	SCORE
<i>Water Efficiency</i>	
Fix leaking faucets and leaking toilet flappers as soon as they are detected	
Set water heaters to 125 to 130 °F	
Guest Room Subtotal	
Housekeeping	
<i>Energy Efficiency</i>	
Have front desk staff work with housekeeping staff to ensure that no more guest rooms than necessary are preheated and that the heat is not turned up sooner than necessary	
Train staff to always keep curtains in guest rooms closed during the summer	
Close windows, draperies, and shades after guest rooms are cleaned	
After guest room cleaning, set temperature controls to the minimum level in cold weather and the maximum level in warm weather	
Keep grills on heating units free of lint and dust	
Limit hot water use in room cleaning	
Use natural light and do not turn on televisions or radios while cleaning	
Clean dust out of registers and heat exchangers in baseboard heaters by blowing them out at least once per year; after each unit is blown out, make sure the detachable front panel is reattached properly to ensure efficient air flow	
<i>Hazardous Chemical Use</i>	
Test and compare various environmentally preferable products before purchasing	
<i>Resource Efficiency</i>	
Use vacuum cleaners with reusable bags	
Reuse or eliminate trash can liners	
Reuse old sheets and towels as cleaning rags instead of purchasing rags or paper towels	
Wait to replace paper products in bathrooms until dispensers are almost empty	
Housekeeping Subtotal	
Laundry	
<i>Energy Efficiency</i>	
Wash only full laundry loads	
Install simple, mechanical, air-to-air heat exchangers to capture waste heat from dryers	
Keep lint filters on dryers clean	
Keep air intakes around dryer burners free of lint and dust	
Purchase colored or off-white linens rather than white linens that have to be washed at a higher temperature	
Use the lowest washing temperature that cleans satisfactorily (check with local and state health codes to ensure this practice is acceptable in your area)	
Insulate hot water pipe runs	
Locate water heaters as close as possible to the primary sites of hot water use	
Purchase energy efficient water heaters or insulate older water heaters well	
Check for steam and condensate losses; steam boilers and generators should not lose more than half a gallon of water per pound of processed linen	

P2 OPPORTUNITY	SCORE
<i>Resource Efficiency</i>	
Give guests the option of using their towels and linens for more than 1 day	
After dry cleaning or laundering, return clothes in reusable garment bags or baskets instead of plastic, paper, or boxes and ask the vendor to do the same if dry cleaning is done off site	
Use nontoxic, phosphate-free, biodegradable, unscented, dye-free, chlorine-free, concentrated liquid laundry detergents that come in recyclable packaging	
Use retired sheets and pillow cases as laundry bags	
Use longer-lasting, high-thread-count sheets	
Attach laminated cards to all laundry equipment summarizing basic maintenance requirements, including a maintenance schedule	
<i>Water Use Efficiency</i>	
Use laundry effluent for irrigation	
Use washing machines that use final rinse water to prewash the next load of laundry (check with local and state health codes to ensure this practice is acceptable in your area)	
Eliminate unnecessary cycles such as rinse or suds cycles	
Adjust water pressure to ensure that equipment is operating in accordance with manufacturer specifications	
Participate in EPA's national water conservation program, Water Alliances for Voluntary Efficiency (see www.epa.gov/owm/aqw.htm)	
Keep careful records of water use, read the water meter once a week, and compare the weekly water volume used to the amount of laundry that was cleaned	
Laundry Subtotal	
Maintenance	
Implement a water leak prevention and detection program	
Install motion sensor lighting outside of guest rooms where appropriate	
Review monthly utility charges with department heads to identify energy saving opportunities	
Use equipment that does not require water cooling	
During new construction or remodeling, install a graywater (water collected and recycled without being sent to a treatment facility, such as laundry, shower, bathtub, and sink water) system	
Maintain caulking and weather stripping	
Keep duct work well sealed	
De-lamp vending machines	
Install reusable air conditioning and furnace filters	
Maintenance subtotal	
TOTAL SCORE	

12.6 ADDITIONAL INFORMATION SOURCES

The following table summarizes resources and contacts for obtaining further information related to improving the environmental performance of hotels.

Organization	Contact Information	Description
Programs and Associations		
CERES Green Hotel Initiative	11 Arlington Street 6 th floor Boston, MA 02116 (617) 247-0700 www.ceres.org	Seeks to increase the supply and demand for “green” lodging and meeting options; created a survey for meeting planners and travel buyers to assess a hotel’s environmental performance.
The Green Partnership Guide	(416) 874-2600 environment@fairmont.com.	Comprehensive how-to guide for companies looking to "green" their operations.
“Green” Hotels Association ®	P.O. Box 420212 Houston, TX 77242 (713) 789-8889 www.greenhotels.com	Association focused on assisting the lodging industry in reducing water and energy use and solid waste generation; sells items such as low-flow showerheads, faucet aerators, toilet water diverters, and more
The ECOTEL® Collection	www.hvsecoservices.com/ECOTEL.htm	A group of hotels that focuses on environmental responsibility. Each certified hotel must pass a detailed inspection and meet stringent criteria.
GREEN GLOBE 21	www.greenglobe.org	Sustainable travel and tourism program
AAA Diamond Rating	www.aaa.com	Hotel and restaurant rating system
Mobil Travel Guide Star Rating		Hotel and restaurant rating system
American Hotel and Lodging Association	www.ahma.com/ahma/index.asp	Largest national trade association for the U.S. hotel and lodging industry; web site contains environmental resources
Water Alliances for Voluntary Efficiency	1200 Pennsylvania Avenue N.W. Mail Stop 4204M, Washington, DC 20460 (202) 564-0623 (phone) (202) 501-2396 (fax) www.epa.gov/owm/aqw.htm	A nonregulatory water efficiency partnership created and supported by EPA. Its mission is to encourage businesses and institutions to reduce water consumption while increasing efficiency, profitability, and competitiveness.
Energy Star Buildings Program	www.energystar.gov (888) STAR-YES	A voluntary EPA program designed to help commercial buildings retrofit for energy efficiency
WasteWise	www.epa.gov/wastewise 800-EPA-WISE	Free, voluntary, EPA program that helps organizations eliminate municipal solid waste.
Hospitality Industry	(301) 588-9387	A Department of Energy (DOE)

Organization	Contact Information	Description
Forum for Energy Conservation		program to encourage energy conservation in the hospitality industry; provides financial and technical support for industry demonstration projects
The Forest Stewardship Council	www.fscoax.org fscoax@fscoax.org Avenida Hidalgo 502 68000 Oaxaca, México Tel: 52 951 5146905 Fax: 52 951 5162110	International non-profit organization founded in 1993 to support environmentally appropriate, socially beneficial, and economically viable management of the world's forests.
SmartWood	www.smartwood.org/ Goodwin-Baker Building 61 Millet St. Richmond, VT 05477 USA Tel: 802-434-5491 Fax: 802-434-3116	Organizations whose purpose is to improve the effectiveness of sustainable forestry.
Reference Documents		
Green Seal	www.greenseal.org 1730 Rhode Island Avenue, NW, Suite 1050 Washington, DC 20036 (202) 331-7337	Nonprofit organization dedicated to protecting the environment by promoting the manufacture and sale of environmentally responsible consumer products; prepared a best environmental practice guide for the lodging industry called "Greening Your Property" that is available at www.p2pays.org/ref/04/03267.pdf .
EPA "Comprehensive Procurement Guidelines"	www.epa.gov/cpg/products	EPA guidelines for purchase of environmentally preferable products
Vendors		
Lights of America	(800) 321-8100	Compact fluorescent light bulb vendor
General Electric Lighting	(216) 266-2884	Compact fluorescent light bulb vendor
Sanitation Equipment	(800) 366-7317	Low-flow toilet vendor
Teledyne Water Pik	(800) 525-2774	Low-flow showerhead vendor
Directory of Markets for Recyclable Materials	www.p2pays.org/DMRM.dmr.d.asp	Nationwide directory of markets for recyclable materials
Amana	www.amana.com	Energy efficient washer and dryer vendors
General Electric	www.geappliances.com	
Maytag	www.maytag.com	
Whirlpool	www.whirlpool.com	
JRS Amenities Ltd.	Unit 109-7011 Elmbridge Way Richmond, BC Canada (604) 244-7627 www.jrsamenities.com	Recycling bin vendor

Organization	Contact Information	Description
All Seasons Pools	(407) 678-3452 www.allseasonspools.com	Pool heater and cover vendors
Heatwave	(800) 983-POOL www.poolheater.com	
Solar Direct	(800) 333-WARM www.solar-electricity.com	
Sunbather	www.sunbather.com.au/home.html	
Vision	P.O. Box 20399 Albuquerque, NM (505) 294-0293 www.visionpaper.com	Tree-free and recycled-content paper
Future Solutions Inc.	www.futuresolutionsinc.com	Sells office supplies made with recycled materials
The Real Earth	www.treeco.com	Sells recycled paper and other products for offices
Eco-Products	189 Continental Court, Breckenridge, CO 80424 (970) 547-0147	Environmentally preferable product (office, industrial, food and kitchen, packaging, and lighting) vendor