

CHAPTER 6

PURCHASING

Ski areas purchase numerous products from a variety of commercial and industrial sources. Virtually all items purchased have environmental aspects that contribute to a ski area's environmental "footprint". Therefore, environmental purchasing policies and guidelines present an opportunity for ski areas to make significant environmental performance improvements. This chapter discusses the process for developing and implementing purchasing guidelines and presents specific information about environmentally preferable options for items commonly purchased by ski areas, including chemicals, lighting, paper, and office equipment. The chapter concludes with a discussion about buying locally and references for additional information. Ski areas should apply the guidelines presented in this chapter to all their purchases, not just the specific items discussed below. Two examples of areas not discussed in this chapter are uniform selection (which should focus on recycled fiber content, reusability, and organically and sustainably grown materials) and energy options (such as wind and solar energy sources; see Chapter 8 for examples of how ski areas can utilize wind-generated electricity). Be creative in looking for alternatives to make environmentally responsible purchasing decisions for your ski area.

6.1 DEVELOPING AND IMPLEMENTING ENVIRONMENTAL PURCHASING GUIDELINES

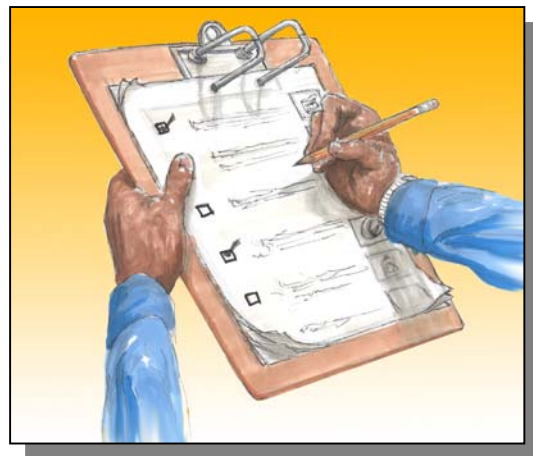
Successfully developing and implementing environmental purchasing guidelines involve seven key steps. The seven steps are listed below in chronological order.

1. Enlist Management Support
2. Develop a Committed Team
3. Decide on an Overall Purchasing Strategy
4. Create Guiding Principles and Policy
5. Determine Focus Areas
6. Establish a Baseline
7. Implement Guidelines and Track Progress

Each of these steps is discussed below, followed by a case study of how Arapahoe Basin (A-Basin) developed guidelines following these steps.

STEP 1: ENLIST MANAGEMENT SUPPORT

With any organizational policy or program, upper management support is critical for success. This support is of particular importance for purchasing guidelines that incorporate environmental principles because employees may be resistant to changing their current purchasing practices. Upper management must allocate labor time to create the guidelines and to help implement them after they are developed. Ideally, a manager or management representative will be part of the purchasing guideline team (see Step 2). Some environmental purchasing can be done without management support or an overall policy, but it would require very motivated staff. Without management support, environmental purchasing typically only occurs on a case-by-case or piecemeal basis.



STEP 2: DEVELOP A COMMITTED TEAM

To develop a purchasing plan and complete Steps 3 through 7, a team interested in and committed to creating and implementing environmental purchasing guidelines should be established. The size of the team may be affected by the volume of purchasing at the ski area and whether purchasing is centralized or decentralized. The team should be large enough to ensure that no member feels overwhelmed with his or her role in the process (because the guidelines will probably be developed in addition to other job responsibilities) but not so large that the group is unable to communicate effectively and complete tasks. The team should attempt, to the greatest extent possible, to set and maintain regular meeting dates. If management support and team commitment exist, draft-purchasing guidelines can be created in as little as 1 month.

STEP 3: DECIDE ON AN OVERALL PURCHASING STRATEGY

Once management lends its support and the team is developed, the team must evaluate how items are currently purchased and whether this system will be effective after the guidelines are implemented. Specifically, the team should consider whether items should be purchased through a centralized or decentralized purchasing system. Depending on the complexity and effectiveness of the existing system, changes may not be feasible or appropriate. The team should discuss the merits of both types of systems and decide which is more appropriate for the ski area. Some advantages and disadvantages of centralized purchasing are listed below.



CENTRALIZED PURCHASING

Advantages

- 👉 Minimizes over-ordering
- 👉 Increases the likelihood that appropriate (environmentally preferable) products are purchased
- 👉 Increases buying power because (1) large quantities are purchased and (2) designated buyers work with vendors to negotiate prices

Disadvantages

- 👉 Is time- and resource-intensive
- 👉 Potentially increases the time needed to obtain products because orders are placed through a purchasing department

STEP 4: CREATE GUIDING PRINCIPLES AND POLICY

The purchasing guideline team decides the direction of the purchasing program when it develops its guiding principles and policies. Guiding principles should be both measurable and attainable. The guiding principles should be general enough to ensure that they are relevant to all types of purchases but specific enough to provide a clear vision for the purchasing program. A-Basin developed environmentally focused guiding principles that are listed in the case study on page 6-4.

STEP 5: DETERMINE FOCUS AREAS

In this step, the team should identify items commonly purchased by the ski area and then develop guidelines for their purchase. Listed below are examples of potential focus areas for ski areas and the sections of this chapter where they are discussed in greater detail.

- Chemicals - Section 6.2
- Lighting - Section 6.3
- Paper - Section 6.4
- Office equipment - Section 6.5
- Paint - Section 10.3

STEP 6: ESTABLISH A BASELINE AND TRACKING SYSTEM

This important step is often overlooked. To measure the impact of the new purchasing system, the team should establish a baseline of products purchased before the purchasing guidelines are implemented. Baseline information is often most useful when it is summarized in spreadsheets and charts; moreover, spreadsheets can be used to track purchasing and product use information after guideline implementation. The information can be used to help make future purchasing decisions. Information progress, such as the reduction in the amount of toxic chemicals purchased as a result of implementation of the environmental purchasing program, can be communicated internally and externally. Example baseline tables are provided in Sections 6.3 through 6.5.

STEP 7: IMPLEMENT GUIDELINES AND TRACK PROGRESS

The work completed in Steps 1 through 6 will be wasted if the purchasing guidelines are not effectively implemented. Characteristics of successfully implemented environmental purchasing programs include:

- Continuous and upper management support
- Presentation of purchasing policies during employee training and orientation
- Use of tools to make environmentally preferable purchasing easy
- Implementation of procedures to track progress and publicize successes

The team should create a straightforward system to ensure that everyone who has purchasing authority follows the guidelines. Enlisting management support in Step 1 is critical to ensure that the guidelines are followed.

One example of a purchasing tool is a “Green List” for common products. The list should be very specific. For example, it should contain information on the specific type of office paper to be purchased in order to ensure that employees do not accidentally purchase paper made from virgin material. An example of how this list could be set up in tabular form is provided below.

Product Name	Product Or Model Number	Vendor Name	Vendor Phone Number	Account? (Yes/No) (If Yes, #)	Comments
Office Supplies					
Office Equipment					
Janitorial Products					
Kitchen Products					
Vehicle Maintenance Products					

Sections 6.2 through 6.5 provide specific information about items commonly purchased items by ski areas. The information in these sections should help ski areas develop environmental purchasing policies for the items discussed.

CASE STUDY: A-BASIN DEVELOPS AND IMPLEMENTS ENVIRONMENTAL PURCHASING GUIDELINES



In fall 2000, A-Basin decided to develop and implement environmental purchasing guidelines. It followed the seven-step procedure described above. A-Basin’s efforts in each of these seven areas are described below.

Step 1: Enlist Management Support. A-Basin’s mountain manager, who has the authority to make and enforce mountain-wide decisions, initiated the project. The mountain manager demonstrated his commitment to creating purchasing guidelines by making the project one of the two main environmental initiatives for the 2000/2001 ski season.

Step 2: Develop a Committed Team. A-Basin developed a team of individuals to create the purchasing guidelines based on (1) interest and (2) the individuals’ operational areas. The team consisted of the mountain manager, food and beverage manager, vehicle maintenance manager, and administrative manager as well as an accountant. The individuals on the team were responsible for determining the overall direction of the purchasing guidelines and represented all of A-Basin’s major purchasing areas.

Step 3: Determine Overall Purchasing Strategy. A-Basin had already decided to use a centralized purchasing system. Each of the guideline team members was assigned as the point of contact for different purchasing matters. The team members’ responsibilities are summarized below.

Contact Person	Purchasing Responsibilities
Mountain Manager	Purchasing policy enforcement
Food and Beverage Manager	Kitchen and janitorial supplies, paper towels, and toilet paper
Vehicle Maintenance Manager	Vehicle and lift maintenance supplies
Administrative Manager	Office equipment, office paper, brochures, and forms
Accountant	Working with vendors on contracts and pricing

Step 4: Create Guiding Principles and Policy. A-Basin’s purchasing guideline team worked with a consultant to develop the following environmentally focused purchasing principles and an overall statement of purchasing policy.

1. Minimize human health impact
2. Minimize environmental impact
3. Conserve natural resources
4. Conserve energy
5. Purchase equivalent or better performing products

Upon their implementation, A-Basin will use the guidelines and policy as its underlying principles in all purchasing decisions whether or not a given type of purchase is outlined as a specific focus area. For example, snowmaking is not specifically addressed in the guidelines because snowmaking systems are not commonly purchased. However, as A-Basin considers what type of snowmaking system to install, it will consider systems that conserve natural resources (water) and conserve energy to the greatest extent practical.

Step 5: Determine Focus Areas. Most of A-Basin’s purchases and thus the focus areas of the purchasing guidelines, involve chemicals, paper products, office equipment, and lighting.

Step 6: Establish a Baseline. A-Basin developed forms for collecting baseline information for each of the focus areas.

Step 7: Implement Guidelines and Track Progress. A-Basin began implementing some environmental purchasing practices before completing the guidelines. For example, in the 2000/2001 ski season, A-Basin began switching over to energy-efficient lighting (see Section 6.3). A-Basin plans to fully implement purchasing of environmentally preferable kitchen and building cleaning supplies (see Section 6.2) in the 2001/2002 ski season. A-Basin’s environmental purchasing team will continue to promote the guidelines and document environmental purchasing. As purchasing projects are implemented, the mountain manager will document the results and inform the public of its progress through the environmental link on its web site (see <http://environment/arapahoebasin.com>).

Challenges. The biggest challenge that A-Basin faced in developing its guidelines was finding time for all the guideline team members to meet, agree on next steps, and make progress on action items in a regular and timely fashion. As a result, A-Basin required 14 months to develop and institute the guidelines, which was about 8 months longer than expected. Although progress was somewhat slow, A-Basin has the guidelines in place and will fully implement them in the 2001/2002 ski season. To write the guidelines and establish a baseline, A-Basin estimates that it expended about 160 total hours of labor time.

CASE STUDY: ENVIRONMENTAL PURCHASING AT VAIL RESORTS



In 1998, Vail Resorts corporate Purchasing Department adopted the following environmental policy:

Vail Resorts Purchasing Department will make every reasonable effort to reduce the environmental impact of our operations. We will:

- Buy recycled content products and recyclable products
- Purchase energy and water efficient fixtures and equipment
- Promote chemical waste reduction, and recycle all possible waste materials from our operations

In implementing this policy, the Purchasing Department decided that it would support environmentally friendly alternatives that are up to 10 percent more expensive than the current products.

As an example of Vail Resorts' commitment to its environmental purchasing policy, in the summer of 2000 all dishwashing machines across all four Vail Resorts ski areas were retrofitted with dispensers to accommodate Eco-Lab detergents. Eco-Lab solid detergents eliminate the hauling, storage, safety, and spill risks of former, more toxic liquid detergent products. The new products generate 90 percent less solid waste (detergent bricks are packaged in cellophane wrappers instead of buckets), are non-corrosive, require no personal protective equipment when re-filling, and are more efficient (less detergent required per load of dishes washed).

In addition, Vail Resorts' corporate marketing department adopted a similar policy. The department reduces paper use by relying more heavily on electronic media, uses only recycled content paper, and requests soy or vegetable based ink when possible for printing jobs.

Keystone (one of Vail Resorts' ski areas) supported the environmental purchasing policy in 2000 by making the following purchasing decisions:

- Replaced ten residential decks, a spa deck, and two restaurant/bar decks with zero-maintenance composite lumber made from 100 percent waste wood and plastic milk jugs.
- Purchased 22 on-mountain recycling collection centers made from 100 percent post consumer content.
- Switched purchase of more than 10,000 cases of paper products to all 30 percent or higher post-consumer content (up from 20 percent in previous years).
- Restaurants switched to bleach-free napkins and installed condiment dispensers, eliminating disposable packet waste and saving over \$5,000.
- Wooden pallets are composted, toner cartridges are recycled, and polystyrene packing peanuts are re-used.
- The Keystone Lodge finished a 2-year renovation that upgraded all 153 rooms with 1.6 gallon per flush (gpf) toilets (from 3.5 gpf), 2.5 gallon per minute (gpm) bathroom faucets (from 5 gpm), and 2.5 gpm showerheads (from 7 gpm). Keystone estimates it saves 117 gallons of water per room per day, or 4 million gallons per year. The Keystone Lodge is researching bulk amenity dispensers to replace individual amenities, which could reduce 5.7 tons of solid waste per year. Keystone also plans to install 1.6 gpm showerheads in 2002.

- The new information center at Keystone that broke ground in November 2001 integrates renewable solar energy and recycled materials into the construction of the building. Guest education displays will be a key component of the building.

6.2 CHEMICAL PRODUCTS

Ski areas use a variety of chemical products, including janitorial supplies, kitchen supplies (such as dish and oven cleaners), and vehicle and lift maintenance products, that contain mixtures of toxic and hazardous substances. The human health effects of these mixtures are not well understood; however, frequent, long-term exposure to some of the chemicals by inhalation or skin contact can contribute to or cause a variety of ailments, including cancer.

The general approach for purchasing “greener” and safer aerosol products involves screening products against one or more selection criteria. Many cities and states have developed environmentally preferable chemical purchasing criteria; examples of how selection criteria are being used in practice can be found in purchasing programs initiated by various city, state, and federal organizations. Information about these purchasing programs can be found at the web sites listed in Section 6.7. Examples of selection criteria are listed below in the form of product characteristics that, if present, are grounds for not purchasing a product.

- | | |
|---|---------------------------------|
| • Carcinogenicity | • Chlorinated solvent |
| • Reproductive toxicity | • Artificial dyes or fragrances |
| • Chemicals with low permissible exposure levels (PEL) and threshold limit values (TLV) | • Skin irritant |
| • Acute and chronic toxicity | • Volatile organic compound |
| • Persistence in the environment (limited biodegradability) | • Petroleum hydrocarbon |
| | • Flammability |
| | • Corrosivity |
| | • Hazardous waste constituent |

Using these criteria to screen products is a complex and time-consuming process, largely because much of the information needed to characterize a product is difficult to obtain. There are several screening processes that use some or many of the same criteria. Information about these processes can be obtained from the organizations listed in Section 6.7. However, to initiate chemical screening, consider the four-step approach described below:

Step 1: Do not use or purchase products that contain known carcinogens, reproductive toxins, chlorinated solvents, or ozone-depleting compounds (ODC). Lists of known carcinogens and reproductive toxins can be found at www.epa.gov/iriswebp/iris/index.html and www.oehha.org/prop65/prop65_list/newlist.htm. Chlorinated solvents that may be found in products used in maintenance facilities include perchloroethylene (tetrachloroethylene); trichloroethylene; methylene chloride; and 1,1,1-trichloroethane. A list of ODCs prohibited as of September 1999 is presented in the FLIS “Non-Ozone Depleting Substances” report dated September 1, 1999. Also, refer to the Federal Clean Air Act, at www.epa.gov/docs/ozone/title6/usregs.html.

Step 2: Do not use or purchase products that contain chemicals that are F-listed hazardous waste constituents. These constituents are defined in 40 *Code of Federal Regulations* Section 261.31 (<http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-I.htm>) from http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr261_00.html. F-listed chemicals include many solvents commonly used in industrial cleaning operations, and their presence in wastes may cause the waste to be hazardous regardless of their concentrations.

Step 3: Apply case-specific selection criteria. Numerous other criteria may be considered when assessing the environmental preferability of a product. In some cases, the applicability of the criteria depends on physical and chemical characteristics and how the product is used. For example, the characteristic of corrosivity is unlikely to apply to many organic-based solvent cleaning products. Likewise, the characteristic of flammability is unlikely to apply to many cleaning supplies used for housekeeping. Additional criteria and guidelines to consider in selecting chemical products are summarized below.

Criterion	Guideline and Information Source
Neurotoxins and central nervous system depressants	Products should contain no more than 1% by weight of any ingredient that is listed by either the EPA the Integrated Risk Information System (IRIS) (www.epa.gov/iriswebp/iris/index.html) or the National Institute for Occupational Safety and Health (NIOSH) (www.cdc.gov/niosh/87104_48.html) as having a known or probable effect on the human nervous system.
Eye irritation	Products should cause as little eye irritation as possible. The following categories of eye irritation are listed in order of most to least preferable: not an irritant, reddening, irritation, severe irritation, and corrosive damage. If whole product test data are unavailable, the overall eye irritation effect may be determined as the weighted average of the eye irritation effects of each ingredient present at a concentration above 1%. Eye irritant standards for ingredients can be found at www.epa.gov/opptsfrs/OPPTS_Harmonized
Skin irritation	Products should cause as little skin irritation as possible. The following categories of skin irritation are listed in order of most to least preferable: not an irritant, reddening, irritation, severe irritation, and corrosive damage. If whole product test data are unavailable, the overall skin irritation effect may be determined as the weighted average of the skin irritation effects of each ingredient present at a concentration above 1%. Skin irritant standards for ingredients can be found at www.epa.gov/opptsfrs/OPPTS_Harmonized .
Exposure by skin absorption	Products should have the lowest possible potential for skin absorption. The categories of skin absorption potential are low, moderate, and high potential. The following ingredients have high potential for skin absorption and should be avoided if they are present at concentrations greater than 1%. Isopropanol [67-63-0] 2-butoxyethanol [111-76-2] Acetone [67-64-1] 1,1,1-trichloroethylene [71-55-6] Methyl ethyl ketone [78-93-3] Naphthalene [91-20-3] Triethanolamine [102-71-6] Ethylene glycol [107-21-1] Toluene [108-88-3] Diethylene glycol monobutyl ether [113-34-5] Tetrachloroethylene [127-18-4] Monoethanolamine [141-43-5] Xylene [1330-20-7]

Criterion	Guideline and Information Source
Corrosivity	Products should have the lowest possible potential for corrosive action: that is they should have a pH between 2.5 and 11.5. Avoid products with pH values less than 2.5 or greater than 11.5.
Flammability	<p>Products should have as high a flash point as possible. Use the following information as a guide:</p> <ul style="list-style-type: none"> • Flash point greater than 200 °F Good • Flash point between 140 and 199 °F Fair • Flash point between 100 and 139 °F Poor • Flash point less than 100 °F Do not use if possible
Endocrine modifiers	<p>Products should contain less than 1% by weight of any ingredient that is a known, probable, or possible endocrine modifier included on the “Preliminary List of Chemicals Associated with Endocrine System Effects.” This Illinois Environmental Protection Agency document is dated February 1997, has an April 1998 supplement, and is available at www.nihs.go.jp/hse/enviro/illiepatable.htm</p> <p>The EPA "docket #" for the document is 42189 B1-013; see www.epa.gov/scipoly/oscpendo/history/docket.htm.</p> <p>In particular, products should contain less than 1% of the following most commonly used ingredients:</p> <p style="padding-left: 40px;">Nonylphenol ethoxylate [9016-45-9] Octylphenol ethoxylate [9036-19-5] Dibutyl phthalate [84-74-2]</p>
Greenhouse gases	<p>Products should contain less than 1% of any of the following gases, which are designated by the Kyoto Protocol of December 1997 as having a greenhouse impact:</p> <p style="padding-left: 40px;">Carbon dioxide Methane Nitrous oxide Hydrofluorocarbons Perfluorocarbons Sulfur hexafluoride</p>
Limited biodegradability	<p>A product as a whole or each ingredient making up 5% or more of the whole should meet the Organization for Economic Cooperation and Development definition of “readily biodegradable”. For more information, visit</p> <ul style="list-style-type: none"> • www.oecd.org/oecd/pages/home/displaygeneral/0,3380,EN-document-524-14-no-24-5647-524,00.html • www.epa.gov/docs/OPPTS_Harmonized/835_Fate_Transport_and_Transformation_Test_Guidelines/Series/835-3110.pdf.
Volatile organic compounds	Products should meet the VOC content limits established by the California Air Resources Board (www.arb.ca.gov).
Fragrances	Products should contain 0.1% or less of a fragrance that is either a nonfunctional ingredient or a SARA 313-listed hazardous material (www.epa.gov/tri/brochure2000.pdf).
Dyes	Products should contain 0.1% or less of a coloring agent that is either a nonfunctional ingredient or a SARA 313-listed hazardous material (www.epa.gov/tri/brochure2000.pdf).
Not available as a concentrate	Products should be available and purchased in concentrated form, either as a powder or a liquid intended to be diluted by at least 8 parts water (1:8 dilution ratio) before use.
Not available in non-aerosol container	Products should be available and purchased in nonaerosol form.
Not available in bulk	Products should be available and purchased in bulk form.

Step 4: Obtain test samples of products that meet all Step 1 and 2 criteria and as many Step 3 criteria as appropriate and feasible. Test the sample products to evaluate their performance. Select the product or products that meet Step 1, 2, and 3 criteria and perform in a satisfactory manner.

Table 6.1, which contains information on chemicals commonly found in aerosol products used for vehicle and equipment maintenance, will aid the selection process for many common products. For chemicals not included in this table, PELs and TLVs may be found in a product material safety data sheet (MSDS), and F-listed chemicals may be found in 40 *Code of Federal Regulations* section 261.31 (see Step 2).

CASE STUDY: ASPEN MEADOWS/ASPEN INSTITUTE ALTERNATIVE CLEANING SUPPLIES



The Aspen Meadows/Aspen Institute (Aspen Meadows) is a 98 room, four-diamond-rated hotel in Aspen, Colorado operated by Aspen Skiing Company (ASC). The hotel employs a cleaning staff of 20 that use 17 cleaning supplies, such as bathroom cleaner, disinfectant, general purpose cleaner, spot remover, glass cleaner, stainless-steel cleaner, and rug cleaner. In spring 2000, an expert in environmentally preferable janitorial products analyzed the hotels cleaning products. The analysis indicated that Aspen Meadows should immediately discontinue use of one product because it contained a suspected carcinogen. The analysis also suggested that Aspen Meadows should consider using different products for 12 of the remaining 16 cleaning supplies. The expert identified 17 alternative products made by four companies for Aspen Meadows to consider.

“The EnviroCare glass cleaner keeps our windows cleaner longer and the carpet cleaner brightens the carpets and leaves a nice scent in the room.”

*Terri Garza
Aspen Meadows
Housekeeping Manager*

Aspen Meadows ordered products from each of the four companies. The hotel then tried the products side-by-side during deep cleaning. Of the four companies’ products, Aspen Meadows found that one product line, EnviroCare made by Rochester Midland, met or exceeded its cleaning needs and compared favorably with the products it was currently using.

Through its existing product supplier, Aspen Meadows was provided with a bulk product dispenser free of charge. Although Rochester Midland offers such incentives, Aspen Meadows did not purchase enough products annually to qualify for a free dispenser from the company. The cost of Rochester Midland’s dispenser was \$400. In addition, Aspen Meadows’ supplier included shipping in the cost of the products whereas Rochester Midland charged extra for shipping. In spite of these additional costs, the diluted EnviroCare products were significantly less expensive than the products that Aspen Meadows was using, resulting in a cost savings of \$1,420 every year after the first year when the dispenser would be purchased from just switching four of its most commonly used cleaning supplies. Table 6.2 shows the estimated cost savings that Aspen Meadows would realize if it replaced its four most commonly used cleaning products with EnviroCare products.

TABLE 6.1 INGREDIENTS FOUND IN COMMON VEHICLE AND EQUIPMENT MAINTENANCE CHEMICAL PRODUCTS

Chemical	PEL or TLV ¹ (ppm)	F-Listed
Acetone	500	✓
Isopropanol	400	
Petroleum distillates	400	
Inhibited paraffinic oil	400	
Petroleum naphtha	300	
Paraffin oil	200	
Refined petroleum oil	200	
Methyl ethyl ketone	200	✓
Methanol	200	✓
Xylenes	100	✓
Ethylbenzene	100	✓
Dipropylene glycol monomethylether	100	
Kerosene	100	
Light aromatic naphtha	100	
Aromatic petroleum distillates	100	
Light aliphatic naphtha	100	
Aliphatic naphtha	100	
Blend of amyl acetate, 3-methyl butyl acetate, 2-methyl butyl acetate	100 100 --	
Hexane	50	
Cyclohexanol	50	
Diacetone alcohol	50	
Toluene	50	✓
2-Butoxyethanol	25	
Naphthalene	10	
Aliphatic petroleum distillates	0.34	
1,1,1-Trichloroethane	CHLOR ²	✓
Mineral seal oil	CARC ³	
Perchloroethylene	CARC ³	✓
Trichloroethylene	CARC ³	✓
Dichloromethane	CARC ³	✓

The chemicals at the top of the table are the least toxic.

As you read down the table, notice that the exposure limits (PELs or TLVs) for the chemicals decrease, which means that the toxicity of the chemicals increases.

Chemicals at the top of the table are preferred (unless they are F-listed) but should be used carefully: worker health can still be harmed by frequent, long-term exposure.

USE PRODUCTS THAT CONTAIN CHEMICALS WITH HIGHER EXPOSURE LIMITS.

AVOID OR MINIMIZE USE OF PRODUCTS THAT CONTAIN CARCINOGENIC CHEMICALS.

Notes:

- ¹ PEL = permissible exposure values
TLV = threshold limit values
ppm = part per million
The lower value is listed
- ² CHLOR = Chlorinated solvent
- ³ CARC = Carcinogen

TABLE 6.2 POTENTIAL COST SAVINGS FOR ASPEN MEADOWS AS A RESULT OF IMPLEMENTING ENVIRONMENTALLY PREFERABLE CLEANING SUPPLIES

Product	Current Annual Cost	EnviroCare Annual Cost
Bathroom Cleaner	\$800	\$390
Glass Cleaner	\$389	\$180
Disinfectant	\$800	\$330
General Purpose Cleaner	\$590	\$90
Shipping	Included	\$170
Dispenser (one time fee)	Included	\$400
First-Year Total	\$2,580	\$1,560
Subsequent-Year Total	\$2,580	\$1,160
First-Year Savings	\$1,020	
Subsequent Year Savings	\$1,420	

Aspen Meadows did not implement the project because the EnviroCare product line was not available through its current supplier and Aspen Meadows used its supplier to obtain numerous products other than cleaning supplies. Therefore, Aspen Meadows did not want to (1) jeopardize its relationship with its supplier and (2) have to place separate orders for its cleaning supplies.

6.3 LIGHTING

Lighting products should be considered in a purchasing program because many facilities elect to replace conventional fixtures with newer, energy efficient lamps through attrition; therefore, the topic is briefly addressed below. Chapter 10, “Buildings,” contains information about energy efficient lighting and a lighting retrofit (replacing all lamps in a location or building at once) case study for ASC. Additional information about energy efficient lighting can be obtained from local electrical utility companies and lighting consultants.

In general, energy efficient lamps require a higher capital investment than conventional fluorescent and incandescent lamps but consume 33 to 75 percent less energy and last up to 18 times longer. Switching to energy-efficient lamps usually results in a payback period of less than 3 years, depending on how many hours per day the lamps are used. Additional cost savings are realized from reduced maintenance costs because the energy-efficient lamps last so much longer. Although the cost savings are less dramatic, it is less capital-intensive to replace light bulbs by attrition (replacing lamps as they burn out). Furthermore, with technological advancements, many of the quality issues previously associated with energy-efficient lamps have been eliminated. For example, they come in many shades of white from “warm” to “cool,” come in many sizes and shapes to accommodate different lighting situations, have flicker-free starts, and are available for 3-way and dimming applications. A detailed case study of lighting replacement by attrition at Arapahoe Basin (A-Basin) is presented below.

CASE STUDY: LIGHTING REPLACEMENT BY ATTRITION AT A-BASIN



Buildings at A-Basin are lit with either linear fluorescent lamps or incandescent light bulbs. In March 2000, GE Lighting audited A-Basin’s lighting and recommended replacing all lamps in the buildings with energy-efficient alternatives (see Table 6.3 for details). GE Lighting estimated payback periods of about 2 years for replacing the incandescent light bulbs and about 4 years for replacing the linear fluorescent lamps. The payback periods were different for the different lamp types because the incandescent bulbs at A-Basin burn more hours in a year than the fluorescent lamps and because the energy-efficient

incandescent bulbs are less expensive than the energy-efficient fluorescent lamps, but do not last as long. The payback period of 2 to 4 years is somewhat longer than typical lighting retrofit payback periods because most of A-Basin's lamps are used for only about 6 months of the year. A-Basin decided to complete the lighting retrofit of its buildings through attrition; in other words, it will replace lamps and bulbs as they burn out. To date, A-Basin has replaced 20 percent and expects to replace 60 percent by the end of the 2001/2002 ski season. Table 6.3 identifies A-Basin lamp locations and types as of March 2000, the total numbers of lamp and bulb types in use, the total kilowatt-hours used by each lamp or bulb type, and the equivalent carbon dioxide (CO₂) generation. A-Basin uses this table to measure improvements as lamps and bulbs are replaced.

6.4 PAPER PRODUCTS

Ski areas use many types of paper products, including office paper, toilet paper, paper towels, tissue paper, forms, trail maps, and brochures. The environmental preferability of a paper product is determined by (1) the process by which the paper is whitened and (2) the recyclability and postconsumer content of the paper. Important terms to understand with regard to the environmental preferability of paper are defined below. For more information on this topic, visit www.chlorinefreeproducts.org.

- Elemental chlorine (EC) paper is whitened using chlorine gas. This process generates dioxins as a by-product. Dioxin is an organochlorine chemical that is persistent in the environment and can bioaccumulate to toxic levels in fatty tissues.
- Elemental chlorine-free (ECF) paper is whitened using chlorine derivatives such as chlorine dioxide. This process generates less dioxins.
- Totally chlorine-free (TCF) paper is paper whitened using a combination of oxygen delignification and hydrogen peroxide or ozone. This paper cannot be made from recycled paper because the recycled paper may have been made with EC or ECF paper.
- Processed chlorine-free (PCF) paper contains recycled-content paper that has been whitened using a nonchlorine compound. All virgin paper used in PCF paper is TCF.
- Unbleached paper has not been whitened by any process.
- "Recyclable" means that a product can be recycled; in other words, the product can be diverted from permanent disposal (landfilling or incineration) for recycling.
- Recycled: Recycled items are those that have been made from previously used materials ("post-consumer waste" or PCW) that may have otherwise ended up in the waste stream. Also called "recycled" are scraps from a manufacturing process ("pre-consumer"), which has always been a normal part of the manufacturing process. The higher the post-consumer content, the better.

Information about 40 environmentally preferable papers from 21 manufactures is available in the "Ecological Guide to Paper" at www.celerydesign.com. Depending on local market conditions, the costs for different types of paper may vary. Based strictly on environmental considerations, the order for environmental preference for paper products is summarized below. To assist in developing recycling and recycling markets, paper from PCW is preferable to paper recycled from pre-consumer sources. When selecting paper, ski areas should contact suppliers to determine which paper best meets environmental, quality, and cost criteria.

TABLE 6.3 ESTIMATED SAVINGS AS A RESULT OF LIGHTING RETROFIT AT A-BASIN

Lamp or Bulb Location	Lamp Type	Number of Lamps	Annual Energy Use (kWh) ¹	Equivalent CO ₂ (tons) ²
Linear Fluorescent Lamps				
Ski Patrol office, Ski Patrol main area, rental lockers, rental repair, boot area, cafeteria, wastewater facility restrooms, wastewater facility, wastewater facility entry, wastewater facility office, vehicle maintenance shop, ticket office, fire panel room, employee locker room, nursery, no-smoking area, back of cafeteria, and downstairs of lodge	Old: T12 New: T8	182	Old: 245,674 New: 164,901	244 164
Vehicle maintenance shop and wastewater facility	Old: High-output New: T8	23	Old: 153,710 New: 90,418	153 90
Employee locker room and back of cafeteria	Old: STD New: T8	17	Old: 29,628 New: 24,950	29 24
TOTAL			Old: 429,012 (\$36,466) New: 280,269 (\$23,823)	426 278
Incandescent Light Bulbs				
No-smoking area, cafeteria, and downstairs of lodge	Old: 40G40 New: FLG151E	19	Old: 9,959 New: 3,984	10 4
Ski Patrol restroom, wastewater facility restroom, and bar area	Old: 100A 120V New: FLE28QBX	15	Old: 19,656 New: 5,504	20 5
Boot area, group sales, nursery, and no-smoking area	Old: 75/BR30/FL/ 65WM 120V New: EL23/R25/27	28	Old: 23,849 New: 8,439	24 8
Cafeteria	Old: 75BR40/FL/ 65WM 120V New: FLE20TBX/R40	3	Old: 2,555 New: 786	2.5 1
Wall sconces and nursery	Old: 60A 120V New: FLE20TBX/SPX2	7	Old: 5,504 New: 1,835	5.5 2
TOTAL			Old: 61,523 (\$5,229) New: 20,548 (\$1,747)	62 20

¹ Values based on March 2000 “Facility Lighting Audit” completed by GE Lighting. Burn-hours for lamps and bulbs vary. An energy cost of \$0.085 per kWh is assumed.

² (Assumes 1.99 pounds of CO₂/kWh)

Paper Type in Order of Environmental Preference	Example Paper Products
Unbleached (when white paper is not required) with 100 percent postconsumer content	<ul style="list-style-type: none"> • Simpson Paper Co.: Quest (100% PCW) • Domtar Fine Papers: Sandpiper (100% PCW) • International Paper: Hammermill Unity DP/Springhill Incentive 100 (100/50)* • Mohawk Paper Mills: Vellum P/C 100 (100% PCW)
PCF paper with the highest postconsumer and recycled content possible	<ul style="list-style-type: none"> • James River Paper Company: Eureka! (100/70)* • Rolland Inc.: New Life Dual Purpose 100 (100/75)*, New Life Opaque (50/20),* Evolution 100 (100/75)* • Riverside Paper Co.: Ecology Copy Bond (100/35)* • Simpson Paper Company: Equinox (100/50)* • Zanders USA: Ikonofix 50/20 (50/20)*
TCF paper	<ul style="list-style-type: none"> • Mohawk Paper Mills: Options TCF • Zanders USA, Inc: Ikonofix TCF • Lyons Falls: Pathfinder
ECF paper with the highest postconsumer and recycled content possible	<ul style="list-style-type: none"> • Cross Point Paper: Genesis (100/100),* Passport (50/20),* Worx Multipurpose (50/20)* • Neenah Paper: Environment Line (100/30)* • Georgia-Pacific: GeoCycle (20/20)* • New York Recycled Paper: Earth Day Bond
EC paper should not be selected under any circumstances.	

*Note: (percent recycled content/percent PCW)

Paper made of alternative materials such as kenaf, bamboo, and sugar cane is also available. This type of paper may be more expensive than paper made from wood products and PCW. For more information about alternative paper products visit the following web sites: Future Solutions at www.futuresolutionsinc.com and The Real Earth at www.treeco.com.

6.5 OFFICE EQUIPMENT

All types of office equipment such as copiers, fax machines, computers, monitors, scanners, and printers are available with energy-efficient characteristics. Energy Star® is an EPA-sponsored initiative with many energy efficiency (E2)-related programs. It provides specifications for E2 requirements that should be included in a bidding process for office equipment. These specifications are available on the internet at www.epa.gov/nrgystar/purchasing; from here, navigate to products and select the type of equipment for which bid specifications are desired. The same information may be obtained by calling (888) STAR-YES. Alternatively, simply require that any office equipment purchased come with the Energy Star® Label.



Energy Star® also has partnerships that are voluntary agreements between EPA and U.S. businesses. The businesses agree to identify and implement energy-efficient alternatives. In exchange, businesses involved in the partnerships have access to extensive information about E2 opportunities involving compact fluorescent light bulbs, office equipment, transformers, windows, and exit signs. Energy Star® also provides technical assistance, tools for promoting a the business's involvement in Energy Star® to the public, technical manuals, workshops, presentations, and software for completing a

comprehensive energy and economic analysis of E2 opportunities. All ski areas can benefit from involvement in an Energy Star[®] partnership; see Chapter 10 for more information.

6.6 PURCHASING LOCALLY

Many products used at ski areas are available locally but are purchased from sources hundreds of miles away. Purchasing products from nearby locations not only supports the local economy, but it also helps the environment by decreasing fuel use and emissions associated with transporting the products. In 1999, ASC began purchasing beef from local ranchers. Details of this project are discussed below.

CASE STUDY: WHERE'S THE BEEF? ASC BUYS LOCAL



As is the case around many ski areas, property values in the Roaring Fork Valley are at a premium. As a result and because of depressed beef prices, cattle ranchers have sold farmland to developers. Prompted by the desire to preserve open space and rural areas in the Aspen community by supporting local ranchers, ASC decided to purchase beef locally and sell it in its restaurants. In 1999, ASC purchased \$4,000 worth of beef from local ranchers, and in 2000, ASC purchased \$11,000. The locally produced beef costs ASC twice as much per pound as beef produced elsewhere. Although the extra cost could be passed on to its customers, ASC is absorbing the additional cost. However, a brewery in Steamboat Springs, Colorado sells a burger with beef purchased from a local rancher for \$1 more than nonlocal beef burgers, and the local beef burger outsells it by 2 to 1. An added benefit associated with the locally purchased beef in Aspen is that it is produced without hormones, chemicals, or antibiotics.

6.7 ADDITIONAL INFORMATION SOURCES

The following table provides information for additional information on topics discussed in this chapter.

Organization	Contact Information	Description
General Information on Environmental Purchasing		
The Pacific Northwest Pollution Prevention Resource Center	www.pprc.org/pprc/pubs/topics/envpurch.html	Information to assist purchasers in efforts to establish or maintain an environmental purchasing program. Included are information that can assist in identifying "green" products and setting up an environmental purchasing program, general and specific resources available to purchasers, guides for locating green products, and examples of procurement programs that can be used as a guide by purchasers building or improving programs.
EPA	www.epa.gov/cpg	Comprehensive procurement guidelines. The web site contains information about buying recycled products, including recommended recycled-content guidelines for various products and vendors of such products.

Organization	Contact Information	Description
EPA	www.epa.gov/opptintr/epp	EPA environmentally preferable purchasing web page
Co-op America's Green Pages Online	www.coopamerica.org	Web site with listing of companies that supply environmentally preferable products
Environmental Purchasing Guidelines		
State of Massachusetts	www.state.ma.us/osd/enviro/	Massachusetts' environmentally preferable purchasing program web site
State of Minnesota	www.moea.state.mn.us/lc/cleaning.cfm	Minnesota's environmentally preferable purchasing program web site
King County, Washington	www.metrokc.gov/procure/green	King County's environmentally preferable purchasing program web site
City of Santa Monica	www.ci.santa-monica.ca.us/environment	Santa Monica's environmentally preferable purchasing program web site
City of San Francisco	www.sfreycles.org/ look under "City Government" and then the EP3 project	San Francisco's environmentally preferable purchasing program web site
Chemical Product Selection		
California Environmental Protection Agency	www.oehha.org/prop65/prop65_list/newlist.htm	Chemicals known to the state to cause cancer or reproductive toxicity
P ² West, Western Regional Pollution Prevention Network	www.westp2net.org	Numerous P ² resources, including a series of fact sheets on janitorial product selection.
EPA	www.epa.gov/iriswebp/iris/index.html	Toxicology information
Lighting		
GE Lighting	www.gelighting.com	GE Lighting's home page. It contains information on all types of lighting alternatives, including energy-efficient alternatives.
Philips Lighting	www.lighting.philips.com	Philips Lighting's home page. It contains information on all types of lighting alternatives, including energy-efficient alternatives.
Paper		
Chlorine Free Products Association	www.chlorinefreeproducts.org	Trade association representing companies dedicated to implementing advanced technologies, and groups supporting products free of chlorine chemistry
Vision Paper	www.visionpaper.com	Sells "tree free" kenaf paper and other recycled-content paper products
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
Celery Design Collaborative	www.celerydesign.com	Ecological Guide to Paper
Office Equipment		
Energy Star [®]	www.energystar.gov	EPA's Energy Star [®] home page