



Green Office Guide

A Guide to Greening
Your Bottom Line
Through a
Resource-Efficient
Office Environment

City of Portland
Office of Sustainable
Development

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Introduction

Global warming. Water quality. Air pollution. Landfills. Not a typical to-do list for another day at the office, but every workday each of us makes hundreds of decisions that affect all of these issues. Many of these choices are tiny—whether to toss an outdated report in the trash or in the recycling. Others are more substantial—whether to install a high-efficiency cooling unit for the building. In every case, though, the decisions make a difference for better or worse.

The City of Portland promotes decisions that help address all of these problems. In part, this is because the City has a responsibility to deal with these large, long-term policy issues, and it will ultimately succeed only with broad-based action throughout the community. It is also clear that the solutions to these far-reaching environmental problems also generate substantial local economic and social benefits. Using less energy not only reduces global warming pollution but also reduces production costs, making businesses more competitive and improving the local economy.

Simply stated, energy-efficiency, waste reduction, water conservation, and other resource-efficient practices are better for the environment and your bottom line. Considerable cost savings can be achieved by using resource-efficient products and practices. By taking advantage of these practices and using products with the ENERGY STAR® label, you can avoid resource waste and save money on your utility bills.

EPA's ENERGY STAR® program is a public-private partnership designed to make it easy for businesses and consumers to save money and protect the environment. ENERGY STAR® partners have cut their operational costs for energy, water, and paper products by 40 percent or more. The ENERGY STAR® tag line is "Saving the Earth. Saving Your Money."

This guidebook was created to be both comprehensive and easy to use. Chapter 1 provides an overview of resource use in offices. Resource-saving options are spelled out in the seven sections of Chapter 2. These sections cover areas of a typical office operation: Lighting, Office Equipment, Paper Products, Heating and Cooling, Water, Cars and Parking, and Other, a final catch-all section. Each chapter includes some "Case In Point" snapshots of successful businesses and pertinent "Did You Know?" facts.

Once you know what you can do, your next question may be: How do I get started? Chapter 3 identifies resources available for assistance. Brief summaries of technical information, financial incentives, and other resources available are included with internet addresses and phone numbers to contact for additional details. Finally, Chapter 4 highlights broader and more long-term projects your office may want to pursue to move toward sustainability.

Use this guide to do your business a world of good and do the earth a favor too.

Chapter 1—Office Resource Use

Resource-intensive activities are typically associated with factories and manufacturing processes, but modern offices also require significant amounts of energy, water, and paper. Paper is the most obvious physical resource consumed in office operations. Offices also use energy for lighting, space conditioning, and powering office equipment. Transportation needed to move employees (and clients) to and from offices requires energy resources too.

According to the US Department of Energy (DOE), a typical office space in Portland's climate uses 80,000 BTUs per square foot per year. A BTU (British Thermal Units) is a way to measure energy. As a basis of comparison, the typical energy intensity for an office is equal to that of an outpatient health care facility. Office energy use on a per square foot basis is greater than school buildings, average retail spaces, and more than double the energy intensity of a church. It costs, on average, \$1.59 per square foot per year for the energy needed to power an office.

Everyone pays for energy every month either in a lease or on a utility bill. Rarely do we think in terms of BTUs when we write the checks to pay for our monthly energy use. We typically just want quality light, heat, and other services at a reasonable cost. This guide is a tool to help energy consumers get the most for their money. A high-priced consultant might call it energy optimization, but we'd rather think of it as smart business—the resource-efficient way to boost your bottom line.

Every use of energy is an opportunity for savings. This includes office lighting, heating, cooling, hot water, and office equipment. You can make changes without compromising the function of the equipment or the comfort of occupants. Current technology offers better heating, lighting and office systems that are more energy efficient. Savings of 25 percent or more are typical. That means \$4,000 per year for a 10,000 square foot office.

Offices can save even more. EPA ENERGY STAR® partners have cut their operational costs for energy, water, and paper products by 40 percent or more. Few cost categories other than energy can provide savings opportunities this significant.

Offices also use water, generate sewage and stormwater, and create solid waste. Office-based resource use is responsible for a sizable share of global warming gas emissions. An analysis of carbon dioxide emissions in Portland found that nearly 20 percent could be attributed to office energy use and other commercial buildings. Add related transportation and solid waste impacts, and the percentage is even higher. Include “upstream” effects—such as oil drilling for energy, tree cutting for paper—and you can see the true level of impacts from our resource use.

Chapter 2—Green Opportunities

The six main resource conservation opportunity areas for offices are: A. lighting, B. office equipment, C. paper products, D. heating and cooling, E. water, and F. cars and parking. Specific resource-saving options in each area are listed in this chapter.

A. Lighting

According to a US Department of Energy (DOE) end use study from 1995, lighting accounts for about 29 percent of the energy use in a typical office. A number of energy saving opportunities for offices can cut the energy used for lighting in half.

Did You Know? Properly designed and implemented daylighting strategies can save 50 to 80 percent of lighting energy.

Here are six options to consider:

i T-8 and T-5 Fluorescents Fluorescent lighting fixtures that are more than ten years old are likely using T-12 fluorescent lamps. T-12 lamps are 1½-inch diameter tubes in either 4- or 8-foot lengths. A better option, the narrower (1-inch diameter) T-8 lamp, is now available. T-8 fluorescent lighting has better color, less flicker, and uses 20 percent less energy to produce the same light output. T-8 lamps are coupled with more efficient electronic ballasts. T-8s are also available with dimmable ballasts that allow greater light level control and energy savings.

To convert from T-12 to T-8 fluorescent lighting requires replacing the entire existing fixture. That's more complicated—and more costly—than a lamp replacement, but with rebates from your electric utility and tax credits from the state, this conversion can pay for itself quickly. Note: Utility incentives in Oregon may change when utility restructuring takes effect March '02.

CASE IN POINT – Empire Bolt & Screw (Spokane, Washington)

Empire Bolt & Screw, a Spokane wholesaler, replaced T-12 fluorescent lamps and magnetic ballasts with more efficient T-8 lamps and electronic ballasts. The company's lighting bill dropped by one-third. In addition to the utility savings, the lamps provide improved color rendition, enabling employees to see their work better.

An even newer and more efficient fluorescent lighting technology has just arrived. T-5 lamps are smaller—only 5/8 inches in diameter—more efficient lamps. They are 10 to 15 percent more efficient than a T-8 lighting system. All new construction should include T-5 lamps and fixtures. They come in metric lengths so their use has

been largely restricted to new construction or major renovations where the entire ceiling grid is being changed.

i Exit Signs Exit signs may be small, but they are illuminated 24 hours per day, seven days per week, so their energy use adds up. Exit signs formerly used incandescent lamps (usually two 20 or 40-watt lamps). Some of these older exit signs have been converted to use compact fluorescent lamps (CFLs). The CFLs last longer and use less energy. The CFL powered exit signs draw 20 to 30 watts or less, resulting in energy savings of 50 percent or more.

Other efficient exit signs use light emitting diodes (LEDs), neon lighting, or electroluminescent lighting technology. The total energy use for these exit signs ranges from 1 to 10 watts. These technologies offer a maintenance benefit as well. LED, neon, and electroluminescent lighting technologies last much longer than incandescent lamps.

CASE IN POINT – Water Pollution Control Lab (Portland, Oregon)

The City of Portland Bureau of Environmental Services built a new Water Pollution Control Lab in 1997. Among its many energy-saving features were electroluminescent exit signs. These exit signs draw only one watt each. There are 21 of them in the building and they're on all the time. Substituting the electroluminescent lighting for incandescent saves the Water Pollution Control Lab over \$350 per year on their electric bill.

i Occupancy Sensors Everyone forgets to turn off the lights sometimes, but in some cases the forgetting is chronic. This wasted lighting energy can add up quickly. One way to ensure that lights are used only when needed is with occupancy sensors.

Occupancy sensors detect the presence of people in a room. When there's no one there, they turn off the lights. When someone returns, they turn the lights back on. This technology works quite well in storage rooms, conference rooms, break rooms, and even the boss's office.

In a single small office where lights are on unnecessarily two hours a day, annual energy waste adds up to \$10. Add many offices, meeting rooms, and other spaces together and the savings from occupancy sensors can be significant.

Most occupancy sensors are inexpensive, and in many cases they are simple to install. In larger spaces, they work best when mounted in the ceiling. For smaller spaces, they can be installed in place of the room's light switch. Rebates for occupancy sensors are available from Portland area utilities at least until March '02.

CASE IN POINT – Northwest Elementary School (Pasco County, Florida)

Occupancy sensors were installed to control lighting in Northwest Elementary School in Pasco County, Florida. They replaced conventional light switches in classrooms, offices, and other spaces. Detailed before and after monitoring showed that the sensors saved 10% of their lighting energy. Even more, if you include the reduced load on their air conditioning system. These savings occurred in spite of an aggressive energy management program they already had in place. The sensors paid for themselves in five years—equal to a 21% simple rate of return.

i Dimmable Ballasts Fluorescent lights are not like incandescent lights; they need to have special ballasts in order to operate. Dimmable ballasts are an option with most efficient fluorescent lighting systems. They allow you to lower the lighting levels—and cut the energy consumption—when you don't need the lights at their full brightness. Why pay for the light when you don't need it? The lower the light levels, the lower the energy use.

Dimmable ballasts are often used where a skylight or some other kind of daylighting is in place. If your office space is subject to variable natural lighting levels, you can install dimmable ballasts to reduce—or even eliminate—the energy you use when more artificial lighting isn't needed. The savings depend on the space they're installed in. These ballasts are most cost effective during the installation of new light fixtures.

CASE IN POINT – Multnomah County (Portland, Oregon)

Daylight dimming controls were installed in the Multnomah Building. These control the ballasts in fixtures in the perimeter daylit zones for each floor. Photosensors in the ceiling dim perimeter lighting fixtures in response to natural daylighting available. The estimated savings for this energy conservation measure is over \$4,000 annually, and PGE provided a rebate of \$21,000 for this measure.

i Compact Fluorescent Lamps Not every light fixture in every office is already fluorescent. Some desk lamps, accent lighting, or lights in out of the way areas may be incandescent lamps. Incandescent lamps are the standard light bulbs used for the past century. They are much less efficient than the newer alternative, compact fluorescent lamps (CFLs). A 25-watt CFL has the same light output as a 100-watt incandescent. The 75 percent reduction in energy use is only one way in which these bulbs produce savings.

CFLs last much longer—typically ten times longer than incandescent lamps. So, if you're tired of changing burned out bulbs—and paying high electric bills—this could

be the option for you. The prices for CFLs have come down recently although their initial cost is still more than an incandescent bulb. It's best to install them in a place where the light is usually on. In those locations, they can pay for themselves very quickly.

If you pay \$12 for a 25-watt CFL and install it in place of a 100-watt incandescent that usually operates 8 hours a day, it will pay for itself in two years. That's a 50 percent return on your investment! Your return will be even greater with utility rebates that are available until March '02. Where lights are operated frequently, CFLs are a great option to cut energy—and maintenance—costs.

i Exterior Lighting Some of your office's exterior lighting may be incandescent. CFLs could work there too. If you have larger pole-mounted lights in a parking lot, floodlights on your building, or an illuminated sign, there are other opportunities to cut your energy use.

The first thing to do is control the "On" time. If the lights are controlled by a time clock, you can install a photocell in that circuit too. That way the lights come on when it starts to get dark rather than at a preset time like 5 or 6 pm which may be earlier than necessary. The time clock can still turn the lights off at any time you select. For mornings, the time clock and photocell can be set to work in reverse.

Another option is the type of lighting you use. Some outside area lighting uses mercury vapor lamps. Switching a mercury vapor fixture to high-pressure sodium (HPS)—typically used for street lighting—can cut the energy use in half. Metal halide lighting falls between the two from an efficiency standpoint. Metal halides are preferred because of their "white" lighting. Color-corrected high-pressure sodium is an option. Don't overlook fluorescents; fixtures with T-5 lamps can be more efficient than metal halides.

The easiest and most cost-effective option is using only as many exterior lights as necessary and only operating them when they are needed. A simple photocell, time clock, or both can lead to significant savings.

B. Office Equipment

According to DOE, office equipment accounts for 16 percent of an office's energy use. Years ago, a six-person office would have had one electric typewriter and one photocopier for a connected load of about 600 watts. Today, that same office could have six computers, six monitors, two printers, one larger photocopier, and one fax for a connected load of more than 7,000 watts. More and more powerful equipment has been added to nearly every office. However, there are energy-efficient options for virtually all office equipment.

Here are four areas to look at:

i Computers and Monitors A Lawrence Berkeley Lab study from 1999 estimated that one workstation (computer and monitor) left on after business hours is responsible for powerplants emitting nearly one ton of CO₂ per year. That could be cut by 80 percent if the workstation is switched off at night and set to go to “sleep” during idle periods in the day. If every US computer and monitor were turned off at night, the nation could shut down eight large power stations and avoid emitting 7 million tons of CO₂ every year.

Most offices have one computer per desk. Individual computers are not large energy users. But, as they get more powerful—and monitors get larger—they draw more power than they used to. Most new computers come with the ENERGY STAR® label. That’s important to look for, but that label alone doesn’t ensure energy savings. The user needs to be involved too.

Even efficient computers that are on all the time still use more energy than they should. The first thing to know is that it’s OK to turn computers off. There’s a myth out there that says you shouldn’t. That’s not true. There’s another myth that screen savers save energy. That’s not true either. When you’re not going to use a computer for more than two hours—and certainly when you’re leaving overnight—the best thing you can do to save energy is just to turn it off.

There are times during the workday when computers can be turned off too. ENERGY STAR® computers have a “sleep” mode for when they’re not in use. That feature is often overridden because people worry they may lose important data. To alleviate that, just enable the sleep feature for the monitor and not the computer’s CPU. The monitor uses most of the energy and if it’s shut down when nobody’s at the computer, the savings add up.

New flat panel liquid crystal display (LCD) monitors use quite a bit less energy than the conventional cathode ray monitors. The LCD monitors are expensive, but if you are considering new monitors, the energy savings may justify the extra expense.

i Printers ENERGY STAR® printers can cut a printer’s electricity use by over 65 percent. A printer with a duplexing mode can also save around \$30 a month in paper costs. There are several printer types—laser and ink jet—and several control options—standby mode and manual switching—to consider.

Laser printers are available with different printing speeds—the maximum energy draw of faster printers is greater than that of slower ones. Another Lawrence Berkeley Lab paper showed that an eight page per minute (ppm) laser printer used 60 watts while a 24 ppm printer used 100 watts. Comparing the wattage alone is misleading, however. Since the larger printer prints faster, it doesn’t operate as long as the

smaller one. In fact, the 24 ppm printer could use about 40 percent **less** energy for printing.

Ink jet (or bubble jet) printers use much less energy. Instead of drawing 60 to 100 watts, they require only 10 to 15 watts. The trade-off with these printers is partly speed—they're slower than the fastest laser printers—and partly quality. Ink jet printers do not have quite the printing quality of laser printers. With the opportunity to cut printing energy by 75 to 90 percent, there may be times—for draft documents for example—where an ink jet printer is appropriate.

ENERGY STAR® laser printers don't need to be switched off manually. When no print commands have been received for a preset time period, these printers automatically switch to a low-power standby mode. The energy savings are significant: Laser printers save 65 to 75 watts in standby mode. While in standby, printers produce less heat, reducing air-conditioning costs too. With fewer operating hours and less heat buildup, these printers can last longer and be more reliable.

i Copiers Like printers, copiers use energy all day (and night) even when making copies only a small fraction of that time. ENERGY STAR® labeled copiers are equipped with a feature that allows them to automatically turn off after a period of inactivity. This can cut electricity use by over 60 percent. Even non- ENERGY STAR® copiers can be manually turned off in the evenings and over the weekend. All office staff can help with this.

The right copier can also save you paper. Copiers with duplexing capabilities set to automatically make double-sided copies can cut your paper costs. You'll use less paper, have more profits, and help save trees all at the same time.

CASE IN POINT – IBM (worldwide)

The computer giant estimates it saved \$17.8 million worldwide in 1991 alone by encouraging employees to turn off equipment and lights when not needed. The company estimates that the effect of these simple changes is the same as if 50,000 cars were removed from the road avoiding some 190,000 metric tons of carbon dioxide emissions.

i Faxes Fax machines operate like copiers and printers. They use energy even when “just sitting there.” For some infrequently used fax machines, the standby energy use can be 10 to 20 times *more* than when operating. Unlike printers and copiers, the fax machine isn't something you typically turn off at the end of the workday.

For all future fax machine purchases, specify an ENERGY STAR® model. They have a sleep feature that can cut energy costs by almost 50 percent. A typical ENERGY STAR®

fax machine will save energy with a sleep mode and still be ready to send or receive faxes immediately. ENERGY STAR® faxes can also scan double-sided pages. This reduces both copying and paper costs.

Fax modems can also be added to a computer or network. This allows for paperless faxing and electronic storage of faxes received. This uses less paper and takes up less storage space, and may make the documents more retrievable than paper copies.

i Other Equipment Other equipment in a typical office includes refrigerators and vending machines. There are more energy efficient options for both of these.

Refrigerators operate better when the coils are clean, the freezer compartment is defrosted, and they are relatively full. Be sure to clean and defrost (if needed) a couple times a year. If a refrigerator is too large for the number of people using it, fill the additional space with bottles of water. For new refrigerators, specify an ENERGY STAR® model. This change can save you at least 30 percent over your current refrigerator. Replacing older, less efficient models with new ENERGY STAR® refrigerators will cut energy use in half—saving at least \$30 to \$40 per year.

Many offices have refrigerated beverage vending machines. These machines use quite a bit of energy in part because they operate all day and night. Adding a time clock or a Vending Miser™ control can cut energy use significantly. The Vending Miser™ is an occupancy-based control device that shuts the vending machine off when the break room has been vacant for a preset period of time. This device costs less than \$200. In some cases, electric utilities are giving them away at no cost.

CASE IN POINT – Portland City Hall (Portland, Oregon)

The City of Portland added a Vending Miser™ to a refrigerated beverage vending machine in City Hall. The vending machine's energy use was monitored and the Vending Miser™ was found to cut the energy use nearly in half. That adds up to \$75 per year and means the \$195 Vending Miser™ could pay for itself in slightly over 2.5 years. That's equal to a 38 percent return on investment.

C. Paper Products

The paperless office is still more promise than reality. With today's new technologies it is closer. For efficient paper use, follow the environmental standard: reduce, reuse, and recycle. Improving in each of these areas will bring paper cost savings and cut the need for storage space.

Paper is bulky to store in boxes or file cabinets. By using fewer sheets, you can put storage space to more productive use. Also, fewer sheets mailed may mean reduced postage. A single-sided 10-page letter costs \$0.55 to mail; that same letter, copied onto both sides of the paper, uses only five sheets and \$0.34 in postage.

Some paper-saving options to consider are:

- i Paper Use Reduction** Offices use nearly 1.5 pounds of paper per person per day, according to a survey of Los Angeles offices. You can cut this number by using less paper, reusing paper where appropriate, and recycling. Create hard copies only when absolutely necessary.

CASE IN POINT – OECO Corporation (Milwaukie, Oregon)

OECO Corporation used to duplicate and distribute policy, procedure, health and safety, and other manual updates to each department. Now, manuals are updated electronically and one master (printed) copy is kept, saving \$2,100 each year.

In many cases you don't need a paper copy of a document. An electronic copy may be fine. The advantages of electronic copies are paper, postage, and storage space savings. They also allow electronic search capabilities you don't have with paper documents. Electronic filing and retrieval can save time when you need the document again.

CASE IN POINT – Owens Corning (worldwide)

Owens Corning recently made all of its offices worldwide "paperless." Having previously had 14,000 file cabinets around the world, the company has already saved \$30 million in lease costs.

Review and edit draft documents on screen rather than on paper. If you need to print large reports, consider adjusting margins, line spacing, and page settings that allow more information to fit on each page. Use e-mail to share documents and ideas. If possible, bookmark webpages rather than printing them out, and print e-mails and internet documents only when necessary.

CASE IN POINT – Multnomah County Circuit Court (Portland, Oregon)

The Multnomah County Circuit Court evaluated the printing of dockets—the daily listing and schedule of Court hearings. They were photocopying approximately one million pages of dockets per year before they eliminated unnecessary data and changed the font size. That allowed them to double the number of cases per page. They found that not everyone they were sending dockets to needed them and others preferred to view them on-line (and only print out the relevant pages). They also copied some dockets using both sides of the page. Combined, this cut their paper use by almost 70% and significantly reduced staff time required to copy and distribute dockets.

When faxing, use a stick-on label on the first page of the fax message instead of a full-page cover sheet. This will save energy, paper and long-distance phone costs. You can also save with reusable inter- and intra-office envelopes. Maintaining shared files and reviewing external mailing lists and internal distribution lists for accuracy can cut paper use too.

CASE IN POINT – Legacy Health Systems (Portland, Oregon)

Nurses at Legacy determined that much of the photocopying they did was unnecessary. Previously, seven copies were made of each admitting record. They found that less than half that many were typically needed. Now they only print one record, which is then copied only when needed. This saves more than \$125,000 per year. At Good Samaritan Hospital a daily census/financial report was more than 3,000 pages long. It contained 340 separate parts, each with a unique delivery label for distribution to selected managers. A survey of department managers found that 23% didn't want the hard copy, and another 22% would prefer to view it on-line. This justified a \$4,000 programming cost that now allows only specific sections of the report to be printed. Resulting savings exceed \$9,000 each year.

i Two-Sided Printing/Copying Paper has a large embodied energy content. It requires 15 watt-hours of energy to make a virgin sheet of copy paper. That's more energy than the paper would use in a copier, printer, or fax machine. The embodied energy has become a concern in offices that want to reduce the environmental impact of their activities. One simple but highly effective step to take is to change printer and copier settings to duplex. This saves a substantial amount of paper—and money.

When you need new office equipment, purchase copiers and printers that automatically print on both sides. Many copiers can be easily programmed for that. Most new laser printers have a duplex option. Some can do both traditional book style duplexing (also called “flip on long edge”) and legal form duplexing (“flip on short edge”). The latter is preferred by attorneys and others who use file folders that clip at the top. Individual PCs can also be programmed to make duplex printing the default norm.

CASE IN POINT – Mentor Graphics (Wilsonville, Oregon)

Mentor Graphics adopted a policy that all copy orders will be made double-sided unless single-sided copying is specifically requested. In addition, posters were placed above all walk-up copy machines encouraging employees to copy on both sides. Copy paper use decreased 35% in one year, saving more than \$15,000 in paper costs alone.

i Post-Consumer Recycled Content Natural systems ultimately recycle everything. We can do the same with resources such as paper. Paper is a large component of the waste going into landfills and offices are a primary source of that paper.

Consider using recycled paper. The term “recycled” is often used to describe paper that includes scraps and wastes generated in the paper production process. Post-consumer fiber content is what really counts. Look for post-consumer content that is at least 30 percent or more. There are a number of paper products with 100 percent post-consumer content.

How many toner cartridges do you go through in a year? Waste disposal volumes and costs can be reduced with the use of re-manufactured toner cartridges for printers, copiers, and fax machines. Many office equipment suppliers will take back old toner cartridges when supplying a re-manufactured replacement.

CASE IN POINT – Davis Wright Tremaine (Portland, Oregon)

This large law firm uses re-manufactured toner cartridges in its laser printers and fax machines, saving approximately \$12,000 a year for its Portland office alone. They recommend interviewing vendors of re-manufactured toner cartridges to determine what services are provided, and ask for customer references. Re-manufactured cartridges occasionally require early replacement, but a good service company will replace them at no cost.

i Unbleached and Uncolored Paper Paper manufacturers use chlorine to bleach paper bright white. This chlorine makes its way into the environment and creates dioxins, which causes cancers, birth defects, immune system damage and other health problems. Paper produced without bleach is no less functional than bleached paper.

Unbleached paper alternatives are available for a wide range of paper products. This includes writing paper, copier paper, printing paper, toilet paper, paper towels and napkins, file folders, note pads, and even cash register tape. Unbleached papers are whitened with other, more benign chemicals. Some brands are available in

brightnesses comparable to standard chlorine-bleached stock. They're competitively priced and suitable for a wide range of printing applications.

Think about your need for colored paper. Some heavily-colored paper is harder to recycle. If you don't really need it, stick to white or off-white papers. And, if you do need some colored paper stock, use the lightly-colored (pastel) papers.

i Recycling Paper/Reducing Packaging A ton of 100 percent recycled paper saves the equivalent of 4,100 kWh of energy, 7,000 gallons of water, 60 pounds of air emissions, and three cubic yards of landfill space. Conserving energy and natural resources can be as simple as recycling and buying recycled paper products. Look for the recycling symbol.

In the Portland area, like many other communities, nearly all paper products are recyclable. Letterhead and white copy paper have the most value, but you can also recycle colored paper, magazines, newsprint, and corrugated cardboard. Almost all of the waste stream from a typical office can be recycled. Less waste means smaller garbage containers and lower garbage bills.

Another way to cut down on waste is buying products in bulk. Bulk purchases minimize packaging and are often less expensive than smaller, individually packaged items. When bulk items are not available, suppliers may be able to eliminate extraneous packaging if asked. It usually saves them money too. And, if you're shipping or mailing materials from your office, you can find similar savings as well.

CASE IN POINT – Mentor Graphics (Wilsonville, Oregon)

Mentor Graphics saves paper by keeping its mailing lists for promotional materials efficient and targeted. It purchases return postage for third-class mailings that are undeliverable, and uses this information to update mailing lists. Mailing lists have been consolidated into a comprehensive marketing database, which allows for more targeted mailings. The company also periodically calls to "clean up" its lists. This helps to identify people who are no longer available to receive mail. One such "clean-up" activity cost \$7,000 in labor but saved \$14,000 annually by reducing printing and postage of misdelivered sales catalogs.

D. Heating and Cooling

Heating, cooling, and ventilation accounts for 39 percent of the energy use in a typical office. For smaller office spaces in the Portland area, the load may consist of mostly heating (just like it is for homes). However, larger offices have more cooling because of the internal heat gain from people, lights, and office equipment. Either way, heating, ventilation and air conditioning (HVAC) is a large part of energy bills.

The purpose of an HVAC system is to heat, cool, control humidity, and bring fresh air into a building. Employee and customer comfort is the main priority. But saving energy doesn't just mean colder spaces in the winter and uncomfortably warm spaces in the summer. As with lighting, it is generally possible to get better comfort while using less energy.

HVAC systems are among the largest energy end-uses in commercial buildings. With greater energy use comes greater opportunities for savings. Seven HVAC energy-saving options are:

i Proper Operation Turning your heating and cooling off when it's not needed is a simple way to save. Just as lighting is frequently left on when no one is around, the same happens with HVAC systems. Having someone responsible for switching off the system can work, but introduces the possibility of human error. A better option may be an automatic setback thermostat. They provide the added comfort of a pre-warmed or pre-cooled office when you arrive at work. Setback thermostats don't cost much and automatically adjust the settings up (or down) for evenings and weekends, eliminating the uncertainty and waste of manual control.

Another opportunity with HVAC systems is adjusting the temperature settings to avoid overheating or over-cooling. An adjustment of only a degree or two can cut heating or cooling bills by two to three percent. Extending that to three or four degrees can produce savings of 10 percent or more. Try making small changes to find the optimal settings that maintain comfortable conditions for employees and customers. Allowing and encouraging employees to dress comfortably and seasonably will make them appreciate the changes more.

CASE IN POINT – Aster Publishing Building (Eugene, Oregon)

In 1994, the Aster Publishing Building (APC) upgraded the HVAC system, energy management controls, air handlers, and economizers in its downtown headquarters building. At the time of the upgrades, this 66,300 square foot office building was approximately 11 years old. As a result of the system corrections, APC saves more than \$40,000 annually on its electric bill. In addition, they now have better temperature control, improved air balance, reduced tenant complaints, extended equipment life, and fewer equipment failures.

i Proper Maintenance Good equipment maintenance pays off in higher reliability of the equipment and reduced operation costs. Proper operation and maintenance (O&M) will uncover ongoing problems and eliminate nonproductive maintenance practices.

Proper O&M is also important for energy performance. Aside from the obvious tasks like changing filters or calibrating controls, HVAC system maintenance can influence the energy performance of the total building. An overheating fan motor lowers the efficiency of the entire HVAC system. A leaking chiller pump will waste water, draw extra power, and also hurt the chiller efficiency.

i Efficient Products Older HVAC equipment is usually not as efficient as newer products. Inexpensive HVAC equipment costs more to operate than the premium HVAC technologies. When replacing heating and cooling equipment, specify the most efficient models. Some HVAC products, such as smaller air conditioners, are rated by ENERGY STAR®. Remember that bigger is not better—oversized HVAC equipment does not run as well as correctly sized equipment.

CASE IN POINT – Barker-Haaland Insurance (Corvallis, Oregon)

This insurance company upgraded its HVAC system. The primary goal was to improve employee comfort and productivity. The old system, with inefficient HVAC equipment and an undersized air conditioner, left employees either too warm or too cold. The company replaced its old furnace with a unit that reduced gas consumption 28% and will allow employees to eliminate portable electric space heaters. A new, properly sized air conditioner provided the same amount of cooling with 50% less electricity. A continuous speed fan was replaced with a variable speed fan that reduced fan electric load by 42%. While the energy savings are significant, the improved employee productivity made possible by a more comfortable office delivers far more in dollar savings. A 2% labor productivity improvement would pay for the entire retrofit in one year.

i Setback Thermostats/Other Time-Based Controls Programmable thermostats are simple microprocessor-based units that accurately maintain system start-up and setback schedules and eliminate unnecessary HVAC use during hours when a building is unoccupied. Many thermostat models are inexpensive, easy to program and operate, and can handle a different schedule for each day of the week. Improved controls are a small investment that can yield large improvements in HVAC energy efficiency.

i Outside Air Economizers Many commercial HVAC systems have an economizer feature. This brings in outside air for cooling when it's cooler than the air inside. Since many offices do not have operable windows, this is the next best alternative. Economizers save energy and get more fresh air inside.

Western Oregon's climate is ideal for economizers. It's often cool enough outside that an economizer will be used frequently. The savings from this "free cooling" can be big. Some HVAC systems enable this function very easily. Even when you have to add more equipment and controls, an economizer will pay for itself in two to five years.

Economizers can be used to pre-cool the building for additional energy savings. A nighttime building “flush” works well in larger offices that don’t really cool down overnight. An hour or two of fresh outside air in the early morning provides additional free cooling. Even on the hottest summer days in western Oregon, the temperature drops into the 60’s at night. Nighttime pre-cooling can mean the office is cool and comfortable when people arrive for work instead of hot and stuffy. That could help make your employees more productive. At the same time, you’ll save by not from having to run your air conditioning as much during the day.

i Solar Shading In larger buildings, most of the air conditioning load comes from the lights, equipment, and people inside. In smaller offices, a larger share comes from outside. When it’s hot and sunny, air conditioning use will increase. But there are ways to cut the solar heat gain and the associated cooling costs.

Solar heat gain occurs through a building’s roof, windows, and walls. There are “shading” opportunities for all three surfaces—reflective roof coatings, window films and shading, and vegetative shading. However, not every office building can take advantage of all three.

Reflective Roof Coatings—Simply painting a roof white can cut some of the sun’s heat. Studies in sunnier climates show substantial savings. Instead of the sun’s heat being absorbed by a dark roof, it is reflected back to the atmosphere. In Portland’s climate, the summer savings outweigh the added winter heating. A lighter roof means reduced intake air temperatures for offices with rooftop cooling systems. Since lighter roofs stay cooler they last longer too.

Window Films and Shading—Windows let in light...and heat. You don’t have to sit next to one for long on a summer day before you feel the effects. Interior shades and blinds can help keep the heat out. However, shading windows from the outside is even more effective. Shading options include awnings, solar shade screens, or tinted window film.

Did You Know? Daytime air temperatures can be three to six degrees cooler in tree-shaded neighborhoods than in treeless areas.

Vegetation and Other Shading—Before air conditioning, shade trees helped keep buildings cool. It still works today. Planting trees or other vegetation on the south and west side of your building will cut cooling costs—and look nice, too. Deciduous trees work well because they lose their leaves during the winter, when sunlight is desired. Eco-roofs take this issue to a higher level by using vegetative material as actual roof surface. This technique, which is already widely used in Europe, lowers heat gain through the roof, reduces the roof’s stormwater runoff, and survives the effects of sun and rain longer than other roofing materials.

CASE IN POINT – Ecotrust Natural Capital Center (Portland, Oregon)

Over 5,100 square feet of soil and native plants, commonly known as an ecoroof, covers the second story roof of the Natural Capital Center. This innovative roof system combines a waterproof membrane, two inches of soil, and several native species of grasses, wildflowers, and succulents to help capture, slow, and clean stormwater that falls on the building. Excess stormwater from the ecoroof will flow into bioswales in the parking lot, resulting in a thorough stormwater management plan for the building. Portland receives over 30 inches of rain annually, making ecoroofs a viable tool in helping the city clean and manage stormwater to reduce watershed pollution.

i Insulation/Weatherstripping Insulation is a key method for saving energy at home. It's not as important in office buildings, but it still shouldn't be overlooked. If an office has little or no insulation in the floor, ceiling, or walls or if there are drafty gaps around doors or windows, adding insulation, caulking, and weatherstripping will produce real savings. Weatherization contractors who insulate homes and apartment buildings can do the same thing for smaller office buildings.

Did You Know? Collectively adding up the millions of small savings achieved by energy-efficiency measures such as caulking and sealing now saves our country two-fifths more energy than the entire domestic oil industry produces.

E. Water

Water heating in an office can account for nine percent of the total energy load. While the energy costs alone are modest, you pay for your water more than once. It costs to buy the water, to heat it (for hot water), and then to get rid of it (sewage charges). Saving water can have a compound benefit.

Four hot water savings opportunities to consider are:

i Set Temperature Appropriately In an office, water heaters do not need to be set higher than 120 degrees. Many water heaters come from the factory with settings of 130 or 140 degrees. Save energy—and increase employee safety—by turning the temperature down. Reducing the setting from 140 to 120 degrees could save over 18 percent of the energy used at the higher setting. Even a 10-degree reduction will save more than 6 percent in water-heating energy.

i Re-Size Your Water Heater Many small offices have 50-gallon water heaters, just like homes. With no showering, laundry, or dishwashing, that may be much more capacity than you need. A smaller tank will reduce the “stand-by” losses from your water heater. New tankless water heaters cut standby losses even further. They are worth considering whenever you need to replace a failed water heater.

Did You Know? United States residents use three times as much water a day—1,300 gallons per person—as the average European.

i Low-Flow Fixtures Sink faucets in your restrooms and kitchen may use more water than you think. New faucets are one way to deal with this, but there's a lower cost option. Add aerators to your existing faucets. These simple devices—available in most hardware stores—can cut faucet water consumption in half. When you're using hot water, they're saving energy too.

Most offices don't have showers, but some do. Where there are showers, low-flow showerheads should be used. A five-minute shower with a showerhead using five gallons per minute (gpm) will use 25 gallons of water, plus energy to heat the water. A 2.5 gpm showerhead will cut that in half, with no reduction in comfort. New 1.5 gpm showerheads are even better; they cut the water and energy use by another 40 percent.

CASE IN POINT – Trailblazer Foods (Portland, Oregon)

Trailblazer Foods is a small company that specializes in the production of fruits, jams, syrups and, big innovations. Their employees designed one of the most innovative water recycling systems in the food processing industry. The system uses recirculated hot water to pasteurize and recirculated cold water to cool food products. Recycling their water reduces the need to heat and cool it, cutting their energy use too.

i Solar Pre-Heating The sun's energy can help heat water. Residential-style solar water heating systems can work on office buildings too. A solar collector can cut hot water bills in half. State tax credits are available for this type of project.

Did You Know? The amount of solar radiation that reaches the earth's surface in approximately three days equals roughly the total energy content of all known supplies of fossil fuels.

Don't overlook water-saving options where hot water isn't involved either. In an office, these options include:

i Low Flush/No Flush Toilets Toilets and urinals account for about one-third of all water consumed in US buildings. Older toilets use 3.5 to 7 gallons per flush while most urinals consume 3 gallons per flush. Efficiency standards for new toilets require them to use 1.6 gallons or less per flush. The new low-flush toilets have corrected the performance problems experienced with some earlier versions. Where the plumbing code allows, no-flush toilets are an option.

i Fix Leaks Repairing water leaks is a great way to reduce water waste. Small drips of water can add up quickly. A leaky toilet or dripping faucet can waste thousands of gallons of water a year. If the drip is hot water, you are paying for wasted energy too. Fix leaks as soon as you find them. A leaking faucet is frequently the result of a bad washer and is relatively easy to fix with the right tools. Leaks won't go away on their own and repairing water leaks will always save you money.

Toilet leaks can range from small to large, constant or random. Many are even silent. A small, silent leak can easily cost \$50 per year in water and sewer costs. Large leaks can cost much more. In a properly functioning toilet, no water should move from the tank to the bowl, unless the toilet is being flushed. Fortunately, most toilet leaks are relatively easy to fix.

DID YOU KNOW? A single dripping faucet can waste up to 20 gallons of water a day.

CASE IN POINT – Fred Meyer Bakery (Clackamas, Oregon)

The Fred Meyer Baking Plant in Clackamas found and fixed water leaks that were wasting more than 709,000 gallons per year. Their leak repairs are saving them \$3,280 per year.

i Landscape Care The right plants in the right location will yield beautiful landscaping with lower costs for watering, fertilizer and pest control. Where possible, change the landscaping around offices from lawns to native plants that don't require additional irrigation. Alternatives to lawns are ideal for steep slopes, shady areas, or locations near streams and lakes.

If you stick with a lawn, there are five things you can do to minimize water use and keep the lawn healthy:

1. Mow high, mow often, and leave the clippings.
2. Fertilize moderately with a "natural organic" or "slow-release" fertilizer.
3. Water deeply but infrequently to moisten the root zone.
4. Improve poor lawns with aeration and overseeding.
5. Think twice before using pesticides or "weed-and-feed."

i Watering Controls Overwatering lawns is a leading cause of water waste in the summer. Watch the weather; don't water if it's going to rain. Remember to turn off automatic sprinkler systems when the fall rains start. Do any replanting in the fall or spring to avoid additional watering.

Besides wasting water, overwatering promotes lawn disease and leaches nutrients from the soil. Lawns don't need more than one inch of water per week during July and August. Use less in late spring or early fall—let the weather be your guide. Grass does better when the root zone partially dries out between waterings. Avoid frequent shallow watering, which causes shallow rooting. Water slowly, or start and stop, so the water permeates the soil rather than running off. Water early or late in the day to minimize evaporation loss.

CASE IN POINT – Riverside Golf & Country Club (Portland, Oregon)

Riverside made significant changes to save water, reduce their use of herbicides and pesticides, and minimize wastewater. They added a computerized irrigation system linked to a weather station, implemented an integrated pest management program, and installed a wastewater treatment plant to recycle wash water. Riverside has cut costs for water, the energy to pump it, pesticides, and wastewater disposal.

F. Cars and Parking

Don't overlook the energy use or environmental impact represented in a parking lot. The daily energy used in transport to and from a building can exceed the energy used by the building itself. Parking lots that aren't shaded collect and radiate heat on hot, sunny days. This ends up adding to the cooling load of the vehicles and buildings in the area. Parking lots are typically impervious surfaces that generate a lot of stormwater runoff when it rains. This runoff can have detrimental impacts on local waterways.

Commuting opportunities for offices include:

i Subsidize Transit for Employees Many businesses find that a transit subsidy for their employees is a valuable employee benefit. Employees will save money on gas and parking when taking the bus or light rail and employers save too. Parking spaces around your office will become available, attracting additional customers. It may be possible to eliminate part of your parking lot and convert it to more productive uses.

Tri-Met offers an annual pass program called "Passport" where employers can purchase annual passes for their employees at reduced rates. In fact, businesses don't have to pay for the entire cost of a transit pass. Most firms pay \$20 to \$25 per

month, a cost that can be eligible for the state's Business Energy Tax Credit (BETC). Small investment in making employees' commutes easier and less costly can result in more satisfied employees, more customers, lower parking costs, and a corporate tax credit too.

Did You Know? A transit bus with as few as seven passengers uses less fuel per passenger mile than a single-occupant car. A transit bus with full rush hour load of 44 passengers uses much less fuel than 11 cars with four passengers each.

i Carpool/Vanpool Parking Preferences Not everyone can take transit every day. The next best alternative is to encourage sharing rides by reserving as many parking spaces as possible for car and vanpools.

A carpool is just two or more people commuting together. They don't have to both work together; one of them could work for a nearby business. Vanpools use larger vehicles to take more people and usually travel farther. In either case, there's a significant savings in gasoline, parking spaces, and greenhouse gas emissions. Carpool or vanpool investments can also qualify for the BETC (Business Energy Tax Credit).

CASE IN POINT – Fred Meyer Inc. (Portland, Oregon)

Some of the 1,400 employees who work in Fred Meyer's main office campus in Portland commute from Washington. When the I-5 bridge was closed for repair in late 1997, Fred Meyer helped them start three vanpools. The vanpools are still operating at capacity, and eight more have been started to serve other communities. Employees also use the vans to travel to off-site meetings instead of taking several cars. They save nearly 800,000 miles per year and more than \$50,000 per year in avoided gasoline costs.

Be sure to put carpool and vanpool parking spots where employees prefer to park, and sign them prominently. This serves as a nice benefit to employees who can't use transit and might remind solo drivers of the possibilities.

Did You Know? Boosting the US rush hour traffic from one to two people per car would save 40 million gallons of gasoline a day, over 15 percent of US gasoline consumption.

i Bike Parking/Showers/Lockers Although Portland has an extensive network of bike lanes and bike paths and a climate that is ideal for bike riding (at least part of the year), many bike-riding employees will elect not to ride to work unless their office has two things: secure bike parking and shower/locker facilities.

Nobody wants to leave work only to find that his or her bike has been stolen during the day. Bike riders nearly always have effective bike locks, but they still need something to lock them to. A bike rack is inoffensive and unobtrusive and makes a quiet statement about a company's commitment to the environment. Make the bike parking visible, accessible, and consider covering it. Your bike-riding employees—and customers—will thank you.

Lockers or showers are another valuable amenity for bike riders or those who exercise during their lunch hour. When available these facilities get frequent use. Bike riders will often use them in the morning and runners will be there during the lunch hour. Where showers and lockers aren't feasible on site, there may be a place nearby that will allow access to these facilities.

i Flexible Work Arrangements Most employees consider flexibility a key element of their work life. Offering flextime, or flexible working hours, not only benefits them; it's better for the company. A recent *Business Week* survey found that 42 percent of employees believed work had a negative impact on their home life. Unhappy employees are more likely to be distracted, less productive, and to seek other employment.

Flexible work schedules can help in recruiting and retaining high quality employees. With some employees arriving early and others leaving late, you may even be able to expand your hours of operation.

Did You Know? A survey referenced on the Telework New Zealand web site states, "48% of technology professionals currently telecommute; 96% want to; 39% would take a pay cut to be able to do so."

A compressed workweek will cut your employees' commutes. A schedule of four 10-hour days per week cuts commuting time, cost, and emissions by 20 percent. A schedule of nine nine-hour days over two weeks will save 10 percent. Even in situations in which people adjust their shifts within a typical Monday through Friday work schedule, worker productivity benefits. The City of Los Angeles found that its employees were 18 percent more productive when they were allowed to select their own work schedules.

CASE IN POINT – Wacker Siltronic (Portland, Oregon)

Wacker's employee commute-reduction program has cut employee vehicle trips by 33% and saves nearly 2.9 million vehicle miles traveled and 143,000 gallons of gasoline each year. They offer shift schedules to all production workers to give them more time off, reduce trips, and avoid rush hour traffic. Wacker also fully subsidizes employees' bus passes and promotes telecommuting.

Some people may even want to telecommute or work from home one or more days per week. This staffing tool is frequently used by businesses that have space constraints. With today's technology, many employees can work from home and still do almost everything they could in the office. Removing the distraction and worry of the commute adds to employee morale, which can boost productivity.

CASE IN POINT – Xerox

A Xerox customer service center turned decisions about work schedules over to employees. Employee work teams now control the scheduling, resulting in improved morale, better customer service, and a 30% reduction in absenteeism.

- i* **Hybrid Electrics for Fleets** For companies with automobile fleets, new hybrid electric automobiles offer double the gas mileage, greater range, and half the tailpipe emissions of a conventional car. The state Business Energy Tax Credit helps make initial costs of hybrids competitive with conventional cars, and the fuel savings will begin immediately.
- i* **Re-Refined Motor Oil/Recycled Antifreeze** For companies with automobile fleets, you can have a significant environmental impact by using recycled motor oil and antifreeze in your vehicles. These products perform to the same specifications as those from virgin products. The US Post Office and City of Portland put these products in their vehicles. Like them, you can help make a nonrenewable resource last longer.

G. Other

Other options for saving energy, increasing efficiency and greening the bottom line include:

- i* **Sign up as an ENERGY STAR® Business** EPA is soliciting businesses to become ENERGY STAR® partners. This will allow access to a number of energy-saving resources. The ENERGY STAR® program can be used to promote your office, and it doesn't cost a dime. Information is available by calling the ENERGY STAR® hotline or visiting their website (see Chapter 3).

CASE IN POINT – Bank of America Fifth Avenue Plaza (Seattle, Washington)

Bank of America Fifth Avenue Plaza was built in 1981. It is a 42-story, 1.2 million square foot office building. To qualify for EPA's ENERGY STAR® label required extensive retrofitting to building systems. Improvements were made to building lighting, including the retrofitting of existing fluorescent fixtures with electronic ballasts and T-8 lamps, and the replacement of incandescent bulbs with high-efficiency compact fluorescent lamps. Building climate control was updated as well, with the installation of an energy management control system allowing real-time control of chillers, air handling units and mixing boxes. The installation of variable frequency drives on the air handling units and cooling tower fans allow their operating speed (and energy consumption) to vary according to building demand. The ENERGY STAR® program has given the Bank of America Fifth Avenue Plaza an opportunity to showcase the lasting merit of forward-thinking energy efficient engineering.

i Establish Resource Conservation Manager(s) Important business efforts require direct management. If you're serious about boosting energy efficiency, recycling levels, or employee commute alternatives, consider establishing someone (or even multiple people) to manage these operations.

An energy manager doesn't have to be an engineer. It merely requires someone who is interested in energy efficiency, takes time to track energy use, research new products, and do what's needed to take advantage of utility incentives. For a small office, this work may be only a small fraction of someone's time. Companies with energy managers have shown that the savings are much greater than his or her salary.

As with energy, solid waste management is a critical business operation. Many firms have recycling coordinators, a person who tracks recycling activities to ensure that recycling is maximized, that costs are reasonable, and that new waste reduction opportunities are pursued. This person could also be your energy manager.

Many firms are also establishing transportation coordinators. In the Portland area, this position is typical at firms that have 50 or more employees. Companies with fewer employees can still benefit from a transportation coordinator. This position educates employees about commute options, works with Tri-Met to improve transportation service or facilities near the office, and sometimes helps develop flexible work policies.

Did You Know? In 1990, more than 35% of all household miles traveled were between work and home.

i Form an Employee Green Team Employees are a great source of ideas and initiative. When engaged and excited, they can accomplish a lot. That's why some firms have encouraged the development of voluntary employee-based green teams. These teams can take the most interested and inspired employees and focus their attention on resource conservation and other green opportunities. In some cases, a green team can be put in place in lieu of formal resource conservation managers.

CASE IN POINT – Davis Wright Tremaine (Portland, Oregon)

Davis Wright Tremaine's "Green Teams" recycling and telecommuting programs have made life a lot "greener"—environmentally and financially at this law firm. Team-led improvements run the gamut, from eliminating fax cover sheets to e-mailing the daily office bulletin, using preprinted letterhead and two-sided copying, buying recycled-content materials, and teleworking.

i Solar, Wind or other Green Power Both Portland-area electric utilities, Portland General Electric and Pacific Power, offer "green power" for their customers for a modest premium. Their offerings may change as electric industry restructuring in Oregon takes effect in March 2002. For now, each is selling 100 kWh blocks of power from new or soon-to-be-built wind farms. These blocks cost an extra \$3 to \$5 per month. Since it's not always practical to put wind turbines or solar panels up at your business, this is one of the easiest ways to show support and build demand for renewable energy supplies.

CASE IN POINT – Progressive Investment Management (Portland, Oregon)

As part of a larger environmental initiative, Progressive Investment Management has reduced their office energy use as much as possible. On top of that, they are purchasing as much "green" energy as possible from their utility.

i Specify Non-Toxic Cleaning Products Many firms would like to use environmentally preferable cleaners, and a number of pilot projects have had success. Still, millions of tons of cleaning products are washed down drains every month. These products often contain toxic chemicals that can find their way into groundwater or waterways. Cleaning products are also responsible for 10 percent of the poisonings reported to Poison Centers nationally.

Suggest that your janitorial team use more environmentally responsible cleaning products. Even if the costs are slightly more, you—and the janitors—will benefit. Switching to green cleaners will result in fewer adverse health effects from toxic

compounds, fewer hazards in the municipal solid waste stream, less ecosystem destruction from persistent chemicals, fewer toxic releases from manufacturing, and less smog and ozone depletion.

Remember that even the packaging of cleaning products has environmental impacts. Secondary packaging and nonrefillable containers contribute unnecessary waste to landfills. Also consider options for using less water and fewer chemicals during any exterior pressure washing. If you're doing any painting, consider recycled paint or paints with no or low levels of volatile organic compounds.

i Encourage Employee Participation in Environmental Activities Some firms find that team building results from employees working together on voluntary community efforts. These firms have found that a Saturday spent picking up litter on the roadways near the office, planting trees in neighborhoods, or even cleaning graffiti on nearby buildings has a long-term impact on employees' ability to work together. Companies often attract good publicity for these types of activities. Earth Day can serve as a useful catalyst for having these discussions and identifying potential projects with employees.

i Sponsor Environmental Causes You can only do so much yourself. Even with an active green team and a day or two a year where your employees are out cleaning up roads or rivers, there's still much to do. That's why some businesses sponsor an environmental cause at a local school or in a nearby neighborhood. The causes could include tree planting, community gardens, or other similar activities. Teachers, students, and community groups always appreciate more help. Organizations that have participated in partnerships like this have found them to be very rewarding.

CASE IN POINT – Intel Corp. (Hillsboro, Oregon)

Intel sponsors a "Clean Up Washington County" event each year. Besides the corporate support, Intel employees are encouraged to participate in the one-day event.

i Adopt an Organization-Wide Sustainability Policy Saving energy, conserving water, reducing waste, and switching to transportation alternatives are individual elements of sustainability. A broader policy statement that addresses how sustainability efforts will be addressed during the life of an organization will make it easier to coordinate resources, personnel, and operations.

CASE IN POINT – Progressive Investment Management (Portland, Oregon)

Progressive Investment Management has a sustainability policy with a goal of offsetting all of the organization's contribution to global warming. They have calculated their carbon dioxide emissions and established mitigation measures through a "Carbon Offset Program" to offset emissions from office travel and energy use.

Firms making significant contributions in these areas should receive the recognition they deserve:

i **Apply for one of the annual BEST Business Awards** Every year, the City of Portland and its partners, issue a handful of BEST Awards to businesses that have implemented exemplary resource-conservation and sustainable practices. BEST stands for Businesses for an Environmentally Sustainable Tomorrow. Past winners include firms such as Davis Wright Tremaine, Kaiser Permanente, Mentor Graphics, Mt. Scott Family Dental, the Portland Art Museum, Norm Thompson Outfitters, and Progressive Investment Management.

In the nine years since the first BEST Business Awards were issued in 1993, more than sixty awards have been issued. The awards are given in five categories: energy efficiency, water conservation, waste reduction, transportation alternatives, and overall success (for businesses that excel in the first four categories). These award winners have found that resource conservation actions have added lots of green to the bottom line. The annual savings from the winners are \$11.7 million per year.

BEST Business Award applications are solicited each winter. The application deadline is in February and the awards are issued at a breakfast each April.

Other certification and recognition programs are available for Portland area businesses. More details are listed in Chapter 3 along with numerous resources that are available.

Chapter 3—For More Information and Assistance

Knowing the resource-saving opportunities in your office gives you a great place to start making improvements, but you don't have to proceed alone. There are a number of resources for Portland area offices that you can turn to for additional information and assistance.

The assistance available includes general information, technical on-site assistance, financial resources, certification, and case studies. Brief summaries of these resources are listed below with a phone number and a web address for each.

ENERGY STAR® for Small Businesses

Phone: 1-888-STAR-YES (1-888-782-7937)

Website: www.epa.gov/smallbiz/

The Environmental Protection Agency (EPA) offers advice and recognition for businesses that make a pledge to become ENERGY STAR® partners. The link above is for the ENERGY STAR® site dedicated to small business assistance. This site contains their "10 Quick Tips," an energy calculator, and ENERGY STAR® success stories. It also offers the opportunity to subscribe to EPA's E-Update and to sign firms up as ENERGY STAR® partners. EPA also maintains sites for larger businesses, home-based businesses, along with additional resource information.

Alternative Fuel Vehicles

Phone: 503-615-8864 (C-WCCC Coordinator)

Website: No local web site. National information is at www.ccities.doe.gov/

The Columbia-Willamette Clean Cities Coalition (C-WCCC) is one of a number of coalitions around the United States that were formed to further the availability and use of alternative fuels in fleets and other vehicles. The local coalition members include the City of Portland, the State of Oregon, the Port of Portland, and many others. You can learn more by visiting the national Clean Cities web site or by calling the local coalition coordinator.

Bike Riding

Phone: 503-823-7671

Website: www.trans.ci.portland.or.us/Traffic_Management/BICYCLE_PROGRAM

This “Bicycling in Portland” web site has information on bike parking and current and future bike infrastructure project in Portland, and provides links to other bike resources and organizations in the area. The City’s bike program also has back issues of its newsletter, “Portland by Bicycle” available here. For other information about bicycling for commuting, exercise, or fun, you can call the City’s bike program at the number above.

Bus or Light Rail

Phone: 503-238-RIDE (503-238-7433)

Website: www.tri-met.org

Tri-Met provides transit services in the Portland metro area. Their web site has details on routes, schedules, and fares. There are also links to information on bicycling, carpooling, and car sharing. You can even do online trip planning. For answers to other commuting questions, Tri-Met customer services representatives are only a phone call away.

Business Energy Tax Credit (BETC)

Phone: 1-800-221-8035 from within Oregon (1-503-378-4040 outside Oregon)

Website: www.energy.state.or.us/bus/tax/taxcdt.htm

The Oregon Office of Energy (OOE) offers a 35 percent business energy tax credit (BETC) to businesses that purchase energy-saving equipment. Oregon is one of only a small number of states offering this kind of incentive. More details on what qualifies and how to apply can be found on the OOE web site. Other questions can be answered by calling the energy experts on their staff.

Carpooling or Vanpooling

Phone: 503-CAR-POOL (503-227-7665)

Website: www.tri-met.org/bikes.htm

When two or more people share a ride to a common or nearby destination, that’s a carpool. Where more people are commuting over longer distances, vanpooling is another

alternative. This part of the Tri-Met web site has information on starting or joining a carpool. You can also give Tri-Met a call. They can come to your office to explain this commuting option to your employees. There's also a new regional ride-share on-line matching service at www.carpoolmatchNW.org. Your employees can find a car pool partner on the web from the privacy of their home or office.

Clean River Incentive Program

Phone: 503-823-7740 (Central Switchboard)

Website: www.cleanrivers-pdx.org/clean-rivers

The City of Portland Bureau of Environmental Services has a number of programs to reduce the amount of stormwater runoff that occurs whenever it rains. This website contains information on both residential and commercial stormwater management, including access to the City's stormwater management charges, the stormwater management manual, information on the link between air pollution and water pollution, rainfall data for a number of Portland locations, and information about the incentive for reducing runoff. This new program could save you up to \$30,000.

Energy Efficiency and Renewable Energy Network

Phone: 1-800-363-3732

Website: www.eren.doe.gov/EE

The Energy Efficiency and Renewable Energy Network (EREN) is a program managed by the US Department of Energy (DOE). The EREN website addresses technologies such as lighting, water heating, and office equipment. It has information on energy audits, building codes, and landscaping for energy efficiency. If you can't find what you need online, contact the Energy Efficiency and Renewable Energy Clearinghouse at the toll-free phone number above.

Energy Ideas Clearinghouse

Phone: 1-800-872-3568 (OR, WA, ID, or MT) or 360-956-2237 elsewhere

Website: www.energyideas.org

The Energy Ideas Clearinghouse is a no-cost resource available to Northwest businesses and residents. You can visit their website or call their hotline and ask them any

kind of energy related question. They maintain information on residential energy use and energy policy issues as well as energy-saving information for businesses. The “Energy Solutions” tab on their website offers resources on building design, energy use, and operations and maintenance among many other topics.

Green Building (G/Rated)

Phone: 503-823-7725

Website: www.sustainableportland.org/grated_menu.html

G/Rated is a City of Portland program to encourage and assist with the design, construction, and operation of green offices and other buildings. G/Rated has initiated a comprehensive green building policy for City facilities and City-funded projects. The program offers assistance and incentives for commercial construction projects, and the G/Rated website includes information on green building technologies, case studies, specifications, and other technical resources.

Green Power (Blue Sky Power)

Phone: 1-800-842-8458

Website: www.pacificorp.com/pages/Navigation551.html

This site has information on what Blue Sky power is and why you might want to buy it. Pacific Power customers can buy blocks of renewable power representing 100 kilowatt-hours (kWh) of electricity. A charge of \$2.95 is added to your regular monthly bill for each block with the fees going toward the purchase of wind power from newly developed wind farms.

Green Power (Clean Wind or Salmon-Friendly)

Phone: 503-228-6322 (Customer Service)

Website: www.portlandgeneral.com/home/products/renewal-power

PGE offers 100 kilowatt-hour (kWh) blocks of green power to their customers. You can choose between Clean Wind or Salmon Friendly power...or buy both! Either option costs \$3.50 per block per month. A portion of this premium goes to support the development of new wind power resources or enhance habitat for salmon, depending on which option you choose.

NW Natural

Phone: 503-226-2364 (Business Resource Center)

Website: www.nwnatural.com/business

For business customers of NW Natural, this website has their version of “Conservation Ideas for Commercial Buildings,” details on upcoming training and seminars, and a list of frequently asked business questions. This site can also provide you with phone numbers and e-mail addresses for a variety of business contacts at NW Natural.

Pacific Power

Phone: 1-888-221-7070 (Customer Service)

Website: www.pacificorp.com

This site provides information for business customers of Pacific Power about the incentives, financing, and commissioning offered through Pacific’s Energy FinAnswer program. They also have two informative lists you can refer to: “Bright Ideas for Building Operators” and “Bright Ideas for Building Occupants.”

Portland General Electric

Phone: 503-603-1700

Website: www.portlandgeneral.com/business

This site is designed for Portland General Electric’s commercial customers. It contains details on PGE’s incentives for energy efficiency upgrades, information on their lighting lab, and their top twelve energy-saving tips for businesses. You can also learn about using E-Manager to manage your energy bills and the green building services they offer if you’re considering a construction project.

Recycling Hotline (BRAG)

Phone: 503-234-3000

Website: www.metro-region.org/recycling

In addition to a wide variety of information on residential recycling, this website includes links to office paper use reduction, construction site recycling, and where to buy recycled content paper. For more details on Business Recycling Awards Group (BRAG), a voluntary recycling and waste reduction program open to all metro-area businesses, call the number listed above.

Small Scale Energy Loan Program (SELP)

Phone: 1-800-221-8035 from within Oregon (1-503-378-4040 outside Oregon)

Website: <http://www.energy.state.or.us/loan/selphme.htm>

Another program offered by OOE is the Small Scale Energy Loan Program (SELP). Through SELP, a business with a strong credit history can obtain long-term, fixed-rate loans to finance energy improvements. The interest rates are often better than what a bank would offer a small business. This site has more details and application forms that you can download. SELP repayment terms are usually designed so that your monthly loan payment is less than your energy cost savings, giving you a positive cash flow from the very first month!

Telework

Phone: 1-800-221-8035

Website: www.energy.state.or.us/telework/telehm.htm

Details on telework, including case studies and educational materials, are available from this Oregon Office of Energy web site. Information is also available on how telework investments can qualify for a tax credit.

Water Conservation (BIG)

Phone: 503-823-7770 (Customer Service)

Website: www.water.ci.portland.or.us/BESTBIG.HTM

The Business, Industry and Government (BIG) water conservation program is a service for businesses that purchase water from the City of Portland Water Bureau. This site describes award-winning water conservation efforts. For more details about the opportunities in your facility, call the water bureau or access a PDF brochure with details about how water conservation can save your company money at www.water.ci.portland.or.us/pdf/Think_Big.pdf.

Chapter 4—Building On Your Success

To achieve a “deep green office,” you can go well beyond the resource-efficiency opportunities listed in this booklet. As the case studies in the prior chapters have shown, some local businesses have won awards for their accomplishments. With a little effort, you can too. You can go well beyond saving resources and money and move towards being truly sustainable.

The following five key resources that can help you are active locally.

Businesses for Social Responsibility

Web site URL: <http://www.bsr.org/>

Phone number: 415-537-0888

E-mail address: memberservices@bsr.org

Northwest Earth Institute

Web site URL: <http://www.nwei.org/>

Phone number: 503-227-2807

E-mail address: webinfo@nwei.org

Oregon Environmental Council

Web site URL: <http://www.orcouncil.org>

Phone number: 503-222-1963

E-mail address: oec@orcouncil.org

Oregon Natural Step Network

Web site URL: <http://www.ortns.org/>

Phone number: 503-241-1140

E-mail address: maxine@nwei.org

Oregon Solutions for a Sustainable Future

Web site URL: <http://www.oregonsolutions.net>

Phone number: N/A

E-mail address: N/A

You can encourage your employees to support non-profit organizations that are working on sustainability issues. This is easy and it doesn't cost you anything: simply add the Environmental Federation of Oregon (EFO) to your firm's charitable giving campaign. EFO can be contacted at:

Environmental Federation of Oregon

Web site URL: <http://www.efo.org>

Phone number: 503-223-9015

E-mail address: info@efo.org

Glossary

The language of resource-efficiency has its own set of buzzwords and acronyms that are not always obvious. As a primer, a number of the more common words and phrases are listed below.

- AFV** Alternative Fuel Vehicle, any vehicle powered by a fuel other than gasoline or diesel. Some alternatives include electricity, compressed natural gas, propane, ethanol, and biodiesel.
- BEST** Businesses for an Environmentally Sustainable Tomorrow, a City of Portland-sponsored assistance and recognition program.
- Biodiesel** A diesel alternative fuel made from products such as soybean oil or used french fry oil.
- BTUs** British Thermal Units, a generic measure of energy allowing for comparisons between electricity, natural gas, and other energy sources.
- CCF** One hundred cubic feet, a measure of water (1 CCF = 748 gallons).
- CFL** Compact Fluorescent Lamp, a smaller wattage fluorescent with a screw-in base that allows it to be easily used in place of conventional incandescent lamps.
- CNG** Compressed Natural Gas, an alternative fuel that is used in some vehicles.
- CO₂** Carbon dioxide, a gas produced by burning fossil fuels, among other sources, that contributes to global warming.
- E-85** An ethanol-gasoline blend made up of 85 percent ethanol with 15 percent gasoline. E-85 can be used in some newer vehicles without requiring any modifications.
- ECO** Employee Commute Options, an air quality maintenance program managed by the Oregon Department of Environmental Quality for Portland metro area employers with 50 or more employees at any single site.

Ethanol An alcohol based alternative fuel made from products such as corn, soybeans, or wood. (See also E-85.)

HVAC Heating, Ventilation, and Air Conditioning, collectively refers to the system that provides fresh air, heating and cooling to indoor office spaces.

kW kilowatt, a measure of peak energy demand

kWh kilowatt-hour, a measure of electric energy equal to the amount of electricity needed to run ten 100-watt light bulbs for one hour.

LED Light Emitting Diode, a highly efficient light source (usually in red or green) that is an option for exit signs and traffic signals.

LPG Liquefied Petroleum Gas (also known as propane), another alternative fuel.

Post-Consumer Waste Recycled materials such as paper products that have actually been used and collected before as opposed to process waste that is “recycled” during production.

Renewable Power Power from renewable resources such as wind, solar, and geothermal (also known as “green power”). Hydropower is also included sometimes, but because of its negative impact on fish runs, it’s not often considered renewable in the Pacific Northwest.

Therm a measure of the energy content in natural gas.

Green Office Guide

A Guide to Greening Your Bottom Line
through a Resource-Efficient office Environment

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