Green Works

Business Guide to Best Environmental Practices in Maine

CEI

Coastal Enterprises, Inc.

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Executive Summary

This guide is inspired by the growing number of Maine businesses that are making smart environmental choices to improve their bottom line. Environmental choices such as pollution prevention, waste reduction, energy conservation and sound use of resources lead to business benefits like cost savings, better employee health and productivity, and market advantages that come with environmental stewardship.

Coastal Enterprises, Inc. (CEI), a private, nonprofit Community Development Corporation (CDC) and Community Development Financial Institution (CDFI), counsels about 1,000 entrepreneurs a year and finances around 120 businesses a year. It is for these entrepreneurs and businesses that we have designed this guide. CEI provides capital and support in the development of job-creating small businesses, natural resources industries, community facilities and affordable housing. CEI's work is guided by its mission and 3E* – Economy, Equity and Environment – investment strategy. Our mission is "to help create economically and environmentally healthy communities in which all people, especially those with low incomes, can reach their full potential." This publication is intended to serve as a resource-rich starting place on how to conserve energy, water and materials, improve indoor air quality, and take advantage of smart business location benefits. It does not speak to regulatory issues and environmental compliance. It is a guide that points the reader to products and practices, references, resources and, where possible, returns on investment. Within each section actions are ranked from "easiest" to "difficult", defined in terms of cost, time commitment, scale or depth of change and availability. Each area is color-coded to facilitate quick reference and access to information.

Highlights? Like any smart business decision, start with your numbers. From your baseline on energy, water or materials use, you can define which changes to make. They can be driven by your company's commitment to decreasing costs, improving productivity or tapping into new market opportunities. Below are a few highlights.

- Compact Fluorescent Lights last up to 10 times longer and, as a result, reduce the maintenance costs of replacing light bulbs ten-fold.
- The use of natural daylight in office buildings reduces energy costs and makes workers more productive.
- Energy Star-qualified commercial HVAC equipment uses 7-10% less energy than standard equipment. These products can save your business approximately $3-4 per square foot over the life of the equipment.
- For residents and businesses, Maine offers an incentive of 25% or $1,250, whichever is less, for solar water heating systems, and an incentive of $3/watt for the first 2,000 system watts and $1/watt for the next 1,000 watts of a solar PV system. In combination with new federal credits, this could have the effect of cutting a solar water heating system's price by almost 50%.
- For employers, the federal government offers a tax-free commuter benefit of up to $105 per month for employees who ride public transit or participate in a vanpool.
- A plumbing leak that drips once per minute for a whole year uses over 50 gallons of water.
- Cleaning supplies contain toxic chemicals that are hazardous to humans, putting at risk both the cleaning staff who use the products on a regular basis and office workers. Additionally, cleaning products that are washed down the drain can have adverse affects on local water sources and the natural environment.
- Paints are one cause of indoor air pollution because they emit volatile organic compounds (VOCs) that contribute to ground level ozone. When these VOCs off-gas, they may also cause health problems like nausea, dizziness, irritation of the eyes and respiratory tract, and more serious illnesses including heart, lung or kidney damage and even cancer. Zero-VOC paints are readily available and cost competitive with conventional paints.

Examples throughout this publication are drawn from CEI's direct experience (**www.ceimaine.org**), Maine Businesses for Social Responsibility (**www.mebsr.org**), Maine Energy Investment Corporation (**www.RenewMaine.org**) and Maine's Department of Environmental Protection (**www.state.me.us/dep/oia/case/index.htm**). You can find more on these and other examples on their respective websites.

*CEI uses the following definitions to guide our community development work and investments: **Economy:** Generates a viable financial return, either by maintaining or creating profits, return on investment or a tangible asset. **Equity:** Provides an opportunity for disadvantaged groups to access information, housing, financial resources or livelihoods/employment. **Environment:** Results in a positive impact on the natural environment by reducing energy use, waste, pollution or materials use, or by improving stewardship of natural resources.

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Energy Use

Efficient use of energy is an easy way to realize environmental and financial benefits for your business. Energy costs are one of the most significant business expenses and current trends indicate rising costs and increasing scarcity. As you think about best energy practices, your ability to make changes and decisions will depend upon whether you lease or own your buildings. In either case, a first step is to energy benchmark your office, buildings and facilities to provide baseline data for monitoring trends and productivity. Understanding your energy costs and using this to define opportunities to reduce energy consumption can make a big impact. In fact, not doing something can reduce your long-term revenues and profits. One tool to assist you in this process is the Energy Star web tool that provides training and tools to calculate your building efficiency against a portfolio of similar buildings. (See chart below, right.)

Beyond efficiency, you can purchase renewable energy as well as produce it onsite. While the costs of renewable energy can be higher than conventional energy, it causes less pollution, reduces dependency on foreign energy sources, and increases your visibility as an environmentally responsible business.

Improving energy efficiency and/or switching to renewable non-polluting energy sources will help to reduce greenhouse gas emissions that are responsible for our planet's climate change. In 2001, the New England Governors and Eastern Canadian Premiers signed an agreement to reduce greenhouse gas emissions with the goal of an overall 75% to 80% decrease from 2003 levels.

Maine Public Utilities Commission administers both Efficiency Maine and the State Energy Program (SEP). Efficiency Maine is funded by Maine's electric rate payers; SEP is funded by the US Department of Energy. There are rebates for businesses through Efficiency Maine. **www.efficiencymaine.org** The Maine Public Utilities Commission offers 3% loans of up to $35,000 for energy conservation improvements. **www.maine.gov/msep** The USDA-Rural Development offers grants and guaranteed loans for agricultural producers and rural small businesses to make energy-efficient improvements or purchases and install renewable energy systems. **www.rurdev.usda.gov/ia/rbs.html**

Starting January 1, 2006, new Federal Tax Credits are available for commercial building owners and designers between $.60 - 1.80 per square foot deductions for building envelope, lighting, and heating and cooling system improvements. **www.efficientbuildings.org**

Green Works Scale

Improve Efficiency
1. Benchmark your office/building/facility
2. Improve lighting efficiency
3. Improve energy efficiency of company equipment
4. Daylighting

Sourcing Energy
1. Purchase green power
2. Purchase biofuel
3. Reduce greenhouse gas emissions

Building Upgrades
1. Invest in Energy Star boilers and HVAC
2. Install high-efficiency windows
3. Invest in high R-value insulation
4. Follow Best Green building practices (LEED, Energy Star, etc.)

■ *Products in this Section*

- Energy-efficient lighting
- Energy-efficient office equipment
- Green power
- Biodiesel

■ *Practices in this Section*

- Environmentally-friendly commuting and travel
- Location of building

■ *Building & Site Improvements in this Section*

- Daylighting
- Energy-efficient HVAC, including geothermal systems
- Solar water heating
- Solar photovoltaics (PV) systems

■ *General References & Resources*

CLIMATE CHANGE

State of Maine Governors Carbon Challenge: The Governor has established a voluntary program to reduce the state's greenhouse gas emissions associated with energy use.
http://www.maine.gov/dep/oc/carbon.htm

Maine Energy Investment Corporation: A small nonprofit based in Brunswick, MEIC implements public education and market development programs for clean energy technologies like green power, solar energy, biodiesel and even hydrogen.

MEIC's website provides Maine-specific information and purchasing assistance. **www.RenewMaine.org**

Clean Air-Cool Planet: Creates partnerships in the Northeast to implement solutions to climate change and build constituencies for effective climate policies and actions.
http://www.cleanair-coolplanet.org

World Resources Institute: The Climate Northeast partnership builds strategies for companies to thrive in a carbon-constrained economy. Partners develop greenhouse gas (GHG) inventories, share energy management practices and purchase green power. These corporate actions shape multi-sectoral policy approaches for a safe climate and sound business future in the Northeast.
http://www.climatenortheast.org/

The Green Power Market Development Group: Develops a replicable business case for buying green power and installing renewable energy on site. Fifteen companies are collaborating to purchase 1,000 megawatts, enough to displace one large coal plant by 2010.
www.thegreenpowergroup.org

ENERGY EFFICIENCY

Energy Star: A joint effort between the Environmental Protection Agency and the Department of Energy to provide consumer information and product certification for energy-efficient fixtures, appliances, equipment and homes.
www.energystar.gov

Efficiency Maine: A state-sponsored initiative for residents and businesses that provides product information, rebates and incentives for energy-efficient alternatives.
www.efficiencymaine.org

Maine State Energy Program: Administers Efficiency Maine, Clean Energy Maine, small business energy loans, solar rebates and more.
www.maine.gov/msep

U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy: Federal office that offers information on energy efficiency and renewable sources of energy.
www.eere.energy.gov

Database of State Incentives for Renewable Energy: Lists federal and state grants, loans and rebates for programs across the United States.
www.dsireusa.org

GREEN BUILDING & GREEN BUSINESS

US Green Building Council: Organization that certifies green or high performance buildings.
www.usgbc.org

GreenBiz: Web site that provides information and resources on green businesses and best practices.
www.greenbiz.com

Energy-efficient Lighting

Lighting is a significant energy expense for small businesses. Minor adjustments in fixtures and lighting purchases can make a big difference in annual energy bills. Moreover, Efficiency Maine offers energy-efficient lighting options through rebates on consumer purchases and pre-approved cash incentives to businesses.

Installing energy-efficient lighting is sound business practice for the following reasons:

- Cost savings – adds value to your bottom line.
- Reduced energy consumption – less of an environmental impact.
- Corporate responsibility – community leadership.
- Energy Star affiliation – marketable to your customers.

■ *Products/Actions*

Lighting products include tube fluorescent lighting, compact fluorescent lights, efficient ballasts, dimmable ballasts, exit signs and occupancy sensors. The DesignLights™ Consortium (DLC) – a collaboration of community-based utility companies and regional public service organizations – is committed to raising commercial awareness of the benefits of efficient lighting. **http://www.designlights.org/**

■ *Return on Investment*

Replacing ten incandescent bulbs with compact fluorescent lamps (CFLs) can save you over $60 a year. CFLs last up to 10 times longer and, as a result, reduce the maintenance costs of replacing light bulbs ten-fold. While the upfront cost of CFLs is higher than incandescent bulbs, the payback on this investment occurs within 9 months. According to the PUC, in commercial applications, CFLs tend to generate the greatest source of savings.

■ *Example*

O'Naturals (**www.onaturals.com**) is committed to operating in the most energy-efficient way possible. One way they have been doing this is by using a new type of lighting that uses compact fluorescent bulbs throughout their restaurants. With this lighting system, O'Naturals uses only one 150-watt bulb to supply individual lighting, through fiber-optic cables, to five tables. In this case, one 150-watt bulb replaces the need for five 50-watt bulbs.

O'Naturals has cut down their energy cost by more than a third. The new lighting system requires only 150 watts, compared to the 250 watts that would be required to light an equal number of tables using traditional installations. The fiber optic cable design of the lighting system also adds to the aesthetics of the restaurant.

■ *Suppliers in Maine*

Hardware stores, home improvement stores, home furnishings stores… wherever lighting products are sold.

■ *Incentives*

For small businesses with fewer than 50 employees, Maine offers incentives for energy efficiency, including lighting. Incentives vary up to $50,000 to a business in a single year. Visit **www.efficiencymaine.org** for more information and application forms.

Energy-efficient Lighting Costs

Compact fluorescent lighting

Cost: $5 to $15 depending on style and number of watts

Tube fluorescent lighting upgrades

Cost: $3 to $30 depending on type (T-12/T-8/T-4), length and number of watts

Exit signs

Cost: $50 to $150 depending on features

Efficient and/or dimmable ballasts

Cost: $50 to $200 depending on bulb type

Occupancy sensors

Cost: $50 to $150 depending on type (switch, wall or ceiling mounted)

(Prices estimated from **www.bulbs.com** and **www.elights.com** Contact your local dealer or purchasing agent for specific prices.)

Energy-efficient Office Equipment

Office equipment is vital to the workings of your business; however, this doesn't mean the equipment has to be working all the time. Simply turning off your computer, monitor, copy machine, fax machine and printers overnight can lead to considerable savings. Water coolers, office refrigerators and vending machines offer further opportunities to reduce office energy consumption.

■ *Products/Actions*

Most office equipment manufacturers and retailers offer Energy Star-certified products, which indicates that the equipment is energy-efficient. Look for the Energy Star label on computers, monitors, fax machines, printers, copiers, water coolers and vending machines. VendingMiser will reduce the power consumption of a cold drink vending machine by an average of 46%. It represents a technological breakthrough in intelligent and economical control of vending machines, which significantly reduces energy consumption without compromising the vended product.

http://www.electricitymetering.com/product/vendingmiser/

■ *Return on Investment*

Energy-efficient office equipment costs approximately the same as conventional office equipment and offers payback within a year or two.

- Monitor power management (MPM) can save up to $55 per monitor annually by placing your inactive monitors into a low-power sleep mode.
- Computer power management (CPM) places inactive computers (CPU, hard drive, etc.) into a low-power sleep mode, which can save up to an additional $45 per computer annually. **From http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_management**
- Improved efficiency translates to less plug load, which means less heat, which means downsizing your need for cooling tonnage.

■ *Suppliers in Maine*

Wherever office equipment and supplies are sold.

■ *Incentives*

For small businesses with fewer than 50 employees, Efficiency Maine offers incentives for energy efficiency, up to $50,000 to a business in a single year. Visit **www.efficiencymaine.org** for more information and application forms.

Daylighting

Daylighting is a design technique that introduces more natural light into building interiors. By using natural light, you can save on energy costs in lighting and in cooling while fostering people's connection to the outdoors. Best of all, studies of buildings with more natural lighting have shown that students perform better in school, shoppers linger longer and buy more, and employees are more productive and take fewer sick days. All of these factors make daylighting a smart choice in the development of new buildings and the rehabilitation of old buildings.

■ *Products/Actions*

Daylighting begins with the planning phase of any renovation or construction project. The basic idea is to maximize the amount of natural light that enters a building; therefore, it requires the creative use and placement of windows and skylights while minimizing glare and regulating heat gain. Interior rooms and corridors can be lit through atriums and roof build-ups. Interior and exterior shades can be used at different times of the year.

Daylighting must be undertaken with consideration of an overall lighting design that factors in interior and exterior sources of light. Moreover, daylighting is part and parcel of an energy-efficiency strategy. Using more natural light reduces the need for indoor lighting that produces heat. Reducing the amount of heat that is generated then enables you to reduce the size and energy consumption of the heating, cooling and ventilation system.

■ *Return on Investment*

According to the Daylighting Collaborative and other proponents, the cost of daylighting can be curtailed if you use an integrated design and systems approach. Initial construction costs do not have to increase if you factor in the savings associated with a smaller cooling system. And if you consider a building's life cycle cost, then the savings (on energy, worker absenteeism, etc.) over time can be considerable for a larger upfront investment. The use of natural daylight in office buildings reduces energy costs and seems to make workers more productive. "Studies conducted by Rachel and Stephen Kaplan, environmental psychologists at the University of Michigan, found that employees with views of a natural landscape report greater job satisfaction, less stress and fewer illnesses. Lockheed Martin, an aerospace firm, found that absenteeism fell by 15% after it moved 2,500 employees into a new green building in Sunnyvale, California. The increase in productivity paid for the building's higher construction costs within a year." (*Architecture: New buildings use design and technology to reduce environmental impact, cut costs and provide better places to work, 2005.*)

■ *Example*

Strout's Point Wharf Company in Freeport constructed a low-cost passive solar workshop building that allows year-round use for boat maintenance. The building stays at about 40 degrees Fahrenheit and its all-natural light makes it a pleasant environment in which to work. The original building's shell cost was around $15 a square foot and heating and electrical costs are minimal because of the building's design. The building was later insulated and wired and a heating system was added, which brought overall costs close to $25 a square foot.

■ *References & Resources*

The Daylighting Collaborative: Organization dedicated to promoting cool daylighting with information and case studies.
www.daylighting.org

U.S. DOE Energy Efficiency and Renewable Energy: Information and resources on passive daylighting.
www.eere.energy.gov/buildings/info/design/integratedbuilding/passivedaylighting.html

Green Power

Renewable, non-polluting power helps conserve precious natural resources and limits the amount of greenhouse gases your business emits into the atmosphere. Nationally, most electricity is produced using coal, oil, natural gas and nuclear power, all of which have significant environmental impacts. As nonrenewable resources, they generate pollution during extraction, transportation, refinement and consumption. The majority of electricity in New England is produced using 33% nuclear and 29% natural gas. Switching to renewable, non-polluting energy not only reduces a business's impact on the environment, but also has the following benefits:

- Can reduce health risks.
- Is an infinite resource.
- Supports local jobs and economies.
- Can stabilize energy costs.
- Increases energy security through reduced dependence on foreign sources of power.
- Supports further development of renewable sources.
- Distinguishes your products and services in the marketplace.

■ *Products/Actions*

The ability to purchase green power/clean electricity is now widely available across the U.S. In Maine the market offers two kinds of clean electricity products. The first and most familiar type is offered by independent suppliers and paid for through your electric bill. This is referred to as "supply". The second category is certificate products, often called Renewable Energy Certificates (RECs) or "green tags". When you purchase green tags, you are offsetting your purchase of nonrenewable energy with clean, renewable energy sources. Moreover, you are supporting the development of additional renewable energy sources.

■ *Return on Investment*

Costs for renewable electricity may be higher than standard offer electricity. Depending upon the clean electricity product purchased, prices vary. We recommend starting at the Maine Green Power website (**www.MaineGreenPower.org**) for the current list of 12 products and 8 suppliers.

■ *Example*

In line with its mission to help create economically and environmentally healthy communities, Coastal Enterprises, Inc. (CEI) (**www.ceimaine.org**) began purchasing electricity from renewable sources in 2004. Additionally, CEI is recognized along with other Maine organizations and businesses as a Partner in the Maine Green Power Connection (MeGPC), a statewide clean electricity market development program managed by the Maine Energy Investment Corporation. All such clean electricity purchasers are recognized by MeGPC through its "Connected Companies" directory, "Spotlight" web pages and regular "Maine Green Power News" e-newsletter.

■ *Suppliers in Maine*

For up-to-date information, please contact **www.mainegreenpower.org/menu/index.shtml**

■ *Resources & References*

Maine Green Power Connection: A collaborative effort among green power marketers. This statewide initiative provides a background on clean electricity, product explanations, case studies, business recognition services and buying guide. **www.mainegreenpower.org**

Green Power Market Development Group: A national collaborative among 13 companies to purchase 1,000 megawatts of new cost-competitive green power by 2010. **www.thegreenpowergroup.org**

Environmental Protection Agency's Green Power Partnership: Federal effort to build the market for clean electricity by offering national recognition to Green Power Partners. **www.epa.gov/greenpower**

Green-e, the renewable electricity certification program. Green-e sets national standards for the electricity it certifies as "green", and verifies associated claims made by electricity suppliers and product manufacturers. Green-e's website contains information on national clean electricity options and products certified to wear the Green-e logo, like Interface Fabrics, Silk Soy milk and many others. **www.Green-e.org**

Biodiesel

Cars, trucks, boats and other internal combustion engines are among the largest producers of greenhouse gases. One way to mitigate the pollution effects of your business is to use biodiesel fuel. Biodiesel burns clean – exhaust fumes are eliminated – and your engine will emit less pollution than conventional fuels.

Average Biodiesel Emissions Compared to Conventional Diesel, According to EPA

Emission Type	*B100*	*B20*
Regulated		
Total unburned hydrocarbons	-67%	-20%
Carbon monoxide	-48%	-12%
Particulate matter	-47%	-12%
Nox	+10%	+2%
Non-Regulated		
Sulfates	-100%	-20%*
PAH (Polycyclic Aromatic Hydrocarbons)**	-80%	-13%
nPAH (nitrated PAHs)**	-90%	-50%***
Ozone potential of speciated HC	-50%	-10%

(From **www.biodiesel.org/pdf_files/fuelfactsheets/emissions.pdf**)

■ *Products/Actions*

Biodiesel is commonly made from soybean oil and other renewable sources, and it can be blended with petroleum-based diesel fuel. In Maine there is growing interest in refining biodiesel from waste feed stocks such as restaurant grease, pulp by-products, etc. You can purchase pure biodiesel (B100) or a biodiesel blend (B20-20% biodiesel, 80% conventional diesel). Blended biodiesel reduces vehicle emissions and can be used in a regular diesel engine with little to no modifications; pure B100 may require equipment modifications.

■ *Return on Investment*

In the fall of 2005 the cost of B20 in Maine was approximate to regular diesel fuel, while B100 was slightly more. Because the supply and demand for biodiesel fluctuates, the price does as well. Many suppliers will require you to sign a contract for a specified period of time at a specified price.

■ *Example*

CEI helped finance the purchase of two boats for Old Port Marine (**www.marinerfleet.com**), a Portland-based, deep sea fishing and whale watch excursion business, owned and operated by Capt. Dan Yates and Capt. Mike Gorham. The captains agreed to use biodiesel fuel, a blend of renewable biomass and conventional diesel that reduces pollution and the greenhouse gases that may contribute to global warming. Biodiesel is better for the customers' overall experience, as well as the environment. Often, customers would feel sick or develop a headache from the smell of diesel fumes, which is reduced significantly with the use of biodiesel.

■ *Suppliers in Maine*

The following is a sample of Maine biodiesel suppliers; see an up-to-date list at "Biodiesel for Maine". **www.RenewMaine.org/BFM2.htm**

Frontier Energy, 1160 Route 3, South China, ME 04358; 866-267-9293. **www.frontierenergy.org**

Independence Energy, Incorporated, 361 Cedar Pond Rd., Durham, ME 04222; 800-228-1883. **www.biofuelme.com**

Solar Market, 25 Limerick Rd., Arundel, ME 04046; 207-985-0088. **www.solarmarket.com**

■ *Resources & References*

Biodiesel for Maine (BFM), a market development program for biodiesel, is run jointly by the Chewonki Foundation and Maine Energy Investment Corporation. They provide introductory and customer-specific information on the possibilities of biodiesel for large consumers of diesel and/or heating fuels. Presentations for businesses, informational materials and an e-newsletter on Maine biodiesel developments are available. **www.RenewMaine.org/BFM2.htm**

National Biodiesel Board: "The national trade association representing the biodiesel industry as the coordinating body for research and development in the United States." Consumer and producer information and links to suppliers. **www.biodiesel.org**

* Estimated from B100 result
** Average reduction across all compounds measured
*** 2-nitrofluorine results were within test method variability

Energy-efficient Heating, Ventilation and Air Conditioning (HVAC)

Heating and cooling is one of the largest energy expenses that a business can incur. Upgrading equipment to an energy-efficient model offers the opportunity for substantial cost savings. Best of all, you maintain a comfortable office environment that is indistinguishable from traditional office environments.

Sizing of HVAC is a common challenge in building design, and systems are often oversized to reduce risk and call backs. When integrating the design of HVAC systems with good orientation, envelope design, efficient lighting and good controls, the size of the system can be reduced. These system savings can then be used to pay for the improved envelope and lighting, which helps further reduce operation costs over the life of the systems.

Geothermal heating and cooling systems take advantage of the earth's natural temperature through a heat exchange mechanism that is efficient, non-polluting and cost effective. The cost of a geothermal system varies, depending on its size and its scope, from $5,000 to $20,000. Experienced energy professionals recommend a strong engineering and design plan.

■ *Products/Actions*

Other than purchasing new equipment, you can save money through:

- Proper operation: identify optimal temperature and adjust the thermostat when the building is not in use.
- Proper maintenance: service systems annually.
- Set back thermostat: reduce human error with time-based controls.
- Outside air economizers: a feature of HVAC systems that uses outside air when the temperature outside is lower than the temperature inside.
- Heat Recovery Ventilators and Enthalpy Wheels.

■ *Return on Investment*

Energy Star-qualified commercial HVAC equipment uses 7-10% less energy than standard equipment. These products can save your business approximately $3-4 per square foot over the life of the equipment. A 12,000 square foot building using an Energy Star-qualified HVAC product could save $36,000 to $48,000 over the life of the equipment. Better air quality and improved comfort leads to improved productivity and reduced absenteeism. Energy Star-qualified geothermal heat pumps use about 40-60 percent less energy than a standard heat pump, saving money on energy costs. A recent cost comparison from Central Maine Power estimates that geothermal heat costs about one-third the cost of electric heat, two-thirds that of fuel oil, and less than half as much as propane.

■ *Example*

The Maine Audubon Center in Falmouth was designed and constructed according to green building principles. According to the Maine Audubon website, "Water from a 600-foot well is drawn to three heat pumps, or compressors. Operating much like a refrigerator in reverse, these pumps extract heat from the 45-50 degree (F) groundwater and transfer it to a closed loop of water circulating through tubing in the floor. Heated up to 130 degrees (F), the circulating water warms the surrounding concrete, which radiates the heat."

■ *Suppliers in Maine*

You can find a list of manufacturers, wholesalers, retailers and contractors that are Efficiency Maine program allies at **www.efficiencymaine.com/business/program-allies.html**

A list of contractors certified by the International Ground Source Heat Pump Association is available. **www.igshpa.okstate.edu**

■ *Incentives*

For businesses with fewer than 50 employees, Maine offers incentives for energy efficiency, including HVAC, though rarely for geothermal heat. Incentives can be up to $50,000 to a business in a single year. **www.efficiencymaine.org**

■ *Resources & References*

Energy Star Guide to Energy-efficient Heating and Cooling. **www.energystar.gov/ia/products/heat_cool/GUIDE_2COLOR.pdf**

A list of Energy Star-compliant geothermal heat pumps is available at **www.energystar. gov/indexcfm?c=geo_heat.pr_geo_heat_pumps**

Geothermal Heat Pump Consortium: A partnership of geothermal industry professionals "to increase the awareness and use of geoexchange technology in the US and the world." **www.geoexchange.org**

Solar Water Heating and Solar Photovoltaics (PV) Systems

Solar water heating is a simple and cost-effective mechanism to cut down on the costs associated with heating water. There are few moving parts and it's based on the simple concept of the sun heating water in a holding container placed on the roof of a building. While simple passive solar water heaters are possible and use little purchased energy, in Maine's climate most installers recommend "closed loop" solar water systems, as these provide more reliable, carefree operation and the freeze protection most business owners require.

Solar PV panels generate electricity. They are placed on your roof or land to reduce your business's environmental impact as well as ease long-term energy costs. Solar technologies have been around for awhile and have been relatively costly. However, technological advances, government incentives, and rising energy costs have begun to turn solar energy into an attractive, clean and quiet source of energy. If your business uses a modest amount of electricity and/or needs 24/7/365 electrical reliability, a solar electric system may be an increasingly attractive investment.

■ *Products/Actions*

Today in Maine, it is possible to choose between two basic types of solar water heating units: those that rely on flat plate collectors versus those employing evacuated tube collectors. Both employ pumps and controllers to regulate and circulate water. Flat plate collectors have proven reliable over decades of use, both in Maine and elsewhere. The newer, more efficient evacuated tube collectors trade slightly higher cost for higher efficiency in Maine's "swing seasons", fall and spring. Both types are readily available in Maine.

While it used to be thought that solar PV systems would only fit on precisely the correct roof tilt and southern orientation, today's systems work well within a wider range of conditions. The system's size will reflect both electricity needs and budget constraints, and installation requires an experienced, Maine-certified installer. Since the amount of sun available for harvesting varies throughout the year, a system that is tied into the main electrical grid allows you to use the right mix of energy from your solar generation and conventional energy, while eliminating the need for an expensive battery back-up. Finally, under state and regional policies that encourage the installation of clean generation like PV, new solar electric systems may take advantage of the ability to sell renewable energy credits (RECs: see below). This can enable system owners to realize an additional small revenue stream, thereby further shortening the payback period.

■ *Return on Investment*

Solar water heating systems will cost between $4-7,000, depending upon their size. Systems can be purchased in many sizes, based on the volume of water needed. Payback periods will vary, depending upon the volume and prices of traditional fuel displaced by the solar system.

The pricing for solar PV systems depends entirely on system size. Systems capable of providing 30% of the annual electricity used by an average Maine family would range from $14-20,000 before rebates. Larger business systems can cost $50-100,000 and more, again depending upon the electrical output desired. Payback can take as little as ten years or upwards of 40 years and varies considerably, based on assumptions about the value of displacing rising grid electricity and emissions. Fortunately, government incentives offer opportunities to reduce the upfront cost, which shortens the payback period. Increases in conventional energy costs will also reduce the payback period. Solar PV systems are very durable and most manufacturers offer warranties for 20 years or more.

■ *Incentives*

For residents and businesses, Maine offers an incentive of 25% or $1,250, whichever is less, for solar water heating systems, and an incentive of $3/watt for the first 2,000 system watts and $1/watt for the next 1,000 watts of a solar PV system. In combination with new federal credits, this could have the effect of cutting a solar water heating system's price by almost 50%. Both solar electric and solar water systems must be installed by appropriately licensed and certified contractors, and the requirements differ for solar water systems versus PV. Find lists of both types of Maine-certified contractors at **www.maine.gov/msep/pdf/SolarInstallersInternet.pdf**

The federal government offers a Solar and Geothermal Business Energy Tax Credit. Starting in 2006, the credit has been increased to 30% of the price for solar equipment, with no maximum credit for business filers (assuming sufficient business income to take the credit). For more information, visit **http://www.seia.org/getpdf.php?iid=21**, "Frequently Asked Questions on the Solar Tax Credits", from the Solar Energy Industries Association.

The Department of Agriculture offers direct loans, loan guarantees and grants for rural farms and small businesses to invest in renewable energy projects. The grant maximum is $500,000 and no more than 25% of the project's cost, and the loan maximum is $10 million and no more than 50% of the project's cost. For more information, visit **www.dsireusa.org**

While rebates and tax credits help reduce solar's upfront costs, there are other forms of incentives as well. Higher property resale value, the value of energy independence during weather emergencies, and emissions benefits are all paybacks solar owners value. In addition, PV owners can sell the Renewable Energy Certificates (RECs) that their systems earn over time. REC revenues are not large (roughly $100-150/year for each kW of installed system size) and systems must meet reporting and eligibility requirements. The Downeast Solar Co-op simplifies these requirements; contact them for more information.

■ *Suppliers in Maine*

The following is a sample list of installers. For an up-to-date complete listing, visit **www.RenewMaine.org/DSC.htm**, homepage of the Downeast Solar Co-op (DSC), a program of Maine Energy Investment Corporation (above to the right).

Energyworks, 91 West Main Street, Liberty, ME 04949; 877-EN-WORKS.
www.energyworksllc.com

Penobscot Solar Design, 569 Backridge Road, Penobscot, ME 04476; 207-326-0779.
www.penobscotsolar.com/

Solar Market, 25 Limerick Road, Arundel, ME 04046; 877-785-0088. **www.solarmarket.com**

■ *Example*

Sponsored by CEI, Marble Oaks is a 16-unit, rental housing development in Waldoboro. In addition to targeting low-income families, the development achieves several aspects of "green" building. There are solar panels on 3 of 8 buildings for electricity and for domestic hot water pre-heat, as well as a solar-powered sewer pump station.

■ *Resources & References*

Downeast Solar Co-op (DSC): A project of the Maine Energy Investment Corporation, DSC provides product-neutral information on the array of solar options available to Maine businesses and consumers. This includes lists of sources for system design and equipment, financing information, a regular e-newsletter and basic introductory overview presentations for groups. DSC also provides information on how PV system owners can earn income from the sale of RECs.
www.RenewMaine.org/DSC.htm

Maine State Energy Program: Administers a solar rebate program as well as Clean Energy Maine.
www.CleanEnergyMaine.com

Solar Energy Business Association of New England (SEBANE): SEBANE is a growing trade association for solar and related companies across New England. "Yellow Pages" at their website (**http://www.sebane.org/sebane_info/members_overview.asp**) provides a comprehensive listing of dealers, consultants and others available to work on solar systems throughout the northeast.
www.SEBANE.org

SolarBuzz.com: The world of solar technology and application is growing very quickly worldwide. SolarBuzz provides an excellent "portal" into current financial and technical headlines, and an array of complete educational resources.

Northeast Sustainable Energy Association: Education and advocacy organization for renewable energy. **www.nesea.org**

Environmentally-friendly Commuting and Travel

In a rural state like Maine, commuting and travel by automobile are part of our daily lives. This cost of doing business is rising with fuel prices and contributes significant amounts of greenhouse gases thought to cause global warming. Alternative commuting and travel options not only provide environmental benefits, but enable employees and employers to save money. Offering options can help employers recruit and retain high-quality employees.

■ *Products/Actions*

There are several ways to encourage use of alternative methods of getting to work.

- Subsidize carpools and vanpools.
- Limit parking onsite or set aside preferred places for carpools.
- Provide bike parking and shower/lockers.
- Offer telecommuting and flexible work arrangements.
- Locate buildings near existing and/or planned public transit.

■ *Return on Investment*

Costs are nominal and you'll see payback through reduced employee stress and greater employee satisfaction.

■ *Incentives*

In partnership with the state of Maine, the Greater Portland Council of Governments offers free commuter services, including ride matching, transit information, and an emergency ride home guarantee, through its Go Maine commuter connection.

For employers, the federal government offers a tax-free commuter benefit of up to $105 per month for employees who ride public transit or participate in a vanpool. Those who park and ride can also qualify for the benefit. Employers who pay for parking or provide free parking can deduct $200 per month. Information is in the IRS Employer's Tax Guide to Fringe Benefits, available at **www.irs.gov/pub/irs-pdf/p15b.pdf**

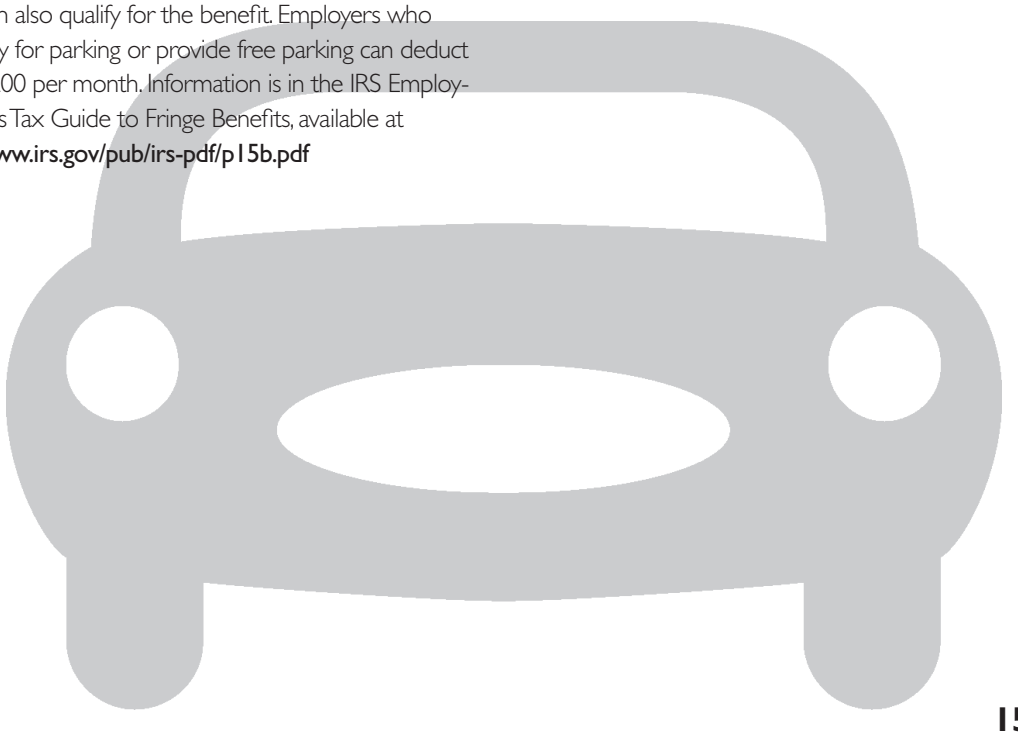
■ *Example*

Ducktrap River Fish Farm, Inc. (**www.ducktrap.com**) encourages employees to car pool by reimbursing the driver $0.75 per ride or $1.50 per day per rider. Drivers with one full-time rider are paid $7.50 cash per week and they receive preferred parking spaces close to the walkway. Implementation was easy. First, the company marked a map with the general location of each employee and put it up so people could look for a compatible ride/rider. Second, it distributed paper forms filled in by the driver and signed by the rider. The forms are turned into the personnel office on the designated day for cash. The program is run on the honor system and is self-policing. Overall, the company was able to postpone capital investment of building a new and larger parking lot. Not only does the program reduce air pollution and traffic congestion, it helps build rapport among employees.

■ *Resources & References*

Go Maine! Commuter information and carpooling network. **www.gomaine.org**

Explore Maine: Commuter and travel information. **www.exploremaine.org**



Water Use

Water is a precious natural resource and a cost of doing business. Water efficiency will enable you to conserve a precious natural resource while adding savings to your bottom line. A mere three percent of the world's water is fresh water and only a third of that is found in land-based water sources suitable for human consumption. Many places around the world face a severe shortage of clean drinking water. With a burgeoning global population, the shortage will only increase. Moreover, the modern, industrial economy creates many toxic by-products – air pollution and hazardous waste – that are released into the environment. In far too many cases, ground water, rainwater and other water sources become too polluted to support ecosystems and for human consumption. According to the Maine Department of Environmental Protection, over 598 miles of streams and rivers, and 32 lakes in Maine are impaired. In other words, they fail to meet basic water quality standards.

This section presents strategies for water conservation as well as pollution mitigation.

■ *Products in this Section*

- Water-efficient fixtures and equipment

■ *Building & Site Improvements in this Section*

- Xeriscaping
- Stormwater and parking lots
- Rainwater harvesting

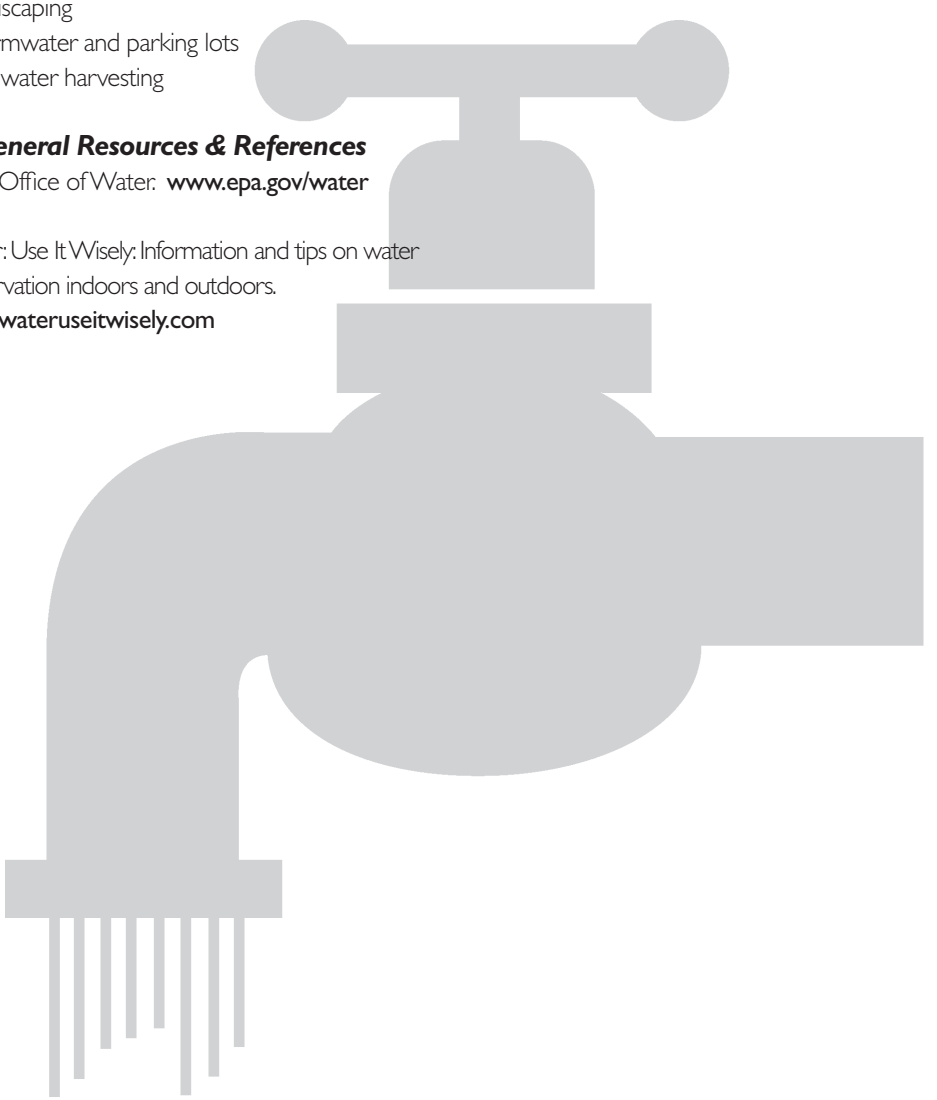
■ *General Resources & References*

EPA's Office of Water: **www.epa.gov/water**

Water: Use It Wisely. Information and tips on water conservation indoors and outdoors.
www.wateruseitwisely.com

Green Works Scale

1. Install water-efficient fixtures
2. Xeriscaping – native low water landscaping
3. Rainwater harvesting
4. Stormwater management



Water-efficient Fixtures and Equipment

According to some estimates, installing water-efficient fixtures can reduce water consumption by 30%. You can control and reduce your water usage through some easy and minor improvements to your business. If your business uses a lot of water in its production processes, then it makes both environmental and financial sense to use the most water-efficient equipment and machinery you can find.

■ *Products/Actions*

One easy strategy that does not require any new equipment purchases is to maintain pipes and fixtures to prevent and fix leaks. A leak that drips once per minute for a whole year uses over 50 gallons of water. However, using water-efficient equipment can save you money on water expenses and conserve water. These are some of the products and strategies you can use:

- Faucet aerators: Fixtures that add air to the water stream, reducing the amount of water that flows out.
- Low-flow showerheads: Fixtures can be aerating or pulsing, restricting water flow.
- Dual-flush toilets: Two flushing options, usually 0.8 and 1.6 gallons.
- Waterless urinals: Disconnected from the water line, these urinals use a filtering cartridge or a sealing fluid that maintains sanitary conditions.
- Commercial dishwasher pre-rinse spray valve. Estimated savings are 870 therms per unit per year with an incremental price of $5 more than the standard product. Information can be found at the Consortium for Energy Efficiency website **http://www.cee1.org/com/com-kit/codes.pdf**

■ *Return on Investment*

Easy installation procedures make low-flow plumbing fixtures feasible for retrofitting. It is estimated that low-flow toilets alone could save up to 22,000 gallons of water per year for a family of four. Low-flow plumbing fixtures are available in all the styles and colors of conventional fixtures.

- Faucet aerators usually cost $5 to $10.
- Low-flow showerheads range from $8 to $50, depending on features such as flow adjusting dials and designer styling.
- Dual-flush toilets range from $300 to $900.
- Waterless urinals range from $200 to $500. (There are additional costs for replacement cartridges and sealants, but savings from reduced water and sewage fees usually outweigh these costs.)

■ *Examples*

The University of Southern Maine has installed 40 waterless urinals in 10 buildings across the campus as a part of their initiative to become a more environmentally-friendly institution. Included as part of building upgrades, the units were relatively inexpensive and cost-effective at about $50. The drawbacks have mostly to do with housekeeping – staff have been resistant to changing the cartridges that filter urine. However, there are many more benefits, including reduced water and sewage costs, reduced maintenance and plumbing costs, and better sanitary conditions from the touchless system.

■ *Suppliers in Maine*

Many of these products are available at any supplier of bathroom and kitchen fixtures. While faucet aerators and low flow showerheads are fairly common, dual flush toilets and waterless urinals are not and local suppliers may not have them in their inventory.

- Manufacturers of dual flush toilets include: Caroma, Duravit, Keralor, Kohler, Mancesa, Mansfield Eco Quantum, Sterling and Vitra.
- Manufacturers of waterless urinals include: Waterless, Falcon Waterfree, Zeroflush, Duravit and Uridan.

■ *Resources & References*

EPA: Water-efficient Products Market Enhancement Program.
http://www.epa.gov/OWM/water-efficiency/

EPA: Water-efficiency Measures for Commercial Businesses.
www.epa.gov/OWM/water-efficiency/comtips.htm

EPA: Using Water Efficiently: Ideas for Commercial Businesses.
www.epa.gov/OWM/water-efficiency/commercial.pdf

Water Use Backgrounder: Article on Commercial Building Water Usage. **www.greenerbuildings.com/tool_detail.cfm?LinkAdvID=49344**

Facility Manager's Guide to Water Management.
www.resourcesaver.org/file/toolmanager/O16F8609.pdf

Water-efficiency and Management in Commercial Buildings.
www.mwra.state.ma.us/04water/html/bullet4.htm

Xeriscaping

The word xeriscaping comes from the Greek word "xeros", which means dry, and "scape", which means view or scene. Today, xeriscaping basically means landscaping with hearty native plants to reduce the need for watering. This approach generally requires less fertilizer and fewer pest control measures Xeriscaping lowers water bills and sewer connection fees, and reduces pollution associated with stormwater runoff. In the end, this can lower overall costs associated with landscape maintenance. Using native plants that vary in size and types slows down water flow, aids in the process of absorption and naturally reduces the pollutants typically found in runoff. Well-drained soils that can absorb 1/2 inch of water or more per hour create a good environment for grass, plants and trees to set deep roots and take advantage of deep water and nutrients. "The addition of the proper soil amendments can either help a soil drain faster or slower. Well-composted organic material is an ideal amendment that can serve both these purposes. Additionally, good compost provides a source of slow release nutrients for plants. The balanced growth encouraged by these conditions can reduce pruning maintenance as well as disease and pest pressures." (**http://www.ciwmb.ca.gov/Organics/Xeriscaping/#SoilPrep**)

■ *Products/Actions*

Xeriscaping means altering what you decide to plant and how you maintain the landscaping on your property. Before designing your landscaping, you can consult with a landscape architect or other landscaping professional on what plants are best suited for your site.

■ *Return on Investment*

Xeriscaping should not cost any more than what you would normally pay. The idea is to select plants appropriate to the region that conserve water or eliminate the need to water and are easy to maintain. You will save money in both water and maintenance costs.

■ *Suppliers in Maine*

Find a landscape architect through the American Society of Landscape Architects. **www.asla.org**
A state of Maine site, **www.yardscaping.org** also has a listing of landscaping professionals.

■ *References & Resources*

EPA document: Water-efficient Landscaping: Preventing Pollution and Using Resources Wisely.
www.epa.gov/npdes/pubs/waterefficiency.pdf

Listings of Maine native plants
www.umext.maine.edu/onlinepubs/htmpubs/2500.htm
www.plantnative.org/rpl-nen.htm

Maine Yardscaping: Targeted to homeowners, but applicable to businesses as well. Multi-partner state initiative that focuses on healthy landscaping and pollution prevention. **www.yardscaping.org**

New Hampshire Department of Environmental Services Fact Sheet: Fundamentals of Xeriscaping and Water-wise Landscaping.
www.des.state.nh.us/factsheets/ws/ws-26-4.htm

Stormwater, Parking Lots and Green Roofs

Stormwater runoff is a source of pollution because water carries debris, dirt and other pollutants from impermeable surfaces like parking lots, roads and sidewalks first into sewers, then into streams, rivers, ponds and lakes. In the case of newly paved asphalt, the first rain storm actually generates a toxic event. In terms of runoff, a study of 27 small streams found that streams where impervious surfaces covered 10% or more of the watershed had significantly poorer water quality than those watersheds with less than 3% impervious coverage.

Stormwater runoff from roofs can contribute to the nonpoint source pollution in a number of ways. As rainwater leaves the roof and crosses impervious surfaces, it picks up oil and grease, heavy metals, nutrients, toxic chemicals, mud, sediment, coliform bacteria and litter, all of which can adversely affect the receiving water bodies. Construction of a green roof will reduce runoff on the site by an estimated 70-100% in the summer and between 40-50% in the winter. The filtering of the remaining water that does run off will remove particulate matter.

Stormwater also heats up during the summer on rooftops and while crossing paved parking lots, leading to elevated water temperature of runoff entering nearby water bodies. On hot summer days, the cooler building roof surface temperatures can reach 175 degrees, creating runoff with exceedingly high temperatures. Green roof plant foliage will help transform the heat energy of the sun and soil moisture into humidity through photosynthesis and naturally reduce roof surface heat gain and temperatures of runoff entering local watersheds.

Reducing the amount of impervious surfaces on your property, especially parking lots, will mitigate pollution from runoff as well as create a more attractive and healthy environment. Strategies for parking lots should also include landscaping considerations that focus on stormwater management. Creating more surface area to absorb water naturally reduces the stress put on sewer systems. Moreover, using plants native to Maine (xeriscaping) reduces the need for watering, thereby reducing water consumption.

■ *Products/Actions*

Green parking techniques include setting maximums for the number of parking lots created, minimizing the dimensions of parking lot spaces, utilizing alternative paving in parking areas, using bioretention areas to treat stormwater, encouraging shared parking and providing economic incentives for structured parking.

Alternatives to paving include gravel, cobble, wood mulch, brick, grass pavers, turf blocks, natural stone, pervious concrete and porous asphalt. In general, alternative pavers require proper installation and more maintenance than conventional asphalt or concrete.

Bioretention areas are places where stormwater is directed into an area and filtered down into the subsurface or into a drainpipe for discharge into a stream or another stormwater facility. These areas can have the appearance of landscaping while serving the purpose of capturing and treating stormwater.

A green roof is a vegetated cover built in several layers upon on a strong structural support and incorporated into a building's roof. These layers usually include a waterproofing system, a protective layer above the waterproofing system, insulation, a drainage/water storage layer, a growing medium, and vegetation. Basic green roofs include a range of green roofs collectively referred to as extensive or low-profile green roofs. These green roofs contain only one or two plant species, require minimal planting medium, are less expensive, and are typically not accessible to the public. Soil depth generally ranges from 1 to 6 inches. These green roofs are not designed for public use but can be accessed for routine maintenance walks (generally performed once per year). They are designed to maximize insulating and water-holding benefits, while exerting a minimum weight load on the building structure. Basic green roofs can be installed on a flat or sloped roof, up to a 33% grade. Most require little or no additional structural support. They often require no irrigation and minimal maintenance. (From Low Impact Development Strategies for Stormwater Management by the Casco Bay Estuary Partnership under U.S. EPA assistance agreement CE 981705 1 to the University of Southern Maine.)

■ *Return on Investment*

Reducing the size of your parking area also reduces the cost of constructing it. Strategies that minimize parking while encouraging carpooling are easiest to implement and the most cost-effective. By introducing landscaping, including bioretention areas, into parking areas, you can reduce the amount of impervious surface area while creating opportunities for shade and reducing the amount of heat gain from the parking lot.

According to the EPA, "environmental benefits are not the only valid reason for encouraging developers to incorporate urban runoff controls into new residential and commercial developments. Increased property values can result from aesthetically landscaped controls…The beauty of natural surroundings increases residential property values by up to 28% while also enhancing the quality of life. Commercial property owners, too, can benefit when their property is adjacent to an aesthetically designed urban runoff control. They can realize lower vacancies, lower tenant turnover, and higher rental prices. Real estate professionals agree that the more amenities a property has, the faster it will sell or rent." (From **www.epa.gov/owow/nps/runoff.html**)

"Green roofs can cost 30-50% more than regular roofs. The cost of a green roof depends on several factors, including which system is selected, the installation method it requires, whether any alterations need to be made to the roof structure itself, and the types of plants chosen. Green roofs for Healthy Cities (2004) estimates that green roofs can be installed at a cost of $12-$24 per square foot. Although green roofs typically cost more to construct than other roof types, they have an extended roof life (~2x longer life than conventional roofs) and so represent savings in replacement costs. They also increase energy efficiency, leading to reduced heating and cooling expenses. Green roof cost calculations should include expenses for design materials (protective layer, containment system, drainage layer, filter layer, and growing medium) and plants, as well as installation and maintenance." From Low Impact Development Strategies for Stormwater Management, Casco Bay Estuary Partnership.

■ *Example*

Sponsored by CEI, Marble Oaks is a 16-unit, rental housing development in Waldoboro. In addition to targeting low-income families, the development achieves several aspects of "green" building. The building occupies only 20% of site, thereby conserving open space. The site has minimal impervious surfacing, which reduces pollution runoff, increases natural water absorption, and meets the Maine Department of Environmental Protection requirements for stormwater management.

■ *Resources & References*

Maine Stormwater Web Site: Public resource on stormwater pollution and prevention.
www.thinkbluemaine.org

Maine Department of Environmental Protection Stormwater Program: State agency that manages state and federal laws pertaining to stormwater management.
www.state.me.us/dep/blwq/docstand/stormwater/index.htm

EPA: Stormwater Program: Materials and information on stormwater management.
www.epa.gov/npdes/stormwater

EPA: Article on Green Parking Strategies.
cfpub.epa.gov/npdes/stormwater/menuofbmps/post_12.cfm

Green Roofs for Healthy Cities.
http://www.greenroofs.org

Low Impact Development Center, Inc.
http://www.lidstormwater.net/intro/sitemap.htm

Design Guidelines for Green Roofs. Peck and Kuhn. Ontario Association of Architects (2001).
http://www.green roofs.com/Greenroofs101/how-tos.htm

For additional information on green roof technical specifications, access the **Greenroofs.com** website at **http://www.greenroofs.com**

Rainwater Harvesting

Rainwater harvesting simply involves the collection of water from surfaces on which rain falls, and subsequently storing this water for later use. Typically water is collected from the roofs of buildings and stored in rainwater tanks. Rainwater harvesting systems capture and cleanse rain for use in irrigation and landscape watering. Collecting and using your own water can significantly reduce your water bills. Additionally, by capturing water, stormwater runoff is reduced, minimizing the likelihood of overloading stormwater systems and controlling pollution. While rainwater harvesting is most popular in arid climates like Arizona and New Mexico, it can also be useful in moist, cold climates like Maine.

■ *Products/Actions*

Installing a rainwater system involves figuring out how much rainwater you can harvest and how you are going to use it. Most applications include exterior watering and irrigation. More intricate systems use harvested rainwater for flushing toilets.

These are rainwater system components:

- The Roof Surface. Rainwater harvesting systems rely on the collection of rainwater that has fallen on a building roof.
- Gutters and Downspouts. Gutters and downspouts are used to convey the rainwater from the roof surface to the roof washer and the cistern.
- A Roof Washer. The roof washer pre-treats rainwater before it enters the cistern.
- The Cistern. The cistern is the central portion of the rainwater harvesting system. Protection and maintenance of the cistern is essential for the health of the system. It is also extremely important that the cistern be sized adequately for the size of the household and the use of the water.
- A Pump. Often a pump is necessary to distribute the harvested rainwater from the cistern to the designated fixtures.
- The Piping System. The piping system conveys the harvested rainwater and distributes it to various fixtures.

■ *Return on Investment*

The cost of a rainwater system depends on its intended use (how much water is needed) and how much rain you can capture from rooftops. Generally, the cost is between $0.50 and $4.00 per gallon. By keeping track of bills before and after the installation of a system, you can calculate the payback period.

■ *Suppliers in Maine*

SkyJuice New England: Maine business that installs and maintains residential and commercial rainwater harvesting systems. **www.skyjuice.us**

■ *Resources & References*

Rainwater Harvesting Guide: Information and links for rainwater harvesting. **www.rain-barrel.net**

HarvestH_2O: Information and community for rainwater harvesting. **www.harvesth2o.com**

The Texas Manual on Rainwater Harvesting
www.twdb.state.tx.us/publications/reports/RainwaterHarvestingManual_3rdedition.pdf

Indoor Air Quality

On average, we spend 90% of our time indoors, so indoor air quality (IAQ) can have a profound effect on a building occupant's health and well-being. EPA studies of human exposure to air pollutants indicate that levels of many pollutants may be 2-5 times and, on occasion, more than 100 times higher than outdoor levels. Indoor air quality is influenced by interior products like carpets, paints and other office equipment. Unless properly selected, these products are typically made with hazardous materials that can be harmful to humans and can degrade the natural environment during production and after disposal. These materials may be hazardous to manufacturers and installers and lead to health problems for building occupants. For example, the increase in asthma among children over the past few decades has been linked to the air quality of indoor environments.

There are two basic strategies to improve indoor air quality: source control and ventilation control. You can achieve a degree of source control by using the non-toxic products listed in this section and you can achieve ventilation control through using some of the building and site improvements.

Environmentally-preferable purchasing of office materials is a policy being implemented by federal, state and local governments across the country to avoid the health and environmental risks posed by materials and supplies that contribute to an unhealthy indoor environment.

General References & Resources

EPA Indoor Air Quality Program.
www.epa.gov/iaq

Maine Indoor Air Quality Council promotes the improvement of indoor air quality throughout Maine. **www.miaqc.org**

Consumer Product Safety Commission and EPA: The Inside Story: A Guide to Indoor Air Quality.
www.cpsc.gov/cpscpub/pubs/450.html

EPA Environmentally Preferable Purchasing Program. **www.epa.gov/opptintr/epp**

Green Seal "is an independent, nonprofit organization that strives to achieve a healthier and cleaner environment by identifying and promoting products and services that cause less toxic pollution and waste, conserve resources and habitats, and minimize global warming and ozone depletion." **www.greenseal.org**

Green Works Scale

1. Paints
2. Cleaning supplies
3. Carpets

■ *Products in this Section*

- Non-toxic cleaning supplies
- Non-toxic paints
- Non-toxic carpets

■ *Building and Site Improvements in this Section*

- Ventilation

Non-toxic Cleaning Supplies

Many cleaning supplies contain toxic chemicals that are hazardous to humans. Not only are the cleaning staff who regularly use the products at risk, but so are office workers. Additionally, cleaning products that are washed down the drain can have adverse effects on local water sources and the natural environment.

■ *Products/Actions*

Green Seal, an independent, nonprofit group that evaluates and certifies environmentally-friendly products, publishes a list of preferred cleaning product manufacturers. You can find the list of Green Seal certified cleaning products at **www.greenseal.org/certproducts.htm#cleaners**

■ *Return on Investment*

According to the Massachusetts' Operational Services Division, the department responsible for implementing and monitoring the state's environmentally preferable product program, non-toxic cleaning products are priced competitively with other products. They also urge purchasing agents to take into account the costs associated with increased safety and better worker health. The Center for a New American Dream reports that six out of every 100 custodians are injured by harmful ingredients in cleaning products, resulting in an average cost of $726 in lost time and medical expenses for companies.

■ *Example*

In an effort to operate the business in line with their environmental values, Women to Women Healthcare Center in Yarmouth, Maine uses environmentally friendly cleaning products. They established a contract with their cleaning service to ensure that only environmentally friendly products would be used. While these products cost more, Women to Women considered this a necessary cost of doing business.

From the Green Campus Consortium of Maine Web site: UMAINE ADOPTS NEWLY CERTIFIED "GREEN" CLEANING PROGRAM – ORONO, MAINE - With an eye on employee and student health and the environment, the University of Maine has joined a growing movement to adopt a "green certified" facility cleaning program. UMaine has contracted with Butcher's, Inc., of Marlborough, Massachusetts, to buy cleaning products that are certified by the independent Green Seal product certification organization. **http://www.greenseal.org/**

"Six months ago there was only one company that was certified, but more have now come on board," says David Fowler of UMaine's Department of Facilities Management. New products include carpet and floor cleaners, window washing liquid and other supplies. The department maintains over 80 academic and research buildings with an estimated 2.2 million square feet of surface area. The green cleaning products will be used in UMaine's dormitories and dining halls, as well.

New dispensing systems will also be installed with the aim of efficiency and reducing waste. Custodians will be able to refill cleaning product containers with concentrates and water. The new products will cost about the same as what the university has used in the past, says Director of Facilities Management Anita Wihry, but efficiency improvements are expected to result in overall cost savings. UMaine spends about $190,000 annually on paper and cleaning supplies for academic and research facilities.

■ *Suppliers in Maine*

You can purchase non-toxic cleaning supplies from many sources, including your regular purchasing agents, but contact the manufacturers directly to identify suppliers in your area. Two other sources where these products are immediately available include:

The Green Store at **www.GreenStore.com** or:
71 Main St., Belfast, ME 04915 207-338-4045
77 Main St, Damariscotta, ME 04543 207-563-2662
4 Pleasant St., Brunswick, ME 04011 207-729-4050

■ *References & Resources*

Center for a New American Dream: Offers a program to help institutional purchasers with "greening" their procurement strategies. The website provides information on why non-toxic cleaners are better for people and the environment, as well as product recommendations.
www.newdream.org/clean

Massachusetts' Environmentally Preferable Purchasing Program: Lots of background information on products and practices.
www.mass.gov/epp/enviro.htm

Non-toxic Paints

Paints coat walls inside and outside of our homes and businesses. Unfortunately, paints are one cause of indoor air pollution because they emit volatile organic compounds (VOCs) that contribute to ground level ozone. When these VOCs off-gas, they may also cause health problems like nausea, dizziness, irritation of the eyes and respiratory tract, and more serious illnesses including heart, lung or kidney damage and even cancer. Additionally, the improper disposal of paint – dumping it down a drain – can lead to pollution of local water sources.

■ *Products/Actions*

Choose paints with no or low VOC levels. Some manufacturers will publish the VOC levels on the containers, but it is not required by law. If the label does not contain VOC levels, you can contact the manufacturer directly for the information.

Green Seal, an independent, nonprofit group that evaluates and certifies environmentally-friendly products, publishes a list of preferred paint manufacturers. You can find Green Seal certified paints at **www.greenseal.org/certproducts.htm#paints**. You can access a Green Seal report that recommends environmentally friendly paints and how to go about buying them at **www.doi.gov/oepc/reports/cgr_paints.pdf**

■ *Return on Investment*

Environmentally-friendly paints can cost the same as regular paints and will reduce indoor air emissions. A project by the Aberdeen Proving Ground found that they saved money on both paints and on costs associated with indoor air quality. See report link to the right.

■ *Suppliers in Maine*

You can ask about environmentally-friendly paints wherever you purchase paints. Be sure to ask paint dealers if they stock or can purchase from the manufacturers listed by the sources described above.

A few sources for low VOC paints are the three Green Stores, in Belfast, Brunswick and Damariscotta. Check them out online at **www.GreenStore.com**

ICI Dulux Paints/Devoe Coatings, 973 Congress St., Portland, ME 04102; 207-772-6236. Ask about their 0-VOC products called Lifemaster Series.

■ *References & Resources*

EPA: Painting the Town Green: Aberdeen Proving Ground's Paint Pilot Project.
www.epa.gov/opptintr/epp/pubs/paint.pdf

Non-toxic Carpets

Carpets contribute to environmental degradation at three points: during production, when they are installed, and when they are discarded. According to a 1999 Green Seal report, carpets use on average 10.1 gallons of water per square yard in production, release significant levels of VOCs during production, and contribute over 2 million tons of materials to landfills.

Most carpets consist of synthetic materials that are made with petrochemicals, a non-renewable resource. Moreover, the production process uses a large amount of energy and water and contributes to air pollution. When they are installed, they contribute to indoor air pollution mostly through the adhesives used in the installation process. When they are discarded, they take up space in landfills when they could be recycled or reused. There are, however, a number of products on the market now aimed at limiting use of toxins, increasing recycled content and recyclability. In fact, some carpet companies are creating markets for the waste carpet when it has reached the end of its useful life. They will come pick up the carpet so they can harvest the fibers and melt down the backing for reuse.

■ *Products/Actions*

While it is impossible to purchase a carpet that does not come with environmental impacts, you can mitigate them through your purchasing and recycling policies.

While more expensive than synthetic carpets, some manufacturers produce wool carpets. Others produce carpets from recycled materials. Since over 2 million tons of carpets are put into landfills each year, reusing and recycling your carpets will divert carpets from landfills and create new markets for recycled products.

Some carpet manufacturers refurbish the carpets. Others will allow you to purchase the carpets on a lease agreement. Be sure to ask the manufacturer if they refurbish, reuse or recycle the carpets.

Green Seal, an independent, nonprofit group that evaluates and certifies environmentally-friendly products, produces a guide to carpets that has a list of preferred manufacturers. Access the guide at **www.greenseal.org/recommendations/CGR_carpet.pdf**

Administered by the Carpet and Rug Institute (CRI), the "green label" Indoor Air Quality Carpet Testing Program assures consumers that the carpet product has been tested and meets the criteria for low emissions. The current criteria for the CRI green label are based on maximum allowable emission factors for finished carpet, adhesives and cushion. For a list of manufacturers that meet the criteria, visit **www.carpet-rug.org/drill_down_2.cfm?page=8&sub=11&listid=2**

Interface Flooring Systems (sister company to Interface Fabrics of Guilford, ME and part of sustainability pioneer Interface Corporation) offers many different lines of carpet that use recycled and more environmentally beneficial materials and manufacturing methods. In particular, note their "CoolCarpet" offerings, which enable carpet purchases to be "climate neutral" for 100% of associated energy and emissions impacts.

■ *Return on Investment*

Prices ranged from $12-27 per yard among a handful of environmentally-friendly carpet products from Interface, Shaws, C&A Powerbond and Milliken Earth Square.

■ *Suppliers in Maine*

You can purchase environmentally-friendly carpets at most carpet stores. Be sure to ask carpet dealers if they stock or purchase from the manufacturers listed in the Green Seal recommendations.

Interface Flooring Systems provides samples and ordering service to Maine customers through Boston-based sales reps.
www.interfaceflooring.com

■ *References & Resources*

Carpet and Rug Institute: Carpet industry group that certifies carpets, adhesives and vacuum cleaners.
www.carpet-rug.org

Carpet Recovery America Effort (CARE): Industry initiative to recycle and reuse carpets and materials.
www.carpetrecovery.org

Ventilation

Proper ventilation helps minimize the health impact of poor indoor air quality. By increasing the amount of outside air that enters a building, you can reduce the concentration of pollutants in the air.

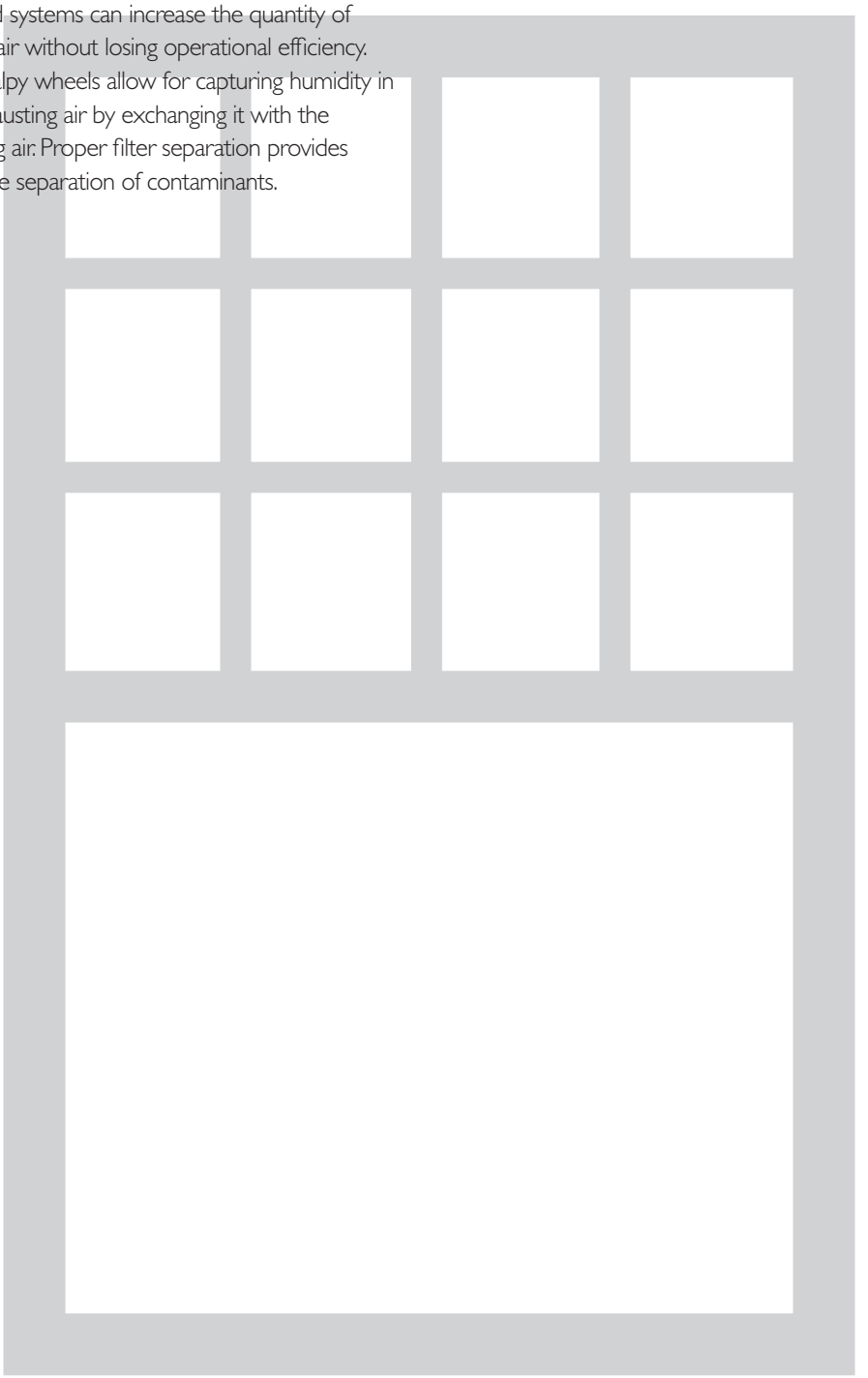
■ *Products/Actions*

Opening windows and purchasing a HVAC system with an outdoor air exchange are simple ways to ensure that your indoor environment is safe and healthy. Also, try to maintain a low relative humidity to stop molds and bacteria from growing. Properly designed systems can increase the quantity of outside air without losing operational efficiency.

Enthalpy wheels allow for capturing humidity in the exhausting air by exchanging it with the incoming air. Proper filter separation provides complete separation of contaminants.

■ *References & Resources*

Green Seal report on air conditioners that meet standards for healthy ventilation.
www.greenseal.org/recommendations/CGR=RoomAC.pdf



Material Use and Waste

Materials and waste are a fact of business. Conscious and creative efforts on the part of you and your employees can divert waste from landfills toward productive reuse and recycling of materials and affect your bottom line directly. Moreover, pollution prevention at the business and consumer levels can contribute to a healthier environment for all. Many products make environmental claims, offering business consumers an opportunity to support sustainable practices across industries. Implementing recycling programs, as well as establishing environmentally-friendly purchasing practices that stress the importance of recycled products, help to close the loop on material use and build markets for these products.

■ *General Resources & References*

Maine State Planning Office's Waste Management and Recycling Program.
www.state.me.us/spo/recycle

EPA Guide to Reuse in New England.
www.epa.gov/NE/assistance/reuse/index.html

EPA WasteWise: A free and voluntary program that offers information, technical assistance and recognition for organizations that reduce waste.
www.epa.gov/wastewise

Small Business Environmental Assistance Program. One-stop shopping for environmental compliance and pollution prevention for Maine small businesses.
http://www.maine.gov/dep/oia/sbta/

■ *Products in this Section*

- Recycled office paper
- Certified and recycled products

■ *Practices in this Section*

- Solid waste reduction, recycling and material use efficiency
- Hazardous waste reduction and disposal

Recycled Office Paper

If your business has an office environment, you're probably using a lot of paper. The average office worker uses 10,000 sheets of copy paper per year. Even in small and home offices, paper products contribute a significant amount of solid waste. With modern technologies and minor changes in business practices, you can reduce, reuse and recycle a large amount of the paper you use while lessening the space needed in landfills and the carbon released by incinerators. For each sheet of paper used, a company incurs not only purchasing costs but storage, printing, copying and disposal. A study estimated that associated paper costs could be as much as 31 times purchasing costs.

■ *Products/Actions*

Purchasing post-consumer recycled paper goes a long way toward reducing the need for the harvesting of virgin timberlands. Businesses can also decrease weight and brightness of paper as a way of reducing total material use and bleaching.

Office paper reduction and reuse begins with how you use paper. You can save paper and postage by printing on both sides of the page. A simple way to do this is to set your printer default to double-sided printing. Using an electronic filing system can save you significant amounts of money in paper and in printing.

The Maine State Planning Office offers businesses free waste assessments and audits as well as a searchable database of recycling companies. Download their PDF document covering 9 Steps to Office Paper Recycling at **http://www.state.me.us/spo/recycle/docs/office.pdf** The Natural Resources Council of Maine provides a list of Brands for Chlorine Free Paper products on their website. **http://www.maineenvironment.org/chlorinefreepaper.asp**

■ *Example*

If a company that uses 133 cases of paper a year shifted to 100% recycled content, it would generate the following savings:

- 61 trees
- 176 pounds of waterborne waste
- 25,978 gallons of wastewater
- 3,756 pounds of solid waste
- 5,386 pounds of atmospheric emissions
- 35,200,000 BTUs of energy

■ *Return on Investment*

Recycled and post-consumer content paper is competitively priced – it costs little more than virgin paper.

■ *Suppliers in Maine*

Recycled paper is available wherever office paper is sold.

■ *References & Resources*

ReThink Paper: Provides tips for reducing paper usage, database of recycled paper producers, and information on the changing market for recycled paper. **www.rethinkpaper.org**

Lawrence Berkeley National Laboratory: Provides tips and strategies to help you reduce your paper consumptions. **eetd.lbl.gov/Paper**

Recycled Products Cooperative: Group purchasing that lowers the cost of recycled paper! **www.recycledproducts.org**

How to become a paperless office: **www.moea.state.mn.us/campaign/paper/index.html**

Certified and Recycled Products

Certified and recycled products make a claim as to their sustainability or recycled content. In most cases, consumers can tell if a product is certified or made with recycled content by an eco-label that appears on the product label. An example of a certified product is wood that is harvested from forests where land owners practice sustainable management outlined by one of several certification bodies, like the Forest Stewardship Council.

■ *Products/Actions*

While there are many types of certification processes, some with environmental criteria include Green Seal (**www.greenseal.org**) for general consumer products, Greenguard (**www.greenguard.org**) for building and construction products, and NSF International (**www.nsf.org**) and Scientific Certification Systems (**www.scscertified.com**) for general industrial and consumer products.

Recycled products come in all shapes and sizes and cross all industries and uses. When evaluating recycled products, you should ask about the level of post-consumer content. Recycled products can contain a limited amount of recycled materials that are post-production but pre-consumer.

The Pennsylvania Department of Environmental Protection maintains an online database of recycled products at **www.dep.state.pa.us/wm_apps/recycledproducts**. The Recycling Association of Minnesota published a Recycled Products Guide available at **www.recycleminnesota.org/images/Recycled Products - Business Directory.pdf**

■ *Return on Investment*

Most certified and recycled products are comparable in cost to conventional products. The payback is on waste reduction and pollution prevention.

■ *Examples*

CEI provided financing for Shape Global Technologies, which offers customized packaging solutions, injection molding and pad printing. Not only did the loan help to retain jobs, but several products Shape produces are made from recycled materials, including plastic regrind and Styrofoam. This helps reduce the amount of virgin plastic required in their production processes.

Millrock, a designer, manufacturer and installer of custom commercial interior environments, fixtures and point of service displays, is bringing the use of "green" materials to their product manufacturing. The company is slowly replacing the use of particle board and its formaldehyde adhesives with straw board, a by-product of wheat. They also test other "green" materials with the eventual goal of displacing particle board in their manufacturing altogether. Millrock has also found a replacement for Corian countertops, and is now substituting a composite soybean product compressed with post-consumer recycled newsprint. It has a look and feel very similar to the replaced Corian product. Some of their clients had never thought of using renewable materials and are now realizing what it is like to be socially responsible. Millrock is gaining a reputation within its industry for its socially responsible environmental practices. The initial R&D and start-up expense in experimenting with new products has nicked the bottom line. Management, however, is confident that the resulting goodwill in the field and among clients will offset the initial cost of change and development.

■ *Suppliers in Maine*

Purchase certified and recycled products through your normal procurement channels. If you cannot find what you need, identify the manufacturers through the resources above and contact them directly.

■ *Resources & References*

GreenSpec: Database and directory of green building materials. Fee charged for use.
www.buildinggreen.com/menus/index.cfm

The Product Stewardship Institute: Advocacy organization that works to reduce the health and environmental impacts of consumer products.
www.productstewardship.us

Solid Waste Reduction, Recycling and Material Use Efficiency

Reducing the amount of waste your business produces, implementing recycling programs, using materials efficiently and incorporating pollution prevention strategies helps to divert waste from landfills that are filling up fast. Your business has a number of inputs that result in an output. Ultimately, reducing and minimizing waste will save you money in the long run and contribute to environmental health.

A report by the State Planning Office revealed that Maine's recycling rate fell from 37.3% in 2001 to 35.5% in 2003. The state's highest recycling rate was over 40% in 1995. This decline is in spite of the state legislature's mandate for the state to recycle 50% of its waste by 2003.

■ *Products/Actions*

The Maine DEP encourages sustainable development and "smart" production through its POLLUTION PREVENTION and STEP-UP program. Under the pollution prevention program, it assists businesses to define alternative practices. It offers recognition and incentives to businesses that implement sustainable practices. Reusable packaging that customers return is one way to save money as well as divert materials from landfills. A description of each of the programs and case studies appears at **http://www.maine.gov/dep/p2.htm**

The Maine State Planning Office recommends that businesses follow these steps to implement a recycling program.

- Perform a waste audit to discover what you are throwing away and determine what can be recycled. Most things can be recycled and you'd be surprised who might be interested in recycling your waste. Contact the office for sample audit forms and other information.
- Find a market for your materials. The office has a Waste Management Services Directory at **portalx.bisoex.state.me.us/pls/spo_wm/spwmdev.directory.main_page**.
- Educate your employees to make sure they are recycling properly. Some items may need to be cleaned or prepared in a certain way.
- Evaluate your program to track costs and savings.

■ *Return on Investment*

It will take a little bit of time and energy upfront to reduce and recycle the waste that your business produces, but in the long run you can save money on waste removal costs. Additionally, it will take a concerted effort by you and your employees to ensure that any new system is fully implemented and adhered to by everyone.

■ *Examples*

A CEI Ventures investment, SmartPak Equine, direct-markets custom unit-dose packaging of equine supplements and pharmaceuticals with an automatic replenishment system, along with a variety of barn-related supplies. With a strong corporate commitment to the environment, SmartPak follows the credo of "reduce, reuse and recycle". They have minimized their waste as well as costs through packaging innovations. They also purchase recycled materials where possible.

For ten years Wild Oats Bakery in Brunswick has been holistically committed to recycling. In practice, this means collecting traditionally recycled materials such as plastic, metal, newspaper and glass and bringing them to the town's recycling facility. But it also means finding ways to reuse and recycle by-products that are not traditionally recycled. For example, Wild Oats saves egg flat packaging and donates them to egg farmers and a local potter who uses them for packing material. They also reuse food packaging boxes (such as cream cheese containers) as take-out containers. Food scraps are donated to pig farmers and local gardeners for composting. Finding outlets for the specific waste items is an ongoing challenge. However, employees enjoy researching recycling options, such as calling farmers and local gardening projects. The restaurant has reduced waste and identified creative ways to reuse packaging and other by-products.

■ *Resources & References*

Maine State Planning Office: Recycling resources for businesses.
www.state.me.us/spo/recycle/bizrecycling

EPA Small Business Guide to Reducing Waste.
www.epa.gov/p2/assist/sbg.htm

Maine Housing and Building Materials Exchange: Nonprofit organization that offers tax-deductible donations for building materials that are offered at low prices to low-income families.
www.mainebme.org

Maine Materials Exchange: Nonprofit organization that focuses on industrial and commercial reuse and recycling of surplus assets, by-products and wastes.
www.m2x.com

Hazardous Waste Reduction and Disposal

Pollution prevention is the use of processes, practices or products that reduce or eliminate the generation of pollutants and wastes or that protect natural resources through conservation or more efficient use. Rather than treat waste streams after they are generated, pollution prevention focuses on the processes that generate pollution and works toward reducing or eliminating pollution at the source.

If you manage automotive or boat fleets, you know the importance of maintaining those fleets. By recycling motor oil, oil filters and antifreeze, rather than disposing of them in the trash, ground or sewers, you avoid polluting ground water and streams, as well as conserve precious natural resources. Motor oil and antifreeze are toxic to humans and animals. Re-refined motor oil and recycled antifreeze are the same quality as virgin motor oil and antifreeze, so purchasing them shows your commitment to conservation and recycling.

Motor oil and antifreeze are just two products that require proper disposal. One aspect of "smart" production mentioned above is the goal of reducing the use of toxic or hazardous materials and the generation of pollutants.

■ *Products/Actions*

To find out where to recycle motor oil, you can contact the Maine's Waste Management and Recycling Program. **www.state.me.us/spo/recycle** Also, a list of recycling services is at **www.earth911.org/master.asp?s=ls&serviceid=1**

For businesses like automobile repair shops that use a lot of antifreeze, establishing an antifreeze recycling program can significantly reduce management costs and decrease the amount of new materials purchased. Using new technology, these businesses are recycling antifreeze on-site and reconditioning it with additives at a cost that is significantly lower than the cost of purchasing new antifreeze.

■ *Return on Investment*

Re-refined motor oil and recycled antifreeze cost the same as virgin motor oil and antifreeze. If you recycle, you can save costs on purchasing new materials.

■ *Example*

By implementing a recycling system and an air filtration system, Alan Auto managed to reduce its waste stream by 95%, which included hazardous wastes, and improve the air quality in its automotive service shop. Prior to implementation of these environmental practices, Alan Auto was throwing everything away. When the owners made the decision to become more environmentally-friendly, they made substantial gains in reducing their waste and enjoyed savings that amounted to over $2,000 per year.

■ *Resources & References*

Maine Oil Recycling Directory: Directory of businesses that recycle motor oil.
www.maine.gov/dep/rwm/hazardouswaste/pdf/morp.pdf

American Petroleum Institute: Industry group that promotes motor oil recycling and proper disposal.
www.recycleoil.org

EPA: Information on motor oil.
www.epa.gov/epaoswer/non-hw/muncpl/oil.htm

EPA: Information on antifreeze.
www.epa.gov/epaoswer/non-hw/muncpl/antifree.htm

Fact Sheet on Antifreeze Recycling.
www.epa.gov/region09/cross_pr/p2/autofleet/antifreeze.pdf

Business Location

In the past 20 years, concerns over sprawl have grown because land development and consumption have occurred at a rate that outpaces population growth. Suburbanization further and further from town centers requires more roads and other infrastructure that increase costs communities pay to add households. Moreover, suburbanization has left many central city and town populations in decline, with vacant land and aging structures.

There is a growing movement to revitalize town centers through infill development – the redevelopment of vacant land or structures within an existing municipal infrastructure. Infill development is often called smart growth, service center development, sustainable development, transit-oriented development or creating livable communities.

■ *General References & Resources*

GrowSmart Maine is working to engage Maine people in protecting our quality of life and shaping a more prosperous and sustainable future. They organize meetings and discussions around the state to help inform people about what they can do in their communities to manage growth and change.

Smart Growth America: National citizens' advocacy group for smart growth.
www.smartgrowthamerica.org

EPA's Smart Growth website: Information and resources on smart growth.
www.epa.gov/smartgrowth

Smart Growth Network: Information and resources on smart growth.
www.smartgrowth.org

■ *Practices in this Section*

- Service center and infill development

Service Center and Infill Development

Maine's towns and open spaces are part of the state's appeal to both locals and visitors. However, both towns and open spaces, including forest and agricultural land, are endangered species, threatening the quality of life for those that live here and the quality of the experience for those that visit. Under current zoning and land use laws in many Maine towns, the charming mix of stores and homes is illegal. Housing, jobs and shopping are no longer within walking distance from each other – it is practically essential to have a car.

Sprawling development saps town centers of their vitality and paves over valuable open space with asphalt. The collateral damage to our environment – our air, our soil, and our water bodies – is incalculable. Moreover, those who cannot drive – the young, the old and the poor – and live in far-flung suburban communities cannot gain access to those things that we all take for granted.

■ *Products/Actions*

According to Smart Growth America, a national coalition of organizations focused on infill development and livable communities, communities should focus on the following to achieve the desired outcomes of compact development, land conservation, stronger tax bases and less traffic congestion.

1. Mixed Land Uses. New, clustered development works best if it includes a mix of stores, jobs and homes. Single-use districts make life less convenient and require more driving.
2. Take Advantage of Existing Community Assets. From local parks to neighborhood schools to transit systems, public investments should focus on getting the most out of what we've already built.
3. Create a Range of Housing Opportunities and Choices. Not everyone wants the same thing. Communities should offer a range of options: houses, condominiums, affordable homes for low-income families, and "granny flats" for empty nesters.
4. Foster "Walkable," Close-Knit Neighborhoods. These places offer not just the opportunity to walk – sidewalks are a necessity – but something to walk to, whether it's the corner store, the transit stop or a school. A compact, walkable neighborhood contributes to people's sense of community because neighbors get to know each other, not just each other's cars.
5. Promote Distinctive, Attractive Communities with a Strong Sense of Place, Including the Rehabilitation and Use of Historic Buildings. In every community, there are things that make each place special, from train stations to local businesses. These should be protected and celebrated.
6. Preserve Open Space, Farmland, Natural Beauty, and Critical Environmental Areas. People want to stay connected to nature and are willing to take action to protect farms, waterways, ecosystems and wildlife.
7. Strengthen and Encourage Growth in Existing Communities. Before we plow up more forests and farms, we should look for opportunities to grow in already built-up areas.
8. Provide a Variety of Transportation Choices. People can't get out of their cars unless we provide them with another way to get where they're going. More communities need safe and reliable public transportation, sidewalks and bike paths.
9. Make Development Decisions Predictable, Fair, and Cost-Effective. Builders wishing to implement smart growth should face no more obstacles than those contributing to sprawl. In fact, communities may choose to provide incentives for smarter development.
10. Encourage Citizen and Stakeholder Participation in Development Decisions. Plans developed without strong citizen involvement don't have staying power. When people feel left out of important decisions, they won't be there to help out when tough choices have to be made.

(**From www.smartgrowthamerica.com/sghowto.html**)

■ *Return on Investment*

Often it is easier and less costly to build a new building on former agricultural land than it is to renovate a building in town centers. Some older sites, especially former industrial and manufacturing sites, may require environmental remediation that can increase costs substantially. However, the costs to individual businesses are not nearly as high as the costs to taxpayers through increased infrastructure expenditures (sewer, roads, etc.), the costs to the environment and the intangible costs to Maine's quality of life.

■ *Example*

Cadillac Mountain Sports is aware of the negative impacts to community, the economy and the environment that result from sprawl. The company

has adopted a corporate policy that all Cadillac Mountain Sports stores – both primary and franchise stores – must be located within a half mile of a town's center, which is determined by the crossroads of the two major streets in town. This ensures that the stores will be located on existing town sewer and water lines.

The company has found that it needs to be a little more creative in retrofitting existing buildings but believes that future renovations will be easier. Locating stores closer to the town center helps to create a community and Maine-based identity. It also distinguishes Cadillac Mountain Sports from national chain stores, which they believe gives them a market edge.

■ *Resources & References*

Founded in 2002, Grow Smart Maine is a statewide organization that advocates for and provides information on smart growth in Maine.
www.growsmartmaine.org

Friends of Midcoast Maine focuses on sensible growth in the midst of unplanned growth that has occurred from Brunswick to Bucksport.
www.friendsmidcoast.org

The Maine State Planning Office has a list of reports and other resources for smart growth and sprawl at **www.state.me.us/spo/landuse/resources/sprawl.php**.

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