



New England:

Cleaner Environment through
Energy Efficiency & Clean Energy



Introduction

Residents of New England will enjoy a healthier, safer environment when the region uses less energy and cleaner energy. Across these six northeastern states, businesses, towns and cities, nonprofit groups and schools are reducing their energy use and the threat of climate change, and improving our air and water quality.

Here at EPA New England, we have made energy a priority, supporting programs that cut energy use and reduce its impact on our environment. EPA New England has formed an Energy Team whose members focus on energy's impact on air quality and public health. The team guides energy-related policies and programs meant to encourage energy efficiency and renewable power. Conservation efforts complement cleaner energy sources to help New England meet the energy demands of a productive region while also maintaining a healthy environment.

Appliances, buildings and motor vehicles that use less energy cut our energy needs without changing the quality of our lives. Renewable energy, such as wind power, and decentralized sources of energy, such as fuel cells, help reduce our reliance on foreign supplies. In this brochure, we recognize the challenges New England faces and the accomplishments of organizations and businesses dedicated to cutting energy use in this region.



Energy Efficiency in Government

In Somerville, MA, the Michael E. Capuano School uses 43 percent less electricity and 24 percent less natural gas than typical school buildings due to energy efficiency measures. These measures reduce energy costs to the city by \$60,000 each year.



*The Capuano School,
Somerville, MA*

The City of Rochester, NH, one of New Hampshire's first participants in EPA New England's Community Energy Challenge, has become a model for energy efficiency in municipal operations. Rochester began a multi-phase, \$12 million project with Honeywell Energy Services in the mid-1990s to reduce energy consumption in municipal operations. The city saved \$4 million and was partially funded by \$7 million in state and utility aid. In addition, Rochester, with a contribution from Waste Management of New England, bought two hybrid vehicles for its Code Enforcement office. The city continues to expand its energy initiatives through the Rochester Energy and Sustainability Committee.

The Bath Water District in Bath, ME, saves more than \$30,000 a year thanks to new variable frequency drives on two pumps. The drives adjust the speed of the pumps according to the volume of water they need to pump to meet demand. Before the upgrade, the pumps operated only at their maximum speed when in use. The \$60,000 project was subsidized by a \$15,000 incentive from Efficiency Maine, giving it a payback of 18 months. The facility saves about 376,000 kilowatt-hours annually since the upgrades in 2003, which is equivalent to the amount of energy used by 35 homes in a year. The project also has a tangible environmental impact: The energy savings translate into a reduction of more than 208 tons of carbon dioxide per year.

The Saco, ME, wastewater treatment facility slashed its energy costs through a systematic approach to energy management. The utility incorporates an ethic of energy efficiency into all facets of its operations. The payoff is one of the highest possible rankings on the ENERGY STAR® Portfolio Manager benchmarking tool and some of the lowest energy costs for a utility its size in the nation. As projects are completed, new projects start. Upgrades are done when old equipment wears

Government



Cities and towns across New England have found they can save money at the same time that they respond to increased citizen interest in less polluting energy sources. Communities as big as Boston and as small as Poultney, VT are saving millions of dollars each year with new energy efficiency programs and by using cleaner, renewable energy sources. Among the highlights:

out or plant personnel notice a spike in energy costs. For example, when ceramic diffusers on the plant's aeration system were clogging frequently, the plant saw higher energy bills and switched to different membrane diffusers. The utility is now looking to add renewable energy to its portfolio. A solar thermal heating array and a 1.8-kilowatt windmill are in operation, and future upgrades may include a larger 50-kilowatt windmill and a project to reuse waste heat from the plant's effluent wastewater.

New Hampshire's Department of Justice building uses 37 percent less energy than average for a building its size, preventing annual greenhouse gas emissions equal to 200 vehicles while saving more than \$24,000 a year. Built in 1955, this state building is one of 74 buildings in New Hampshire that received extensive upgrades as part of the state's Building Energy Conservation Initiative. Together these upgrades save New Hampshire taxpayers more than \$1.1 million in annual energy bills.

The Maine Public Utilities Commission Building in Augusta was the first office building in Maine to earn the ENERGY STAR® label. It uses 35 percent less energy than average for a building its size. Built in 1942, the PUC building received several upgrades, including efficient lighting and a solar hot air wall-mounted panel system. New operating practices reduced energy use further while improving indoor air quality and ventilation.

The Conn. Department of Environmental Protection building in Hartford earned an ENERGY STAR® label after scoring 90 out of 100 on ENERGY STAR®'s national energy performance rating system. Built in 1930 and renovated in 1995, it proves that older buildings can be energy efficient. The DEP building uses one third less energy than average for a building that size—saving taxpayers more than \$400,000 each year. It is one of more than 20 buildings upgraded by the State Building Energy Conservation Program that together save taxpayers millions of dollars.

Medford City Hall was the first city or town hall building in Massachusetts to earn the ENERGY STAR® label. Completed in 1937, Medford City Hall has new lighting and controls, solar panels for electricity, more efficient heating, and water conserving plumbing fixtures. Medford City Hall uses 28 percent less energy than average for a building its size.

In 2007, Town Hall buildings in **Littleton, MA** and **Glastonbury, CT** also earned ENERGY STAR® labels.

Manchester, VT, replaced more than 40,000 incandescent light bulbs with energy efficient compact fluorescent bulbs (CFLs) that use 75% less energy. The town completed this in less than six months. Over the lifetime of the bulbs, the project will save \$1.7 million and 13,184 megawatt-hours of energy, enough to power nearly 1,600 Vermont households for a year. It will also prevent 7,772 tons of carbon dioxide emissions - the equivalent of taking 1,345 vehicles off the road.

New England Community Energy Challenge

The average New England town of 25,000 spends about \$1 million on energy per year. Given that typical buildings waste as much as 30% of the energy consumed, there is a significant opportunity for savings when cities and towns take control of energy use in local schools, municipal buildings, and wastewater treatment facilities.

Right now, municipalities across New England are taking action to reduce energy waste, limit greenhouse gas emissions and save money with EPA New England's Community Energy Challenge. Through this program,

town managers and mayors commit to assessing energy use in buildings, schools and/or wastewater treatment facilities—using ENERGY STAR® tools to analyze building energy performance, pledging to reduce energy use by 10 percent or more, and promoting energy efficiency and renewable energy among residents, local businesses and nonprofit organizations.

In return for this commitment, EPA provides free training and technical assistance, and offers national and regional recognition through its awards programs.

Northeast Diesel Collaborative

Emissions from diesel engines are a primary source of air pollution in New England and can aggravate respiratory problems. Two counties in Connecticut fail to meet air quality standards for fine particles, and cities across New England narrowly meet the standard. The northeastern states have some of the highest asthma rates in the nation, including a childhood asthma rate above 10 percent in each New England state. Although EPA has taken steps to ensure that diesel engines in the future are cleaner than those operating today, older models of these engines that are still being used could pose health and environmental risks for decades. EPA New England, aware of the value of working together to combat emissions, has joined with EPA Region 2, the Northeast States for Coordinated Air Use Management (NESCAUM) and the governments of the eight northeastern states to establish the Northeast Diesel Collaborative (NEDC). The NEDC combines the expertise of public and private partners in a coordinated regional initiative to significantly reduce diesel emissions from existing fleets in five key sectors: municipal, transit, freight, construction, and ports. Recent achievements by NEDC and its partners include:

- As part of a landmark \$22.5 million agreement between the environmental protection and transportation agencies in Massachusetts, regional transit and school buses statewide will be equipped with advanced pollution controls.
- Four states have new laws requiring emissions controls on public fleets, including school buses (CT, NJ, RI), garbage trucks (NJ), all state-owned or contracted vehicles (NY), and municipal vehicles (NJ).
- NESCAUM, on behalf of NEDC, is retrofitting 500 to 600 utility company vehicles throughout the eight-state region.

The NEDC is joining other organizations in New England to help local efforts to reduce diesel emissions. One such initiative, Greater Boston Breathes Better (GB3), is working to reduce air pollution from transportation and construction sources in and around Boston. GB3 provides a range of options to companies, institutions, and municipalities that want to reduce air pollution and air toxics from mobile sources. Harvard University, for instance, has developed contract language requiring retrofits, cleaner fuels, and an anti-idling policy to be implemented on all construction projects. Both the city of Boston and the city of Somerville are using a biodiesel blend in all their diesel-powered vehicles.

The Somersworth, NH, Housing Authority saves more than \$45,000 a year on energy bills, thanks to energy saving lighting and other energy improvements at its 169 housing units. The energy upgrades were done through a performance contract with an energy services company that guaranteed the town \$540,000 in savings over 12 years.



Clean Transportation in Government

The Town of Natick, MA, worked with General Growth, the contractor involved in the expansion of the Natick Mall that began in 2005, to require the use of advanced pollution control technology and low sulfur diesel fuel (ahead of the requirement) and to enforce state idling regulations for construction vehicles involved in the project.

The City of Boston, MA, has shown its continuing commitment to sustainable transportation through the CleanAir CABS program launched in April 2007. Through this program, city taxi owners will be able to replace traditional gasoline taxis with cleaner vehicle technology, including electric, hybrid-electric, compressed natural gas and other low emission alternative fuel vehicles.



Clean Energy in Government

In Hull, MA, a second wind turbine was built on the site of the town's old landfill, saving the town's ratepayers \$400,000 a year on their electric bills. The first wind turbine has already cut the town's electric bill by about \$140,000 annually.

Charlemont, MA, has a municipal wastewater treatment plant with a 15-kilowatt photovoltaic solar array that has reduced energy costs by 54 percent since the panels went on line in mid-2005. The project, which includes 96 solar panels mounted on eight poles connected to three inverters, performs above its design capacity and provides more than half of the plant's electric needs. The plant's average energy use in the month of June from 2001



to 2004 was 2482 kilowatt-hours. Since 2005, the average June energy use has dropped 62 percent to 950 kilowatt-hours. A grant of the Massachusetts Renewable Energy Trust offset half of the \$142,000 project cost. In addition to the financial savings, the panels reduced the facility's carbon dioxide footprint by nearly 17 tons in the first two years of operation.

Massachusetts Maritime Academy in Bourne, MA, and the **International Brotherhood of Electrical Workers Union in Dorchester, MA**, built on-site wind turbines to provide electricity to their facilities.

In New Haven, CT, a 200-kilowatt fuel cell at the city's wastewater treatment plant saves the city nearly \$700,000 a year in electric bills, while also supplying the heat to run an expanded fats/oil/grease processing facility. This expanded facility also pays the city \$200,000 in usage fees each year. Fuel cells produce heat and electricity by combining hydrogen and water in an emission-free electrochemical process.

Burlington Electric Department in Burlington, VT, signed a 20-year contract to buy electricity from a proposed 9-megawatt wind farm on Little Equinox Mountain in Manchester. The wind project, slated to provide 7 percent of the city's electricity, is a major boost to the city's goal of reducing greenhouse gas emissions by 10 percent by 2010.

Essex Junction, VT, installed a high efficiency microturbine to provide heat and electricity to its wastewater treatment plant. This system will provide about 40 percent of the plant's electricity needs, saving the city approximately \$30,000 per year in electricity costs. The turbine runs on natural gas, but in this case, the fuel is a renewable by-product of the wastewater treatment process. This system will cut the plant's greenhouse gas emissions by more than 250 tons a year, which is the equivalent of taking 42 cars off the road.

In late 2006, **Brockton, MA** opened one of the largest solar electricity facilities in New England. This 425-kilowatt facility sits on a 3.7-acre brownfield site formerly owned by Bay State Gas Corporation. This facility will help the city avoid emissions of 600,000 pounds of carbon dioxide per year.

The Whitman-Hanson Regional School reduced its environmental impact with a 51-kilowatt solar array, a well-insulated building envelope, energy-efficient mechanical systems, a reflective white roof, high-efficiency appliances and the best use of natural lighting. The 234,500 square-foot Whitman school also includes a stormwater collection system that stores rainwater in a 20,000 gallon storage tank for use in toilets and urinals. The school is part of the Green Schools Initiative founded by the Massachusetts Building Authority and the Massachusetts Technology Collaborative.

NE States Take Action on Energy

From energy efficiency to renewable power, New England states are national leaders. These six states made commitments through the New England Governors and Eastern Canadian Premiers' Climate Change Action Plan to put in place policies that are among the most aggressive in the nation. New England states together commit more than \$250 million per year to energy efficiency.

These investments—combined with aggressive efficiency standards for home appliances—are recognized as among the leading efficiency programs in the US. In addition, EPA's ENERGY STAR® program, which encourages businesses to reduce energy use, has led hundreds of building managers to use EPA software that measures energy consumption and helps managers cut demand in their buildings.

When it comes to renewable energy, New England is also showing leadership. All six New England states have enacted standards calling for increasing amounts of electricity sold in each state to be generated from renewable resources such as wind, hydro and solar power. In addition, Connecticut, Massachusetts, and Rhode Island also have programs that spend more than \$25 million a year to advance renewable energy technologies and businesses in their states.

EPA NE a National Leader on Energy Efficiency

When EPA New England's laboratory in Chelmsford, MA was constructed in 2001, it was the first laboratory in New England - and the first EPA building nationally - to be certified LEED Gold by the US Green Building Council. Over the past three years, the laboratory has complemented its energy efficient design with improved energy management practices like daily end-of-day walk-throughs to shut down non-essential equipment. Practices like this have collectively decreased energy consumption in the facility by 31%, reducing energy bills by \$207,000 in 2007 alone.

In addition, the installation of 23 fan-powered air terminals helped with heat distribution. The operation of the building changed in other energy-saving ways, including turning down heating or air for longer hours during weekends and nights; closing down equipment and processes that are not in use; manually adjusting heating, cooling and humidity controls when necessary; reducing light levels in common areas by using emergency and natural lighting in building hallways; and walking through the lab at the end of each day to close fume hoods and turn off lights. EPA hopes to achieve further energy savings at the lab by developing expanded on-site renewable resources to provide power.



Energy Efficiency in Business

Bringing Energy Efficiency to New England's Lodging Industry

EPA has partnered with trade associations, building owners, and utilities to bring the message of energy efficiency to New England's lodging industry. Nationwide, hotels spend almost \$4 billion on energy every year, and are among the most energy intensive commercial buildings. Across New England, 33 hotels have earned the ENERGY STAR® label. Of these, 28 are in Massachusetts and 5 in Connecticut.

EPA is collaborating with the lodging industry associations throughout New England to help hotel owners manage their energy efficiently. EPA staff members have presented at training sessions hosted by the NH Lodging and Restaurant Association, and worked with New Hampshire utility staff to coordinate energy efficiency incentive programs with a strategic energy management approach. In Massachusetts, EPA is working with Boston Green Tourism, to promote strategic energy management, and to recognize energy efficiency improvements at these facilities. In 2007 alone, five Boston area hotels—Doubletree Guest Suites Boston and Boston Downtown, Hyatt Harborside and Hyatt Regency in Boston; and the Royal Sonesta in Cambridge—earned EPA's ENERGY STAR® label by making significant energy improvements.

Jurys Boston Hotel significantly reduced energy consumption with cost-effective measures ranging from upgraded guest room lighting to an ozone laundry system. EPA estimates that the Jurys Boston Hotel uses 28 percent less energy than similar buildings with average energy performance, and saves more than \$217,000 in energy costs each year. Jurys Boston Hotel also avoids more than two million pounds of carbon dioxide emissions annually, the equivalent of burning 109,712 gallons of gasoline or taking 207 cars off the road.

Businesses



Businesses across New England have learned that cutting energy use is one of the easiest, most effective ways to control costs. Companies also find they can be more independent and predict costs with more accuracy by buying more of their power from clean, renewable energy sources. Among the examples across the region:

Car dealership **Planet Subaru in Hanover, MA**, improved energy efficiency by using operable windows, programmable thermostats, passive solar heat, increased insulation and a specially-designed garage door that closes rapidly to minimize loss of heated and cooled air. The owners also upgraded exterior lighting, and created outdoor lighting zones that run on timers and photo sensors. They also provide bonuses and other recognition to employees who suggest energy efficiency initiatives.

The company worked with National Grid power company to save 125,000 kilowatt-hours and more than \$22,000 each year.



John Hancock tower saves \$3.5 million in energy bills

of energy efficiency. In 2005, the Hancock Tower and two other buildings in its complex achieved EPA's ENERGY STAR® rating for their building's energy performance. Compared to similar buildings, EPA estimates the Hancock Tower uses one third less energy, saving more than \$3.5 million a year in energy bills, and avoiding more than 30 million pounds of carbon dioxide emissions annually.

Stop & Shop Supermarket Company is one of the nation's most energy efficient grocery chains. The company, considered a "top performer" among ENERGY STAR® Leaders, earned a remarkable energy performance rating of 91 (out of 100) for 552 of its Stop & Shop and Giant stores. The company's retail outlets feature cutting-edge elements like: skylights and natural lighting, high-efficiency lighting, refrigeration systems with variable-speed compressors and low-energy glass doors, occupancy sensors and reflective roofing.

The Business Council of Fairfield County, CT, and its member companies have embraced energy efficiency to save money, reduce air pollution and improve reliability of the region's antiquated and overburdened electric system. The council and EPA together developed an innovative program to improve energy efficiency in large office buildings that was adopted by the Connecticut Public Utilities Commission and put in place by Northeast Utilities and United Illuminating. In the first round of the program, participating

companies received comprehensive energy upgrades in about 8 million square feet of office space. This saved them hundreds of thousands of dollars and significantly reduced energy use. The pilot was so successful it was expanded to address other buildings in a second round.

Hannaford Bros. Co. of Maine avoids more than 52 million pounds of carbon dioxide emissions a year, the equivalent of taking more than 5,100 cars off the road, by energy efficiency changes made in 16 of its grocery stores. The store also earned national recognition for its use of the ENERGY STAR® Portfolio Manager after it improved energy efficiency by upgrading its lighting to T8 fluorescents and LEDs; maximized natural lighting; reused waste heat; and automated control of lighting, heating, refrigeration and air conditioning.

Progressive Plastics saves nearly \$18,000 a year with energy efficient hydraulic injection molding machines at its Williamstown, VT, plant. In addition to cutting electricity use by 160,000 kilowatt-hours a year, the more efficient machines reduced the company's scrap rate from 5 percent to nearly zero and eliminated the labor and environmental costs of dealing with hydraulic fluids in the old machines.



Clean Transportation in Business

IBM in Cambridge, MA, joined EPA New England's list of Best Workplaces for Commuters in 2006. To help employees reduce air pollution from their commutes, IBM offers an outstanding commuter benefits package, including a transit subsidy, emergency ride home program and a significant telecommuting program.

PlanetTran of Cambridge, MA, is the first auto service in the country to exclusively use ultra fuel-efficient hybrid vehicles.

In 2006, **Oakhurst Dairy**, an independent dairy company in Maine, transitioned 130 of its delivery trucks, or more than 90 percent of its fleet, from petroleum diesel to a B20 blend of biodiesel fuel. Oakhurst estimates the greenhouse gas emissions saved on an annual basis by switching to biodiesel to be the equivalent of avoiding the use of 137,628 gallons of gasoline each year.



Clean Energy in Business

In March 2007, New England's largest wind farm went into service in Mars Hill, ME. **Mars Hill Wind** consists of 28 wind turbines each of which is 389 feet tall from the ground to the tip of the rotor. The wind facility, when operating at full capacity, generates approximately 42 megawatts of power, enough to

power 45,000 average Maine homes. Even at 35% capacity, the project generates enough power to accommodate at least 22,000 homes.

"Cow power programs" from **Central Vermont Public Service** now use bio-gas from cow manure to produce electricity. Farms in Bridport, Richford, Sheldon and St. Albans are expected to produce between 1.2 and 3.5 million kilowatt-hours of electricity a year from more than 2,500 cows at the four farms. Blue Spruce Farm in Bridport with nearly 1,000 milking cows produces about 24 million pounds of milk a year and 1.3 million kilowatt-hours,

SmartWaySM Transport Partnership: Bringing "Green" Principles to Shipping

EPA and the freight industry are working together through the SmartWaySM Transport Partnership to both make this country more secure and reduce air pollution and greenhouse gases. The partnership challenges shipping companies, truck and rail carriers, and logistics companies to minimize the pollution caused by their operations.

By 2012, this initiative aims to eliminate 33 to 66 million metric tons of carbon dioxide emissions and up to 200,000 tons of nitrogen oxide emissions each year. At the same time, the program will reduce fuel use by up to 150 million barrels of oil a year. SmartWaySM, which has more than 650 partners, is developing new tools like innovative financing for vehicle upgrades, certified tractors and trailers with fuel- and emissions-saving features, and information and rewards for using renewable fuels.

EPA New England encourages trade associations, carriers, shippers, ports and state and local government agencies to join the effort. In June of 2007, EPA and the Massachusetts Motor Transportation Association cosponsored a Fuel Saving Equipment Showcase and seminar, giving New England truck operators a chance to hear expert advice and see efficient products. EPA also promotes related technologies and infrastructure, as well as efficient transportation mode choice.

New England companies participating in the **SmartWaySM Transport Partnership** include:

Stop & Shop Supermarket Company has improved energy efficiency in transporting through automatic engine shutdown and driver training to reduce idling; cab roof contouring and a reduced gap between cab and trailer to improve aerodynamics; and advanced lubricants and automatic tire inflation to reduce friction losses. They also use longer trailers to carry more in one trip.

Hannaford Bros. Co. of Maine's subsidiary, **Hannaford Trucking Co.**, is achieving additional emission reductions as a partner in EPA's SmartWaySM Transport Partnership. Hannaford is using a wide variety of fuel-saving technologies on its trucks, such as aerodynamics, weight reduction, auto idle shutdown, and super-single tires to reduce rolling resistance. Operational strategies include driver training and incentives to reach higher fleet-wide mpg targets, and optimizing routing and scheduling to maximize trip efficiency. Through these measures Hannaford is currently saving over 8,600 tons of carbon dioxide, 59 tons of nitrogen oxide and a ton of particulate matter per year.

In 2007, **Staples** joined EPA's SmartWaySM Transport Partnership as a shipper partner, pledging to ship more freight via fuel-efficient SmartWaySM carrier partners. In its own trucks, Staples is using biodiesel, optimizing routing and loads to reduce trips, and limiting top speeds to 60 mph—all of which reduce emissions and save fuel.



enough electricity to power more than 100 average homes. The farm recently added a second generator to boost their energy production. Montagne Farm in St. Alban's, which came on line in late 2007, has 680 milking cows that produce more than 15 million pounds of milk a year and are expected to produce 1.4 million kilowatt-hours of electricity.

The Genzyme Corporation's 12-story headquarters in Cambridge, MA uses about 40 percent less energy than a traditional building, saving the company about \$460,000 a year. The building's sustainable design also includes waterless urinals and low-flow fixtures that reduce potable water use by nearly a third, or about 500,000 gallons a year, and a vegetative roof and rainwater collection system that reduces stormwater runoff.



The Searsburg, VT Wind Farm is one of the renewable energy suppliers for the GreenUp program in MA and RI



The Schiller power plant in Portsmouth, NH, turns burning wood chips into electricity

Gregory's Supply, a building supply and hardware store in Burlington, VT, saves \$10,000 a year through energy efficient equipment and practices at its 24,300 square-foot store.

Staples incorporated environmental stewardship into their corporate plan early on. The first retail store opened in Brighton, MA, in 1986 and the main office remains based in Framingham, MA. To fuel its booming

Reducing the Energy Costs of Water

Water and sewage utilities supply us with drinking water and treat our sewage. In many New England communities, these utilities are publicly operated. By working to reduce the amount of energy these utilities use without compromising the quality of their service, we can help save the public money and protect the environment at the same time.

Energy is the largest monthly expense for many water and sewer utilities, and one of the top three expenses at almost all of them. Lowering the power bill can allow utilities to focus their tight budgets on other critical areas without raising rates. For example, the Lowell, MA; Regional Water Utility saved more than \$145,000 a year by upgrading to more efficient variable frequency drives for its pumps.

Introduced in October 2007, the EPA ENERGY STAR® tools designed specifically for wastewater treatment plants is providing facility managers across New England with a new tool to make it easier to track and improve energy performance. The environmental benefits of saving energy are equally important. Saving energy at a water utility means better air quality for everyone. Energy savings are often tied to reductions in water use, which can make life better for fish and farmers and make communities better able to withstand droughts.

business Staples has purchased nearly 122 million kilowatt-hours of green power, representing more than 20 percent of the company's purchased electricity use within the U.S. The majority of Staples' green power consists of renewable energy certificates, but they also purchase direct green power through various utility programs. Staples now has 9 active solar power systems on distribution centers and retail stores and is investigating future projects involving fuel cells and wind power. An active participant in EPA's Fortune 500 Green Power Challenge, Staples ranks as one of the largest purchasers and its Green Power initiatives have put the company on both the EPA's National Top 25 list and Top 10 Retail list of green power purchasers, serving as a great example for other businesses to follow.

Jiminy Peak Mountain Resort in Hancock, MA, installed a 1.5-megawatt wind turbine, the first wind turbine at a ski resort in North America. The turbine, named Zephyr and made by General Electric, began generating power in August 2007. Its three 123-foot blades provide about a third of the resort's total energy needs. Any excess power not used by Jiminy goes back into the grid. The Zephyr produces between 5,000 kilowatt-hours per day in the summer months and 20,000 kilowatt-hours per day in the windier winter months when operations at the ski resort are at their peak.

In 2004, **Cranmore Mountain in North Conway, NH**, became the first ski resort on the East Coast to use biodiesel fuel to power its snow grooming machines. The project is a collaboration of the NH Department of Environmental Services and the Granite State Clean Cities Coalition, a statewide partnership aimed at increasing the use of alternative fuels across New Hampshire.

Interface Fabrics Group, a commercial fabric manufacturer with facilities in Massachusetts and Maine, is buying 2.5 million kilowatt-hours of wind power a year — enough electricity to weave 1 million

yards of Interface's environmentally conscious fabric known as Terratex. The cost of the energy certificates to support the wind power is more than offset by the new business generated from good publicity and resulting good will.



Photovoltaic panels provide 25 percent of the electricity at the Doyle Conservation Center in Leominster, MA



The Mark Twain Museum Center in Hartford, CT is the first LEED-certified museum in the country

Public Service Co. of New Hampshire in 2006 converted an aging 50-megawatt coal-fired burner at its Schiller Station facility in Portsmouth, NH, into a wood-fired boiler. This new boiler emits 75 percent less nitrogen oxide, 95 percent less sulfur dioxide, and 90 percent less mercury than the coal-fired boiler it replaced. The Northern Wood Power project not only replaces 130,000 tons of coal annually, it also puts more than \$20 million dollars into the local forestry industry.

New England Confectionary's manufacturing facility in Revere, MA, is powered by a 6-megawatt combined heat and power plant. This plant operates at 68 percent efficiency compared to a national average of 33 percent for conventional generation. The plant saves the company about \$750,000 a year in utility costs while cutting emissions of carbon dioxide by 32 percent, nitrogen oxides by 39 percent and sulfur dioxide by 97 percent.



Energy Efficiency & Clean Energy at Nonprofits

Given Mark Twain's fascination with technology, it only makes sense that the new **Museum Center at the Mark Twain House in Hartford, CT**, would include cutting edge 'green' technologies. The 33,000 square-foot building that opened in 2005 uses geothermal wells as the primary heating and cooling source and various other energy-saving systems that are expected to cut energy use by nearly 30 percent.

Nonprofits



Nonprofit groups can educate and inspire New Englanders about the wide range of possibilities for creating “green” buildings with energy-saving features and renewable energy. All across the region—from parish halls in Massachusetts, to land conservation groups in New Hampshire—nonprofits are using new green building designs to showcase technologies that are available and to demonstrate their own environmental commitment.

By installing photovoltaic solar panels and a renewable wood-chip heating system, **Society for Protection of New Hampshire Forests** has cut energy bills at its Concord, NH, headquarters by 23 percent. The nonprofit group has also opened a new 11,400 square foot wing built with native green-certified lumber and a super-insulated airtight exterior shell that uses 60 percent less energy than comparably-sized buildings.

Through upgrades and other energy-saving measures, **All Saints Parish of Brookline, MA**, has reduced its utility bills by nearly \$5,000 a year, despite an increase in operating hours. All Saints Parish is a member of the Massachusetts Interfaith Power and Electric initiative, which has helped dozens of other congregations reduce energy consumption and promote renewable energy.

Roof-mounted photovoltaic panels, composting toilets and two 1,500-foot geothermal wells used for heating and cooling are just a few of the “green” attributes of The Trustees of The Reservations’ new **Doyle Conservation Center in Leominster, MA**. The 18,000 square-foot building has cut its energy bill by 61 percent, or about \$6,000 a year.

Massachusetts Audubon’s Boston Nature Center in Mattapan, MA, includes photovoltaic shingles that convert the sun’s energy into electricity and a ground-source geothermal heat pump system that takes advantage of the solar energy stored in the earth to provide efficient heating and cooling. The 10,150 square-foot building uses 30 to 35 percent less energy than other similarly sized buildings.

The Artists for Humanity Epicenter in Boston includes the largest photovoltaic system in New England’s largest city. The 49-kilowatt, 160-panel solar array supplies more than 80 percent of the building’s electricity. The project, a LEED Platinum-certified building, also includes enhanced natural light, panel fans and an unusual ventilation tower that eliminates the need for air conditioning. The LEED (Leadership in Energy and Environmental Design) Green Building Rating System® is a voluntary, consensus-based national standard for developing high performance, sustainable buildings.

The Woods Hole Research Center in Falmouth, MA, is a scientific and policy institution dedicated to solving the complex issue of climate change and to defending the earth’s great forests.

In contemplating their consolidation in a new headquarters, trustees and staff agreed that this building should reflect the Center’s core ideals, support their research and education mission, and promote the health of not only the building occupants, but the larger world as well. By giving close attention to all aspects of environmentally intelligent design, the project demonstrates how modern construction can preserve the functional integrity of the landscape. The all-electric building relies on renewable energy sources, including an on-site photovoltaic array which powers the building’s closed-loop ground-source heat pump system. Careful detailing of the envelope optimizes use of these resources—the building is very well insulated, with an extremely tight envelope. Skylights and full-height windows provide abundant daylight and access to views, while ventilation systems and operable windows supply fresh air. A temperature and humidity monitoring system, zoned ventilation in laboratory spaces, and low-VOC paints and adhesives further enhance indoor environmental quality.



Tufts Health Plan Headquarters in Watertown, MA



Wind turbine at Portsmouth Abbey School, Portsmouth, RI

Massachusetts-based Tufts Health Plan’s Watertown headquarters facility uses almost one-third less energy than an average performing building—saving hundreds of thousands of dollars in annual energy bills. A comprehensive energy management strategy helped the building earn an ENERGY STAR® label in 2006 and 2007. Key features of the energy strategy include aligning lighting and air conditioning operations closely with work schedules, lighting occupancy sensors, and computer monitor power management software.

Portsmouth Abbey School in Portsmouth, RI, built the first large wind turbine in Rhode Island. The 660-kilowatt turbine will save the school more than \$100,000 a year in electricity costs and will be used to teach students about energy as part of their science curriculum.



Clean Transportation at Nonprofits

The Boston office of the **Environmental Defense Fund**, a national environmental advocacy group, joined EPA New England's list of Best Workplaces for Commuters in 2005. EDF located its Boston office near a transit stop, encouraging employees and visitors to take public transportation. EDF offers a substantial telecommuting program, which results in more than 20 percent of employees working from an alternative location at least one day a week.

Dana Farber Cancer Institute incorporated clean diesel strategies into construction of the Yawkey Cancer Center in Boston and thus minimized the impact of the construction on its patients, staff, visitors, residents of the nearby community,

and those involved in the construction. Early in the planning process, Dana Farber Cancer Institute hired Walsh Brothers, Inc. to manage the project and together they decided to include an emissions control element in the construction, including a no-idling policy and specifications requiring the use of advanced pollution control technology.



Energy Efficiency at Colleges & Universities

Yale University's Energy Program in New Haven includes a novel energy conservation website (<http://java.facilities.yale.edu/cmp/energy.jsp>) that supports the program's effort to improve efficiency of power plants, update buildings, encourage emerging technologies and find clean energy alternatives. The site focuses on the habits and

Best Workplaces for Commuters



Employers in Boston encourage commuters to save time and money by riding the commuter rail, subway, and the bus

Best Workplace for Commuters, a national program to highlight employers who offer their employees outstanding commuter benefits that help reduce traffic congestion and improve air quality, was launched by EPA, but will now be managed by the Center for Urban Transportation Research at the University of South Florida. The center, which took over BWC in 2007, has support from the National Center for Transit Research to operate the program.

EPA has collaborated closely with the center since the inception of Best Workplaces for Commuters in 2001. The Center for Urban Transportation Research is committed to working with communities and partners around the country to strengthen and expand the program. The program recognizes employers who provide incentives that help their employees reduce air pollution, alleviate traffic congestion and save fuel. In many cases, these measures can help employers save on taxes and reduce the need for parking facilities. For more information and to join the list visit, www.bestworkplaces.org

Colleges & Universities



University campuses, where student idealism is combined with cost conscious planning, are ideal for setting the bar high on energy efficiency and clean energy. That's certainly been the case in New England, where dozens of universities and colleges are working to reduce their energy consumption and are buying renewable energy at unprecedented levels. And the impetus is coming from all levels—from ground level student activists such as Connecticut College's Renewable Energy Club to high-level administrators.

daily life of members of the campus community. Visitors can view in real time the amount of energy that has been saved since January 1, 2005 at various Yale buildings. For instance, between that date and November 2007, the school reduced its use of natural gas by 600,000 million cubic feet, cut its oil use by more than 100,000 barrels and avoided 47,035 metric tons of carbon equivalent emissions through conservation measures and new technologies. An energy scorecard encourages students to compete with each other by showing the relative energy reductions accomplished by various dormitories.

Since publishing a ground-breaking environmental report card of campus operations, the **University of Vermont's Environmental Council** has developed many projects to enhance energy efficiency and smarter energy use on campus. Among the "smart projects:" Cooling system upgrades at the heating plant have reduced annual energy bills by \$40,000 and annual water use by 690,000 cubic feet. New on-campus washing machines consume 50 percent less water and 40 percent less electricity. Occupancy sensors, light

emitting diode exit signs and Sleep Mode software for computers are used in all campus buildings. The University's Environmental Council encourages environmental entrepreneurship by offering small grants to support the planning and/or implementation of innovative projects that reduce UVM's ecological footprint.

The **University of New Hampshire** earned the ENERGY STAR® designation for eight of its campus buildings in 2006, including the first residence halls in New England to earn this recognition. The eight buildings together prevent pollution equivalent to annual emissions from 230 vehicles - more than 135,000 gallons of gasoline - while saving UNH more than \$180,000 per year in energy bills.



Clean Transportation at Colleges & Universities

Training College Officials to Reduce their Energy Use

EPA New England staff are training administrators and environmental staff at New England Colleges on the free ENERGY STAR® Portfolio Manager online software package, which allows colleges to benchmark their buildings against other similar buildings. This allows them to achieve an ENERGY STAR® rating or to track energy use over time on a campus. This tool will help colleges make strategic energy efficiency and conservation choices to reduce their energy use. The tool can also be used to calculate the greenhouse gas emissions from energy use on campus, helping officials at campuses that have made climate change commitments.

The **University of Vermont in Burlington** has joined the "yellow bike" craze that's starting to roll out at colleges across the region and country. Under the program, used bikes are fixed up, painted yellow and made available for free for students' use on campus. "Yellow bike" cooperative programs offer an easy alternative to driving. The UVM program stems from a student thesis done for an environmental studies course and was supported with a \$1,000 mini-grant from UVM's Environmental Council. Other schools in New England with "yellow bike" programs include the University of New Hampshire, Hampshire College in Massachusetts and Middlebury College in Vermont.

The **University of Maine, Orono**, the first employer in Maine to join the Best Workplaces for Commuters program, provides its employees with a number of commuter benefits, including free and preferred parking for carpools and vanpools, secure bicycle parking, showers and lockers, and flexible work schedules. The university also encourages employees and students to use the Bangor Area Transportation system with a full bus subsidy for

employees and students. In addition, the school supports a Green Bike Program to promote bicycling, and offers employees a Guaranteed Ride Home in an emergency. Other energy or fuel saving initiatives include the addition of 9 new hybrid vehicles, promoting teleconferencing, improving control of heating and ventilation systems in academic buildings for increased efficiency, and the installation of electric timers to replace light switches and energy efficient light bulbs in over 800 resident rooms.



Clean Energy at Colleges & Universities

The **Community Solar Power Initiative at MIT** installed 25 advanced solar photovoltaic systems on campus and in the community. Supported by a grant from the Massachusetts Technology Collaborative, the project involved local home owners, institutional leaders, and a host of local solar engineers, entrepreneurs, and installers to add more than 74 kilowatts of solar energy capacity to the area. This generated enough electricity to light more than 60 homes with no greenhouse gas emissions or other harmful emissions. The 3 systems on MIT's campus mark an important milestone: the first large-scale renewable power systems inter-connected to MIT's power grid. The project shows that MIT can bring innovative and renewable power to its campus in a way that is practical and reliable.

Colby College in Waterville, ME, no longer relies on fossil fuels for electricity thanks to a contract that has all of the college's electricity coming from renewable energy sources. Half of the college's power is coming from Maine hydropower, the other half from Maine biomass wood waste such as wood chips and sawdust. By eliminating its past reliance on coal for 70 percent of its power, Colby has cut its smog causing nitrogen oxide emissions by 41 percent and acid rain-causing sulfur dioxide emissions by 98 percent.

Connecticut College, a founding member of EPA's Green Power Partnership, recently doubled its support for the generation of green power by buying wind power energy certificates equal to six megawatts, or about 44 percent of the college's annual electric consumption. The effort began when students in the college's Renewable Energy Club won approval to raise student fees to pay the extra costs for the renewable power.

Under a 2-year contract, EAD Environmental, a green power marketer from New York, is supplying the **University of Southern Maine in Portland** with 1.5 million kilowatt-hours of Green-e™ certified renewable energy certificates from wind energy facilities to offset electricity needs of a new campus building.

The **Central Utility Plant at MIT** is hosting an algae colony upon its roof as part of a pollution control technology being developed by an energy firm in Cambridge. This unit uses a fraction of the carbon dioxide being emitted from the power plant's emission stream while also removing polluting nitrogen oxide emissions. As the algae feeds on the CO₂ and other pollutants, it grows and gives off oxygen and nitrogen, producing biomass that can be converted into biofuels, including biodiesel. MIT is considering expanding its collaboration with the energy firm to process the algae on campus into biodiesel for possible use on campus. The installation has proven that this technology is feasible and as a result efforts are underway to build large-scale industrial applications.

The University of New Hampshire is building a 12-mile pipeline to bring methane gas from a local landfill to the Durham campus. The methane will power the cogeneration plant that provides heat and electricity to the UNH campus. The renewable, carbon-neutral landfill gas will replace commercial natural gas as the primary fuel in UNH's cogeneration plant, enabling UNH to receive 80 to 85 percent of its energy from a renewable source. In addition, the methane gas will reduce the university's greenhouse gas emissions an estimated 67 percent below 2005 levels and 57 percent below 1990 levels. The project is expected to begin providing gas to the cogeneration plant by the fall of 2008.



At **Cape Cod Community College**, the Lyndon P. Lorusso Applied Technology Building opened as a “green building” in mid-2006. The \$7 million building with 19,000 square feet conserves energy through alternative energy sources, including passive solar systems, “smart” lighting, cooling and air-quality sensors, and a 27-kilowatt photovoltaic system, day-lighting and light shelves. The Lorusso building serves as both a model green building and as an exemplary environmental education teaching and learning tool for future technology-related facilities on college campuses across the country.



Middlebury College has won praise for its new energy-efficient library

The Lorusso building serves as both a model green building and as an exemplary environmental education teaching and learning tool for future technology-related facilities on college campuses across the country.

Students at **Clark University in Worcester, MA**, donated \$10,320 to the New England Wind Fund. The Commonwealth of

Massachusetts matched these funds twice, once in a donation to the city of Worcester and once to a fund for low income residents of Massachusetts. Clark raised the money by asking students to donate \$30 to offset their energy consumption. Clark’s ‘Choose Renewable Energy’ program is one of numerous Clark student initiatives targeting the environmental impact of the campus. The money raised buys renewable energy credits and supports wind power turbines in the state. With this commitment, Clark joined EPA’s Green Power Partnership, launched by EPA in 2001 to support the transformation of the green power market through the voluntary purchase of clean renewable energy. Since the partnership started, more than 600 organizations have committed to making the switch to green power.

NE and Eastern Canadian Universities Charting New Energy Paths

More than 100 New England college and university presidents and chancellors representing 67,000 students, faculty and staff have agreed to support the goals of the New England Governors’/Eastern Canadian Premiers’ Regional Climate Action Plan. Many set greenhouse gas reduction goals for their campuses, and all of them are taking on a wide range of energy efficiency, renewable and clean energy and smart transportation projects that help control rising electricity and fuel costs and reduce air pollution. A new professional development network of college and university professionals who are working to “green” campuses across New England has formed the Northeast Campus Sustainability Consortium. These “sustainability coordinators” work to make their campuses sustainable through energy related projects such as projects to reduce energy use, projects using renewable and clean energy systems, environmentally-responsible construction practices, buying green power and energy efficient products, buying more energy efficient and alternatively-fueled vehicles, and programs to reduce vehicle traffic. Green campus coordinators networks also have been formed for regions, including Connecticut, Maine, Boston and western Massachusetts.

Contacts & Resources



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Web links to EPA's Energy Programs

ENERGY STAR[®]

www.energystar.gov/

Green Power Partnership

www.epa.gov/greenpower/

Combined Heat and Power Partnership

www.epa.gov/chp/

Best Workplaces for Commuters

www.bestworkplaces.org

SmartWaySM Transport Partnership

www.epa.gov/smartway/

Climate Leaders

www.epa.gov/climateleaders/

Climate

www.epa.gov/oar/globalwarming.nsf

Web links to EPA New England Energy Programs

Energy & New England's Environment

www.epa.gov/ne/eco/energy/index.html

EPA NE's 'Green' Regional Laboratory

www.epa.gov/ne/lab/greenbuilding/index.html

Related Links

Northeast Energy Efficiency Partnerships

www.neep.org/

Web links to New England State Energy Programs

Connecticut

www.ctclimatechange.com

Maine

www.maine.gov/dep/air/globalwarming/index.htm

Massachusetts

www.mass.gov/ocd/climate.html

New Hampshire

www.des.state.nh.us/ard/climatechange/index.html

Rhode Island

www.dem.ri.gov/climate/

Vermont

www.anr.state.vt.us/air/Planning/htm/climatechange.htm