



# REDUCING GREENHOUSE GAS EMISSIONS: MUNICIPAL SOLUTIONS

## FACT SHEET #5: ENERGY EFFICIENCY



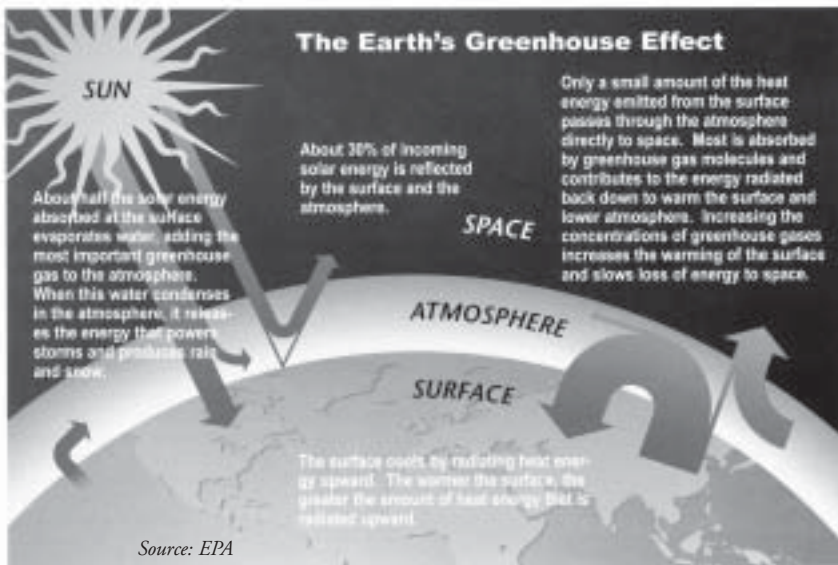
### What is Climate Change?

Our global climate is always changing, but now the rate of change is accelerating much faster than ever before. The Earth's average temperature has increased by 1°F over the past 100 years. Although the change seems small, it has happened very quickly—a mere speck on the Earth's long lifetime. Rapid climate change can have major impacts on many aspects of the environment, such as water quality, agriculture, coastal erosion, and sea level.

Temperature changes naturally as a result of the Earth's CO<sub>2</sub> (carbon dioxide) cycle. Animals and other living things release CO<sub>2</sub> into the air, while other organisms, such as plankton, absorb CO<sub>2</sub> through the ocean. For millions of years, carbon dioxide and the other greenhouse gases (such as methane) were balanced by the Earth's

### What We Can Do: Energy Efficiency

There are many ways to deal with the challenge of climate change. Some programs work to reduce carbon emissions, while others help communities adapt to environmental changes. The Waquoit Bay National Estuarine Research Reserve has identified several priority measures that communities can implement in order to lower the amount of carbon emissions they produce. This fact sheet focuses on energy efficiency in buildings.



Energy Star® ENERGY STAR® is a voluntary partnership between business and government, with the purpose of implementing energy-efficient practices today to protect our environment for the future. Just last year, ENERGY STAR® helped businesses and consumers to save more than \$5 billion in energy costs, while reducing greenhouse gas emissions an amount equivalent to that of 10 million cars.



delicate atmosphere. Since the Industrial Age, human activities, such as fossil fuel burning and de-forestation, have disturbed this balance. CO<sub>2</sub> emissions are now so high that they cannot be completely absorbed naturally. As a result, CO<sub>2</sub> is building up in the atmosphere and the Earth is warming (see figure above).

Evidence of climate change is all around us. Severe weather is becoming more common. Not only is the Earth's temperature rising, but the world's oceans are also rising. Signs of high sea levels and beach erosion become more obvious every year. These environmental impacts will become more serious as CO<sub>2</sub> continues to build up.

An ENERGY STAR® label clearly indicates that a product or building is more energy efficient. ENERGY STAR® consumer products include light bulbs, heating and cooling systems, household appliances such as dryers and refrigerators, and electronics such as computers and televisions. ENERGY STAR®-labeled buildings have proven to be 40% more efficient than conventional buildings, and cost \$0.86 less per square foot to operate.

### Example: Green Schools

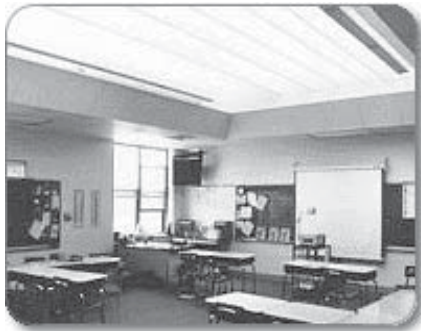
Schools in the U.S. spend more than \$6 billion each year on energy, which exceeds the cost of computers and books combined, and is second only to salary expenses. In a typical school, one-third of consumed energy is wasted, due largely to old and poorly functioning equipment.

A green school uses energy more efficiently through building retrofits, changes in operational and maintenance routines, and changes in behavior of building users. New green buildings with cost-effective energy performance improvements can reduce energy bills by 25 to 30 percent on average, which would save \$1.5 billion each year in the U.S.—enough to hire 30,000 new teachers or to buy 40 million books annually.

While these case studies focus on schools, similar programs (and savings) can be applied to other municipal buildings, such as town halls and recreation centers.

### Case Study: Williamstown, MA

The Massachusetts Technology Collaborative has established a Green Schools Program that supports the design of more energy efficient schools, which will help the state lessen its use of CO<sub>2</sub>-emitting fossil fuels. The Massachusetts Green Schools Program is a \$13.5 million project that promotes the design and construction of green school buildings.



*Natural daylighting and renewable energy technologies are just some of the ways schools can reduce their energy use. Photos courtesy of U.S. Department of Energy*



The Williamstown Public School system is one of seven recently chosen districts that received a state grant towards building a new, green elementary school. The new school has plans for a 10-kilowatt solar energy system, a sun-utilizing greenhouse, and a building design that will maximize daylighting. Even the placement of the building on the site was done in a manner to take advantage of the sunlight. The solar panel system will take up only four percent of the school's roof, but it may generate significant amounts of electricity and reduce energy costs.

### Case Study: Dennis-Yarmouth Regional School District, MA

New buildings and equipment replacements are one way to reduce energy consumption. But simple no-cost behavior modifications can also yield tremendous savings. The Dennis-Yarmouth Regional School District, in consultation with the private consulting firm Energy Education Inc., prepared a plan to reduce energy use in their eight schools. Through techniques such as ensuring all lights and computers are off at the end of the day, lowering thermostats at night, and changing cleaning staff routines, the school district saved \$146,000 during the first year of the program. This savings represents a 22% reduction from the previous year's utility bill.

### Sources:

Waquoit Bay National Estuarine Research Reserve, "Global Climate Change: What Communities Can Expect and What They Can Do", Science and Policy Bulletin Number 7, July 2001.

Energy Star - <http://www.energystar.gov>

Massachusetts Renewable Energy Trust - [http://www.masstech.org/massrenew/newsclips/02\\_21\\_02williams.htm](http://www.masstech.org/massrenew/newsclips/02_21_02williams.htm)